natural eco capital

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February 20, 2026

The Honorable Minister,
Federal Ministry of Environment
Mabushi, Abuja

Your Excellency

SUBMISSION OF THE DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) REPORT FOR THE 7TH AXIAL ROAD PROJECT- LOT 2

It is with great respect and a deep sense of national duty that we formally submit the **Draft Environmental and Social Impact Assessment (ESIA)** for the **7th Axial Road (Lekki Deep Sea Port Access Road)** for your esteemed review and further necessary action.

This transformative project stands as a testament to the Federal Government's unwavering commitment to strengthening national infrastructure, enhancing economic competitiveness, and improving citizens' quality of life. The 7th Axial Road is a flagship corridor that will unlock the full potential of the Lekki Deep Sea Port, the Dangote Refinery, the Lekki Free Trade Zone, and the wider Lagos–Ogun–Southwest economic region. Its implementation will significantly ease congestion, reduce travel time, enhance logistics efficiency, and catalyse industrial and commercial growth.

The ESIA report submitted herewith provides a comprehensive assessment of environmental, social, and climate-related considerations, ensuring full alignment with national regulatory requirements and international best practices. The assessment incorporates a robust climate-resilience framework to safeguard the project against future climate risks and to support Nigeria's commitments under the Nationally Determined Contributions (NDCs).

Given the **strategic national importance** of this project and its central role in advancing the Federal Government's development priorities, we respectfully request the **accelerated review and processing** of this ESIA. Timely clearance will enable the commencement of critical works and ensure that the benefits of this infrastructure reach Nigerians without delay.

We remain grateful for the Ministry's leadership in promoting sustainable development and environmental stewardship nationwide. Please be assured of our full cooperation and readiness to provide any additional information or clarification required during the review process.

We respectfully look forward to your favourable consideration.
Thank you, Your Excellency.
Yours faithfully,

EUGENE ITUA, PhD
CEO, Natural Eco Capital

CC: *The Permanent Secretary, Federal Ministry of Environment & Director, Environmental Assessment Department*

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

For

7TH AXIAL ROAD (LEKKI PORT ACCESS ROAD)

LOT 2 (CH 8+700-CH 24+932)

Draft Report

Submitted To

Federal Ministry of Environment

by

Federal Ministry of Works

JANUARY 2026

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

For

7TH AXIAL ROAD (LEKKI PORT ACCESS ROAD)

LOT 2 (CH 8+700-CH 24+932)

Draft Report

Contractor

China Harbour Engineering Company Ltd (CHEC)

Prepared by

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Mercados Aries International S.A. (MAISA), Spain

DECLARATION OF THE PROPONENT

The Federal Ministry of Works hereby declares that this Environmental and Social Impact Assessment (ESIA) for the 7th Axial Road (Lot 2) has been prepared in accordance with the EIA Act No. 86 of 1992 and the FMEnv 2021 Procedures. We commit to implementing the Environmental and Social Management Plan (ESMP) as detailed in Chapter 7 of this report.

Disclaimer

This report is a draft for review and consultation purposes. The findings, conclusions, and recommendations are subject to revision based on regulatory and stakeholder feedback. The proponent and consultants assume no liability for decisions made prior to final approval by the Federal Ministry of Environment.

Document Control

Version	Date	Prepared by	Reviewed by	Approved by
Draft 1.0	Jan 2026	Natural Eco Capital & MAI	CHEC, FMEnv, FMW	FMEnv (Pending)

LIST OF ABBREVIATIONS AND ACRONYMS

%	Per Cent
°C	Degree Centigrade (Also known as Degree Celsius)
µg/m³	Microgram Per Cubic Metre
ADT	Average Daily Traffic
AEC	Advanced Engineering Company
AEWA	African-Eurasian Waterbird Agreement
AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
ALARP	As Low As Reasonably Practicable
Am	Tropical Monsoon (Koppen Classification)
AoI	Area of Influence
APHA	American Public Health Association
AQG	Air Quality Guidelines
As	Arsenic
ASL	Above Sea Level
BANTEC	Best Available Techniques Not Entailing Excessive Costs
BAP	Biodiversity Action Plan
BH	Boreholes
BOP	Biodiversity Offset Plan
BR	Biodiversity Rehabilitation
BRI	Belt and Road Initiative
C&D	Construction and Demolition
CAGR	Compound Annual Growth Rate
CBD	Convention on Biological Diversity
Cd	Cadmium
CDA	Community Development Association
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
cells/mL	Cells Per Millilitre
CFU/g	Colony-Forming Unit/Gram
CH	Chainage

CHA	Critical Habitat Assessment
CHEC	China Harbour Engineering Company Ltd
CIA	Cumulative Impact Assessment
CITES	Convention on International Trade in Endangered Species
CLMP	Contractor Labour Management Plan
CMIP6	Coupled Model Intercomparison Project Phase 6
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
COPE	Care of the People
CP	Condition Precedent
CPT	Cone Penetration Tests
Cr	Chromium
CR	Critically Endangered
CRCP	Continuously Reinforced Concrete Pavement
CRM	Certified Reference Materials
CRP	Climate Resilience Plan
Cu	Copper
dB(A)	A-weighted decibels
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DRP	Decommissioning and Restoration Plan
e	Level of Precision (In Population Estimate)
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EC	Electrical Conductivity
EHS	Environmental Health and Safety
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment

ELEFAN I	Electronic Length Frequency Analysis
EN	Endangered
EO	Environmental Officer
EP IV	Equator Principles IV
Eq	Equation
ERP	Emergency Response Plan
ESF	Environmental and Social Framework
ESG	Environmental Social and Governance
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ETC	Electronic Toll Collection
FAO	Food and Agriculture Organisation of the United Nations
Fe	Iron (Fe
FGD	Focus Group Discussion
FiSAT II	FAO-ICLARM Stock Assessment Tools
FMEnv	Federal Ministry of Environment
FMMBE	Federal Ministry of Marine and Blue Economy
FMW	Federal Ministry of Works
FPIC	Free, Prior and Informed Consent
FRC	Full Replacement Cost
FRSC	Federal Road Safety Corps
FX	Foreign Exchange
GBIF	Global Biodiversity Information Facility
GBV	Gender-Based Violence
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GIS	Geographic Information System
GPS	Global Positioning System
GRI	Global Reporting Initiative
GRM	Grievance Redress Mechanism

HCB	Hexachlorobenzene
HCHO	Formaldehyde
HDV	Heavy-Duty Vehicle
HGSFHP	Home Grown School Feeding & Health Programme
HGVs	Heavy Goods Vehicles
HNO_3	Nitric Acid
IBAT	Integrated Biodiversity Assessment Tool
IDF	Intensity-Duration-Frequency
IESM	Independent Environmental & Social Monitor
IFC	International Finance Corporation
ILO	International Labour Organisation
ISO	International Organisation for Standardisation
ISS	Integrated Safeguards System
IUCN	International Union for Conservation of Nature
K	Growth Coefficient of Fish
KII	Key Informant Interviews
L_∞	Asymptotic Length of Fish
L'	Length of Fish
L_t	Length of Fish at Time t (In Fish Population Dynamics Studies)
$\bar{L}$	Mean Length of Fish
LASEPA	Lagos State Environmental Protection Agency
LASG	Lagos State Government
LASUSTECH	Lagos State University of Science and Technology
LAWMA	Lagos State Waste Management Authority
LCCH	Lagos-Calabar Coastal Highway
LCDA	Local Council Development Area
LCEC	Lekki Corridor Environmental Committee
LEK	Local Ecological Knowledge
LFTZ	Lekki Free Trade Zone
LOS	Level of Service
LRP	Livelihood Restoration Plan

LTIFR	Lost Time Injury Frequency Rate
LT-LEDS	Long-Term Low Emission Development Strategy
M	Natural Mortality Rate
M&E	Monitoring and Evaluation
M/S	Metre Per Second
MDBs	Multilateral Development Banks
MDLs	Method Detection Limits
mE	Metres East (Cartesian Coordinates)
Mg/Kg	Milligram Per Kilogramme
Mg/L	Milligram Per Litre
Mn	Manganese
mN	Metres North (Cartesian Coordinates)
MRLs	Maximum Residue Limits
MRV	Monitoring, Reporting, and Verification
N	Estimated Population Size (In Population Estimate)
n	Sample Size (In Population Estimate)
NASSCO	National Social Safety-Nets Coordinating Office
NBSAP	National Biodiversity Strategy and Action Plan
NCCP	National Climate Change Policy
NCTP	National Cash Transfer Programme
NDC	Nationally Determined Contribution
NEC	Natural Eco Capital
NESREA	National Environmental Standards and Regulations Enforcement Agency
NGO	Non-Governmental Organisation
Ni	Nickel
NITT	Nigerian Institute of Transport Technology.
NO_x	Nitrogen Oxides
NRC	Nigeria Railway Corporation
NSPP	National Social Protection Policy
NTFPs	Non-Timber Forest Products

OCPs	Organochlorine Pesticides
OHS	Occupational Health and Safety
OPPs	Organophosphorus Pesticides
PAC	Projected Affected Communities
PAPs	Project Affected Persons
Pb	Lead
pH	Potential for Hydrogen
PM	Particulate Matter
PPE	Personal Protection Equipment
PPM	Parts Per Million
PRA	Participatory Rural Appraisal
PRC	People's Republic of China
PS	Performance Standard
QA/QC	Quality Assurance/Quality Control
QoL	Quality of Life
RAP	Resettlement Action Plan
RCP	Representative Concentration Pathway
RH	Relative Humidity
ROW	Right-of-Way
RSA	Relative Species Abundance
SDGs	Sustainable \development Goals
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
SOP	Standard Operating Procedures
SPRP	Spill Prevention & Response Plan
SSI	Semi-Structured Interview
SURE-P	Subsidy Reinvestment and Empowerment Programme
T	Mean Annual Temperature (In Fish Population Dynamics Studies)
T	Temperature
t_0	Age of Fish at Length Zero
TCFD	Task Force on Climate-related Financial Disclosures

TEU/Year	Twenty-Foot Equivalent Units Per Year
TMP	Transport Management Plan
TNFD	Taskforce on Nature-related Financial Disclosures
TP	Test Pits
TPH	Total Petroleum Hydrocarbons
UDHR	Universal Declaration of Human Rights
UN	United Nations
UNGPs	UN Guiding Principles on Business and Human Rights
VBGF	Von Bertalanffy Growth Function
VES	Visual Encounter Surveys
VOC	Volatile Organic Compounds
VPA	Virtual Population Analysis
WHO	World Health Organisation
WMP	Waste Management Plan
Z	Total Mortality Coefficient
Zn	Zinc
ZoI	Zone of Influence
α-HCH	Alpha-Hexachlorocyclohexane
β-HCH	Beta-Hexachlorocyclohexane
δ-HCH	Delta-Hexachlorocyclohexane

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EXECUTIVE SUMMARY

ES1.1 Introduction

The Environmental and Social Impact Assessment (ESIA) covers Lot 2 of the proposed 7th Axial Road, a 24.9 km Class A dual-carriageway expressway in Lagos.. Lot 2 is 16.232 km in length and forms the northern continuation of Lot 1 (8.7 km), extending the 7th Axial Road from the Lekki Lagoon crossing (CH 8+700) to Epe Township (CH 24+932). Together, the two lots form a 24.9 km Class, Nigeria's primary evacuation and logistics corridor for the Lekki Industrial Zone on the Lekki Peninsula. The project responds to severe mobility and logistics constraints caused by rapid industrial expansion that has outpaced existing infrastructure.

The ESIA identifies, assesses, and proposes management measures for the environmental and social risks and impacts associated with the project's lifecycle, ensuring compliance with Nigerian regulations and international standards, including the International Finance Corporation Performance Standards (IFC PSs) and the Equator Principles IV (EP4).

ES1.2 National Context

The 7th Axial Road is the primary evacuation corridor for Nigeria's Lekki Peninsula industrial hub, connecting the Lekki Deep Sea Port, Dangote Refinery, Lekki Free Trade Zone, and the planned Lekki International Airport to the national highway network via Epe. Lot 2 (CH 8+700 to CH 24+932) completes this linkage, supporting Nigeria's industrialisation agenda, AfCFTA integration, and climate-resilient infrastructure priorities under NDC 3.0 and LT-LEDS.

ES1.3 Geographic Context

The project is located in Ibeju-Lekki and Epe Local Government Areas of Lagos State, passing through peri-urban settlements, agricultural lands, and ecologically sensitive zones. Key settlements along the corridor include Odo-Noforija, Epe, Igando-Oloja, Akodo, and Siriwon.

ES1.4 Project Delivery and Key Entities

Lot 2 is awarded under Contract No 8864 to China Harbour Engineering Construction (Nig) Ltd (CHEC), with Advanced Engineering Company (AEC) serving as supervising consultant, the project is overseen by the Engineer's Representative, Engr. Oyeneye Damola K. The oversight of the project is provided by the Federal Ministry of Works (FMW) and the Lagos State Government (LASG), with Natural Eco Capital (NEC) and MAISA, with providing independent environmental and social consultancy services.

ES 1.5 Rationale and Assessment Focus (Lot 2)

Lot 2 is the critical link transitioning the 7th Axial Road into a regional transport artery, providing the Lekki industrial zone with an inland evacuation route to Epe and the national network. Unlike Lot 1's industrial focus, the Lot 2 ESIA addresses impacts to a new set of inland receptors, including peri-urban communities, agricultural livelihoods, and sensitive freshwater ecosystems, ensuring full compliance with IFC PS5, PS6, and PS8 regarding land acquisition and ecological continuity.

ES1.6 Policy, Legal, and Institutional Framework

The ESIA adopts a harmonised dual-compliance framework integrating Nigerian statutory requirements with international safeguard standards and lender Environmental, Social and Governance (ESG) frameworks.

At the national level, the assessment is guided primarily by the Environmental Impact Assessment Act (CAP E12 LFN 2004), the Land Use Act, the Climate Change Act (2021), and applicable NESREA regulations. State-level compliance is governed by Lagos State environmental protection, planning, and waste management legislation.

Internationally, the ESIA aligns with the IFC Performance Standards (PS1-PS6, PS8), World Bank Group Environmental, Health and Safety (EHS) Guidelines, and Equator Principles IV. Where multiple frameworks apply, the project adopts the most stringent requirement.

Chinese environmental and social safeguard obligations applicable to CHEC are incorporated to ensure full alignment with both domestic and international compliance expectations.

ES1.6.1 Voluntary Standards and Global Benchmarks

Beyond statutory compliance, the ESIA integrates voluntary global benchmarks, including ISO management systems, GHG accounting frameworks, biodiversity disclosure mechanisms, and international sustainability reporting standards, across nine Universal Safeguards covering environmental assessment, biodiversity, community health and safety, land acquisition, cultural heritage, labour, pollution prevention, climate risk, and grievance mechanisms. This layered compliance architecture ensures Lot 2 is legally defensible under Nigerian law, aligned with international lender safeguard policies, and positioned as a globally credible and bankable infrastructure asset.

ES1.6.2 Contractor's Environmental & Social Management System (ESMS) and Oversight

CHEC is contractually obligated to implement a project-specific ESMS integrating Nigerian legal requirements, IFC Performance Standards, Equator Principles IV, PRC MOFCOM guidelines for overseas environmental compliance, ISO 14001, and ISO 45001. Monthly ESMS performance reports are subject to tripartite verification by the Supervising Consultant (AEC), the Independent Environmental and Social Monitor (NEC/MAISA), and the Lenders' appointed E&S Advisor, forming the basis for regulatory submissions to FMEnv and LASEPA. Unannounced site audits may be conducted by the Independent Monitor or Lenders' representatives to ensure system integrity.

ES1.7 Structure of the Report

The Lot 2 ESIA follows Nigeria’s statutory EIA structure while incorporating expanded content to meet international lender due diligence requirements. The report is organised into nine chapters covering project justification and alternatives, project description, environmental and social baseline conditions, impact assessment, mitigation measures, the Environmental and Social Management Plan, decommissioning and restoration planning, and final conclusions and recommendations.

ES2 Project Justification and Alternatives

ES2.1 Project Justification

Lot 2 is an essential extension of the 7th Axial Road corridor. Without it, the corridor would be functionally incomplete, the economic viability of Lot 1 would be undermined, and heavy freight traffic would continue to be routed through congested peri-urban roads, with adverse safety and environmental consequences.

ES2.2 Alignment with National and State Policies

The project is aligned with Nigeria's National Development Plan (2021-2025), the Ibeju-Lekki Model City Plan (2024-2044), and Nigeria's Nationally Determined Contribution (NDC 3.0) and Long-Term Low Emissions Development Strategy (LT-LEDS 2060), which emphasise climate-resilient transport systems and logistics efficiency.

ES2.3 Alternatives Analysis

The alternative analysis for Lot 2 considered social impacts, environmental sensitivities, engineering feasibility and climate resilience to arrive at preferred project options, consistent with the IFC PS1 mitigation hierarchy.

ES2.3.1 Project Options

The No Project option was rejected as it would leave the 7th Axial Road corridor incomplete, increase congestion, raise safety risks from heavy vehicles diverting through residential areas (IFC PS4), and strand the economic benefits of Lot 1.

2.3.2 Project Alternatives

Two primary alignment options were evaluated. The Eastern Alignment was considered but rejected due to a longer route, higher earthwork volumes and cost, and greater biodiversity sensitivity in freshwater wetland areas.

- The Western Alignment was selected as it minimises social disruption, avoids dense settlements and sensitive wetland clusters, achieves optimal regional connectivity, and is fully consistent with the Ibeju-Lekki Model City Plan, addressing both IFC PS5 and PS6 obligations.

Design alternatives were also evaluated across three dimensions.

1. For pavement, Continuously Reinforced Concrete Pavement (CRCP) was selected over asphalt based on a design life exceeding 30 years, superior resistance to heavy freight axle loads, and lower lifecycle greenhouse gas (GHG) emissions (IFC PS3).
2. For drainage, a climate-resilient design standard, culverts sized for 1-in-100-year events with an additional 20% climate change allowance, was adopted over the conventional historical-rainfall approach, consistent with the Climate Change Act (2021) and IFC PS1 climate risk requirements.
3. For intersections, grade-separated interchanges were selected over at-grade junctions at critical junctions, including the Epe-Ijebu Road, to ensure long-term safety and operational efficiency.

ES3 Project and Process Description

ES3.1 Engineering Design

Lot 2 is engineered as a Class A Expressway with a design speed of 100 km/h, optimised for heavy-duty freight movement, passenger travel, and long-term operational resilience.

Key technical parameters include a 16.232 km dual carriageway with four lanes (two per direction), a 24.6 m subgrade width, 3.65 m lane widths, and 2.75 m paved shoulders. The pavement structure comprises a 280 mm C40 CRCP slab on a 150 mm lean concrete base and 200 mm granular sub-base.

Twelve reinforced concrete box culverts are sized for 1-in-100-year storm events with a uniform 20% climate change allowance. Two grade-separated interchanges, two flyovers, and two drainage bridges provide structural continuity. Deep foundations using bored piles (1.2-1.5 m diameter) are specified in sections underlain by weak or saturated soils. Finally, consistent with expressway safety requirements and IFC PS5, the geometric design balances operational performance, land take, and constructability through a minimum horizontal curve radius of 437 m, maximum vertical gradient of 4%, superelevation of up to 6% on curves, and a minimum stopping sight distance of 185 m.

ES3.2 Traffic Demand and Design Capacity

The Lot 2 corridor currently supports an average daily traffic (ADT) of 8,500-12,000 vehicles of mixed composition, including cars, buses, tricycles, and heavy-duty vehicles (HDVs). HDVs currently constitute 15% of traffic flow related to the movement of port/refinery vehicles. In the absence of the project, traffic along the corridor is projected to reach 18,000-22,000 ADT by 2030 based on a 4.0% compound annual growth rate (CAGR). HDV share is expected to increase significantly following full operationalisation of the Lekki Port and Dangote Refinery, requiring strict axle load enforcement (IFC PS4).

ES3.3 Integration with Lot 1 and Regional Networks

Lot 2 is physically and functionally continuous with Lot 1, with key integration points including the northern terminus at Epe connecting to the Epe-Ijebu Road and onward to Ogun State and the Lagos-Ibadan Expressway, the Lagos-Calabar Coastal Highway linkage via the Lot 1 interchange at KM 47+474, and coordination with Dangote Refinery and NNPC pipeline corridors. Integration also ensures harmonised ESMP implementation, monitoring indicators, and reporting obligations across the full corridor.

ES3.4 Project Phases and Activities

The project is executed in four phases:

- The preconstruction phase (Months 1-3) includes the development of a Resettlement Action Plan (RAP) census and compensation, site clearance, mobilisation, utility mapping and relocation, and implementation of initial environmental and social controls.
- The construction phase (Months 4-18) covers earthworks (~1.2 million m³ earth movement), pavement construction, drainage installation, structure erection, and road furniture installation.
- The operational phase commences with commissioning and encompasses routine maintenance, traffic management, environmental monitoring, and ongoing community engagement.

- The decommissioning phase (>40 years) is addressed through a dedicated Decommissioning and Restoration Plan consistent with IFC PS1, PS3, PS4, and PS5.

ES3.5 Framework for Environmental and Social Management Integration

The Lot 2 engineering design integrates environmental and social safeguard requirements from the outset, ensuring that mitigation measures are embedded in design specifications rather than applied retrospectively. Design decisions, including alignment selection, drainage standards, geometric parameters, and structural specifications, directly reflect ESMP obligations covering pollution prevention, biodiversity protection, community health and safety, labour rights, and stakeholder engagement. Contractor-level ESMPs (C-ESMPs) are required before mobilisation, subject to approval by the Engineer's Representative and NEC/MAISA, ensuring design intent is carried through to construction practice.

ES4 Description of the Baseline Environment

ES4.1 Study Approach

Baseline conditions were characterised through field surveys conducted on 20-21 November 2025 (dry season), with follow-up socioeconomic surveys on 22 November and 5 December 2025. The study integrated primary field data with validated secondary data from the approved Lot 1 and Lagos-Calabar Coastal Highway Section 2 ESIAs, ensuring corridor-wide consistency. All laboratory analyses were conducted by ISO/IEC 17025-accredited laboratories, consistent with IFC PS1 data adequacy requirements.

ES4.1.1 Area of Influence

The Area of Influence encompasses 15 affected communities, with spatial parameters defined by receptor type: 500 m either side of the centreline for soils and biodiversity, and 1 km upstream and downstream of the three aquatic crossings (CH 15, 16, and 17) for hydrology and hydrobiological assessment. The AoI also captures induced development zones and worker-community interaction areas, consistent with IFC PS1, PS4, PS5, and PS6.

ES4.2 Baseline Data Acquisition

Field studies were conducted on 20-21 November 2025 (dry season). Sampling was conducted at the following geo-referenced locations (WGS84, Garmin Map62, ±3 m accuracy):

- Epe Town (6.5901°N, 3.9814°E): air quality, noise
- CH 15 (6.5664°N, 4.0061°E): groundwater, surface water, sediment
- CH 16 (6.5741°N, 4.0108°E): groundwater, surface water, sediment
- CH 17 (6.5824°N, 4.0143°E): air quality, noise, groundwater, surface water, sediment
- CH 20 (6.6094°N, 4.0138°E): air quality, noise, soil, biodiversity
- CH 22 (6.6269°N, 4.0101°E): air quality, noise, soil, biodiversity
- CH 24 (6.6395°N, 3.9877°E): air quality, noise, soil, biodiversity

Sample counts across the seven biophysical media were: air quality (5 locations), noise (5 locations), groundwater (3 samples), surface water (3 samples), sediment (3 samples), soil (6 samples at 3 locations × 2 depths), and hydrobiology comprising phytoplankton and benthic macroinvertebrates (3 samples each). Socioeconomic data were collected through 80 household questionnaires and 23 stakeholder interviews.

ES4.2.1 Field and Laboratory Equipment

The following instruments were deployed during field surveys:

- **Garmin Map62 GPS (±3 m accuracy, WGS84):** Spatial referencing of all sampling locations.
- **Kestrel 5000 Series Weather Meter:** Temperature and relative humidity measurement
- **Aeroqual Series 500 Air Quality Monitor:** In-situ measurement of particulate matter (PM) $PM_{2.5}$, PM_{10}, nitrogen oxides (NOx, CO_2), volatile organic compounds (VOCs), and formaldehyde (HCHO).
- **Extech 407730 Sound Level Meter (±2 dB, A-weighting, Slow response):** Ambient noise monitoring at 1.5 m height.
- **Calibrated multi-parameter water quality meter:** In-situ pH, electrical conductivity, and dissolved oxygen (DO) in surface water and groundwater
- **Soil auger:** Soil sampling at 0-15 cm and 15-30 cm depth intervals
- **Heckman sediment grab (25 kg):** Benthic sediment and macroinvertebrate collection
- **Standard plankton net (20-55 µm mesh):** phytoplankton collection via horizontal tows and vertical hauls
- 50-metre measuring tape: Biodiversity plot demarcation
- **Digital camera:** Photographic documentation of flora, fauna, and habitat conditions
- **Top-loading Mettler balance:** fish biometric weight measurement

Laboratory analyses were conducted at Environmental Laboratory Services Ltd, Lagos (FMEnv-accredited), using Atomic Absorption Spectroscopy (AAS) for heavy metals, Standard Methods for the Examination of Water and Wastewater (APHA, 23rd Edition, 2017) for water quality parameters, and the Utermöhl sedimentation method with inverted light microscopy (×100-×400) for phytoplankton enumeration.

ES4.3 Physical Environment

ES4.3.1 Climate and Meteorology

The corridor lies within a tropical monsoon climate (Am) with mean annual rainfall of 2,200-2,500 mm and bimodal peaks in June-July and September-October. Temperature ranges from 28.6°C to 35.3°C and relative humidity (RH) from 67.5% to 90% during the November 2025 survey. Dominant winds are southerly to south-westerly at 2.5-10.5 m/s with a mean of 5.6m/s.

ES4.3.2 Air Quality and Noise

Baseline air quality monitoring was conducted at five representative stations. Results indicate that fine particulate matter ($PM_{2.5}$) exceeded the WHO 24-hour guideline (15 µg/m³) at all monitored locations, with concentrations ranging between approximately 22.5 µg/m³ and 39.3 µg/m³. PM_{10} levels were largely within WHO limits (45 µg/m³), with one marginal exceedance at CH 17. VOCs, HCHO, and CO_2 were within applicable national limits, while NOx were uniform across monitoring stations and are considered likely influenced by instrumentation constraints. The findings indicate pre-existing particulate stress within parts of the corridor, likely linked to traffic emissions, biomass burning, and unpaved surfaces.

Daytime noise levels (52.85-74.5 dB(A)) exceeded the NESREA residential standard of 50 dB(A) at all five locations and the WHO road traffic guideline of 53 dB(A) at four of five locations. Epe Town recorded the highest level (74.5 dB(A)), reflecting traffic density and commercial activity. These pre-existing exceedances elevate receptor sensitivity for impact assessment purposes.

E4.3.3 Land Use and Physical Features

The Lot 2 corridor encompasses a diverse mosaic of natural, agricultural, and built land uses across predominantly low-lying terrain (0-15 m ASL). Secondary forests, freshwater wetlands, and riparian vegetation characterise the more natural sections, particularly near aquatic crossings. Smallholder farming and fallow fields reflect the peri-urban and rural character of the region, whilst settlement density intensifies around Epe Town.

Land use mapping within the AoI identified three principal receptor categories: residential and mixed-use communities at Epe Town and Noforija/Eredo; peri-urban transition zones along the Eredo axis.

ES4.3.4 Geology, Geotechnical, and Soil Conditions

Coastal Plain Sands of the Dahomey Basin, underlain by unconsolidated sedimentary materials including sands, silts, clays, and organic lagoonal deposits. Subsurface data indicate an upper silty clay layer of 6.0-16.5 m depth overlying coarse sand. Soils are predominantly sandy loams with acidic pH (5.2-5.8) and low contamination burden, whilst slopes exceeding 5% present a moderate erosion risk.

ES4.3.5 Hydrology, Surface Water and Groundwater Quality

The alignment falls within the Lekki Lagoon hydrological system, with surface water connectivity across freshwater wetlands and tidal influences in some sections.

Surface water exhibited near-neutral to slightly alkaline pH (7.1-7.3), dissolved oxygen of 6.8-7.69 mg/L, and elevated total iron (up to 1.2 mg/L). Low coliform counts were recorded, and E. coli was not detected. Heavy metals were below detection at all locations.

Groundwater tables are shallow, ranging from 1.6 to 3.2 m below ground level. Extreme acidity (pH 2.1), very high total dissolved solids (1,515 mg/L), and elevated chloride (222.7 mg/L) were recorded at CH 17, indicating localised groundwater contamination or naturally acidic conditions. Groundwater at CH 15 and CH 16 showed acceptable parameters (pH 7.4). Heavy metals were below detection in all groundwater samples.

ES4.3.8 Sediment Quality

Sediment samples were predominantly greyish and semi-solid with high moisture content (71.4-90.6%). pH ranged from slightly acidic to near-neutral (5.6-6.4). Elevated ammoniacal nitrogen (357.8-1,811.7 mg/kg) and moderate phosphates were recorded, reflecting organic matter accumulation typical of lagoonal depositional environments. Total iron was notably high at CH 16 (21,166.9 mg/kg as Fe_2O_3). Zinc (Zn), copper (Cu), chromium (Cr), and lead (Pb) were within ranges typical of coastal plain sediments with minimal industrial influence.

ES4.4 Biological Environment

ES4.4.1 Habitat Types

The corridor supports a mosaic of modified terrestrial habitat (60%), comprising croplands, fallow plots, and secondary regrowth; freshwater wetlands and riparian habitat (25%), hydrologically connected to the Lekki Lagoon system; and built and settled areas (approximately 15%). Riparian buffers and wetland fringes maintain ecological connectivity across otherwise fragmented landscapes, with wetlands covering approximately 41.8% of land within certain sections of the AoI.

ES4.4.2 Flora Inventory

A total of 24 plant species from 15 families were recorded across three vegetation plots (50 m × 20 m each). Vegetation is dominated by shrubs, herbs, sedges, and grasses characteristic of secondary successional and disturbed wetland habitats. The most abundant species were *Alchornea cordifolia*, *Raphia taedigera*, and *Cyperus ligularis*, collectively representing approximately 80% of vegetation cover. Herbs constituted 45.8% of recorded species, followed by shrubs (25.0%), grasses (16.7%), sedges (8.3%), and woody herbs (4.2%). True mangrove species were absent from the project footprint. The invasive species *Chromolaena odorata* was recorded at low abundance (1.25%), restricted to peripheral disturbed microsites, warranting periodic monitoring to prevent spread.

ES4.4.3 Fauna Inventory

Faunal surveys recorded 12 small mammal species, 9 reptile species, including Nile crocodile juveniles and monitor lizards, amphibians, and 46 avifauna typical of peri-urban and agricultural landscapes. No Critically Endangered or Endangered species were recorded. Species presence declined in areas of intense human activity. Wetland habitats near the water crossings (CH 15-17) provide refuge for waterbirds and amphibians, requiring avoidance and minimisation measures during construction.

ES4.4.4 Critical Habitat Assessment

IFC PS6 Critical Habitat screening classified the corridor as Modified Habitat, with Critical Habitat designation evaluated as Not Applicable across all five criteria. No critically endangered or endangered species were recorded, and all species present have geographic ranges exceeding 500,000 km^2. No globally significant concentrations of migratory species were observed, no true mangrove forests or unique ecosystem types are present, and no key evolutionary processes were identified. Under the Modified Habitat classification, management obligations include application of the mitigation hierarchy, invasive species control, biodiversity restoration where feasible, and long-term monitoring.

ES4.4.5 Hydrobiology

Aquatic ecological surveys recorded eight phytoplankton species from three classes, with *Gonatozygon monotaenium* as the dominant taxon. Benthic macroinvertebrate communities were characterised by pollution-tolerant taxa (Chironomidae, Tubificidae, Nematoda), with sensitive indicators such as Ephemeroptera and Trichoptera present only in low numbers, suggesting moderate ecological stress. Fish fauna assessment of 125 specimens from artisanal catches identified three species, *Synodontis ocellifer, Nematalosa japonica*, and *Chrysichthys nigrodigitatus*, with varying exploitation levels. Of particular concern, *S. ocellifer* is fully exploited ($E \approx 0.5$) with limited capacity to absorb additional mortality, necessitating strict mitigation of habitat disturbance and fishing pressure during construction.

ES4.5 Socioeconomic Environment

The AoI encompasses approximately 15,000 residents across 15 communities, with a notably young population, around 55% under 25 years of age, and a slight female majority (52%). Livelihoods are centred on agriculture (45%), petty trading (25%), fishing, and transportation, with approximately 67.5% of households earning below ₦1,000,000 annually, reflecting widespread economic vulnerability. Land tenure is predominantly customary (60%), water supply is largely borehole-dependent (82.6%), and healthcare provision is limited to three primary health centres along the corridor. Vulnerable groups include women-headed households (18%), unemployed youth (30%), elderly residents, and subsistence farmers and fisherfolk with limited livelihood alternatives.

ES4.5.1 Project-Affected Persons

A structured census and asset inventory identified 32 Project-Affected Persons within the Right-of-Way. Impacts are limited to economic displacement through crop loss only. No residential structures fall within the current RoW, and no physical displacement is anticipated. Agriculture is the primary livelihood for approximately 45% of respondents, underscoring the importance of livelihood restoration planning under IFC PS5.

ES4.5.2 Traffic and Transport Baseline

Current ADT along the Lot 2 corridor ranges from 8,500 to 12,000 vehicles, with HDVs constituting approximately 15% of flow. Peak hour volumes of 1,100-1,400 PCU/hour occur between 17:00 and 19:00. Key intersections currently operate at LOS D-E. Without the project, ADT is projected to reach 18,000-22,000 by 2030 at a 4% CAGR, with LOS deteriorating to F at major junctions.

ES4.5.3 Cultural Heritage

Cultural heritage mapping identified sites near Odo Noforija and Iraye, requiring implementation of a Chance Finds Procedure (IFC PS8). These include two shrines and one historic burial ground, all located outside the currently defined right-of-way (RoW), all of recognised significance under IFC PS8 despite the absence of formal statutory designation. Chance finds procedures will be required during earthworks.

ES4.6 Cumulative and Spatial Baseline

The corridor operates within a region of multiple existing and planned developments, including the Dangote Refinery, Lekki Deep Sea Port, LFTZ, and Alaro City, generating cumulative pressures on air quality, noise, hydrology, and socioeconomic conditions. Baseline $PM_{2.5}$ and noise exceedances confirm a stressed ambient environment. Lot 2 shares hydrological connectivity with Lot 1 through surface water systems at CH 15, 16, and 17, discharging into the Lekki Lagoon, and ecological connectivity through riparian corridors and wetland margins. Peak traffic flows along both lots converge between 16:00 and 19:00, establishing a corridor-wide cumulative transport and emissions context.

ES4.7 Key Baseline Sensitivities

Baseline conditions across the corridor indicate several elevated sensitivities. $PM_{2.5}$ concentrations exceed standards at all monitoring locations, compounded by emissions from the Dangote Refinery and Lekki Deep Sea Port, whilst noise levels at Epe Town and CH 24 are classified as high sensitivity. Soils present moderate erosion risk on exposed sandy profiles, and groundwater is highly vulnerable, particularly at CH 17, where extreme acidity (pH 2.1) was recorded. Freshwater wetlands at CH 15-17 face cumulative hydrological and ecological pressure, and biodiversity assemblages, whilst moderate, are disturbance-tolerant. Socially, 32 PAPs face economic displacement with high agricultural livelihood dependence, and two heritage sites and sacred groves require protection under IFC PS8.

ES5 Impact Assessment

Impact assessments are carried out in line with applicable national regulations and international best practices (IFC PS, Equator Principle IV), World Bank Group Environmental, Health and Safety (EHS) Guidelines and Good International Industry Practice (GIIP).

ES5.1 Impact Assessment Methodology

Impacts are assessed using a structured source-pathway-receptor framework. The impact characteristics considered include the nature, extent, duration, and magnitude of potential change, with significance assessed using a Magnitude-Sensitivity Matrix. Magnitude is determined by integrating the scale, duration, and spatial extent of predicted change and classified as Low, Moderate or High. Receptor sensitivity is determined by ecological value, conservation status, regulatory protection, social vulnerability, and adaptive capacity, and is ranked Negligible, Low, Moderate, High or Very High within the matrix.

Six significance levels apply: Negligible, Minor, Moderate, Moderate-High, High, and Critical. For specific impact categories, including labour risks, community health and safety, and accidental events, likelihood is also incorporated into the significance rating.

Significance is assessed at two stages: inherent (pre-mitigation) and residual (post-mitigation). Impacts rated Moderate or above prior to mitigation require specific management measures under the ESMP. No Critical significance was identified across any project phase, and all identified impacts are manageable through the mitigation framework presented in Chapter 6.

ES5.2 Construction Phase (Physical Environment)

- Air quality is assessed at High pre-mitigation significance, driven by fugitive dust ($PM_{2.5}$ and PM_{10}) from earthworks, unpaved haul roads, vegetation clearance, material stockpiling, and heavy vehicle movement.
- Noise and vibration from excavators, compactors, haul trucks, generators, and piling activities are also assessed at High pre-mitigation significance.
- Water quality is assessed at Moderate-High significance, arising from sediment-laden runoff from earthworks entering the three aquatic crossings (CH 15, 16, 17), with potential for sedimentation to increase turbidity, reduce primary productivity, and smother benthic organisms. Accidental spills of fuels, lubricants, and chemicals present additional contamination pathways to shallow groundwater and surface water.

- Soil erosion is assessed at Moderate significance. Topsoil stripping and slope modification increase susceptibility, particularly where slopes exceed 5%, promoting erodibility.
- Hydrology is assessed at Moderate significance, with construction near the wetland fringes at CH 15-17 requiring strict drainage management to avoid hydrological disruption and downstream sediment loading consistent with IFC PS6.

ES5.3 Construction Phase (Biological Environment)

- Habitat loss and fragmentation are assessed at Moderate significance. Approximately 28 hectares of modified terrestrial habitat will be permanently cleared within the right-of-way.
- Fauna disturbance is assessed at Minor significance. Recorded species are predominantly common, adaptable, and non-threatened, and impacts are expected to be temporary and reversible following construction.
- Wetland encroachment at the three wetland fringes (CH 15, 16, 17) is assessed at Moderate significance. These wetlands are classified as Natural Habitat under IFC PS6, given their hydrological regulation, groundwater recharge, and ecological connectivity functions.

ES5.4 Construction Phase (Socioconomic Environment)

- Community health and safety is assessed at High pre-mitigation significance. Increased heavy vehicle movement, dust, construction machinery, and the influx of approximately 800 workers collectively elevate traffic accident risk, respiratory health risks, and GBV/SEA/SH exposure for surrounding communities.
- Economic displacement is assessed at Moderate-High significance. The 32 PAPs face crop loss only, but livelihood sensitivity is high
- Traffic and mobility impacts are assessed at Moderate-High significance as increased HGV movements may cause congestion, delays, and reduced pedestrian safety.
- Access disruption to four communities and the labour influx pressure on local services are both assessed at Moderate significance.

ES5.5 Operational Phase, Positive Impacts

The operational phase is expected to deliver substantial long-term socioeconomic benefits.

- Travel time between Epe and Lekki Port is projected to reduce from approximately 45 to 25 minutes, with broader economic benefits from improved market access, strengthened supply chains, and expanded commercial activity, all assessed at High beneficial significance.
- Employment, road safety improvements, and corridor-based livelihood opportunities are assessed at Moderate-High beneficial significance.
- Regional integration and improved access to health, education, and emergency services are assessed at Moderate beneficial significance.

ES5.6 Operational Phase, Adverse Impacts

- Air quality from vehicle emissions ($PM_{2.5}$, PM_{10}, NOx, CO) is assessed at High pre-mitigation significance during operation. Baseline $PM_{2.5}$ concentrations already exceed WHO and NESREA guidelines at all monitoring locations; additional operational traffic will exacerbate long-term cumulative exposure for communities within 500 m of the corridor.

- Traffic noise, particularly from heavy-duty trucks during nighttime, is assessed at Moderate-High significance for sensitive receptors within 150 m of the alignment.
- Road safety risks at new interchanges, hydrological changes from increased impervious surfaces.
- Induced development pressures on land use and informal settlements are each assessed at Moderate significance.

ES5.7 Decommissioning Phase Impacts

- Physical impacts, including dust, noise, erosion, and waste generation, mirror those of the construction phase but at a lower magnitude given the reduced scale and duration of activities.
- Socioeconomic impacts, comprising temporary employment cessation, community closure sensitivities, and traffic disruption, are each assessed at Moderate significance.

All impacts are short-term and reversible, and will be managed through a Decommissioning and Restoration Plan. No long-term irreversible legacy impacts are anticipated.

ES5.8 Cumulative Impacts

- Cumulative impact drivers include Lot 1, the Lagos-Calabar Coastal Highway, the Dangote Refinery, Lekki Deep Sea Port, LFTZ, and Alaro City. Even where Lot 2's incremental contribution is Moderate, cumulative significance may be elevated
- Air quality cumulative significance is Moderate-High as the corridor airshed is already stressed, with $PM_{2.5}$ exceeding WHO guidelines at all baseline locations.
- Noise cumulative significance is also Moderate-High as baseline acoustic levels exceed NESREA and WHO standards at multiple locations, and combined industrial, port, and road traffic noise during peak periods (16:00-19:00 hours) creates compounding exposure.
- Traffic and road safety cumulative significance is High. Traffic modelling indicates that combined vehicle movements across all corridor developments may exceed five million annually by 2030, with key interchanges at risk of exceeding operational capacity during peak periods.
- Hydrology and flood risk cumulative significance is Moderate, driven by combined impervious surface increases from multiple developments interacting with the Lekki Lagoon system.
- Socioeconomic cumulative significance is Moderate-High as combined workforces across all corridor projects may exceed 5,000 during peak construction, straining housing, water, sanitation, and healthcare services, and elevating GBV/SEA/SH risk.

ES5.9 Climate Change and Resilience

Climate risks were assessed as both physical and transition risks.

Physical climate risks include:

1. Increased rainfall intensity, assessed as Moderate-High significance due to elevated flood risk and culvert capacity exceedance risk across the low-lying corridor.
2. Sea-level rise and groundwater salinisation are assessed as Minor, given the Lot 2 inland location.
3. Heat stress on construction workers and roadside communities is assessed at Moderate significance.

Transition risks include:

- Construction GHG emissions are assessed at Minor significance due to their one-time, below 0.1% of national emissions nature
- Operational GHG emissions from vehicle traffic, assessed at Moderate significance given the regional air quality context and alignment with the Lagos State Climate Action Plan.
- Carbon stock loss from vegetation clearance assessed at Minor significance (2,000-5,000 tCO_2e.
- Cumulative corridor-level GHG load is assessed at Moderate-High significance, reflecting the additive contribution of Lot 2 to the stressed corridor airshed shared with Lot 1, Dangote, the Port, and LFTZ.

ES5.10 Human Rights and Gender

Human rights risks, including labour violations from inadequately supervised contractors, community exposure to GBV/SEA/SH from labour influx, unequal access to project benefits, and inadequate compensation for vulnerable PAPs, are addressed through a Human Rights Action Framework embedded in the ESMP. Gender-differentiated impacts are explicitly recognised: women traders, farmers, and caregivers face disproportionate risks from access disruption, labour influx, and market disruption.

ES6 Mitigation Measures

Mitigation measures are developed in accordance with the IFC PS1 mitigation hierarchy, Avoid, Minimise, Restore, Offset, with Best Available Technology Not Entailing Excessive Cost (BATNEEC) and As Low As Reasonably Practicable (ALARP) principles applied at each stage.

ES6.1 Construction Phase

- Air quality and dust are controlled through water spraying on unpaved roads and work areas (minimum twice daily during the dry season), covered trucks for material transport, speed limits of 30 km/h on site, windbreaks and silt fencing at perimeter zones, and EURO IV/V compliant machinery with idling restrictions of no more than three minutes.
- Noise is managed through acoustic barriers around stationary sources such as generators and crushers, restriction of piling operations to daytime hours (07:00-18:00) with pre-boring where possible, real-time noise monitoring at three sensitive receptor locations (schools and clinics), and a community notice issued 48 hours before high-noise activities.
- Water quality and erosion are addressed through silt fences, sediment basins, and check dams on slopes exceeding 5%; soil stabilisation within 14 days of exposure using mulch or geotextiles; a 30 m no-work buffer from all wetland and stream banks without prior approval; spill kits and secondary containment at all fuel storage areas; and temporary diversion channels to maintain natural flow during construction.
- Ecological protection controls include enforced 50 m buffer zones from all wetland and riparian areas with no clearing or equipment storage within buffers, preconstruction wildlife salvage by ecologists, seasonal work restrictions prohibiting activity in or near wetlands during peak breeding season (April-September), transplanting of priority vegetation where feasible, and invasive species control to prevent the spread of *Chromolaena odorata*.

- Biodiversity mitigation includes a 2:1 offset ratio to restore and enhance 56 hectares within Epe Forest Reserve, comprising reforestation with native species, invasive species removal, and community-based monitoring to ensure long-term ecological benefit.
- Economic displacement includes:
    - The implementation of a Livelihood Restoration Plan (LRP) for all 32 PAPs. The plan includes agricultural input support, vocational training, and access to microcredit through the Lagos State Employment Trust Fund. A gender-responsive approach ensures that 40% of LRP benefits target women-headed households.
    - A zero-tolerance GBV/SEA/SH policy is enforced through mandatory worker training, confidential reporting channels, and a survivor-centred response protocol.
    - A minimum of 30% of unskilled and semi-skilled positions are reserved for local community members, with IFC/WHO-compliant worker accommodation and a separate worker grievance mechanism distinct from the community GRM.

ES6.2 Operational Phase

- Noise barriers will be installed at four locations near sensitive residential clusters.
- Speed cameras and traffic calming measures will be deployed at approaches to settlements.
- Road sweeping and washing at least twice weekly during the dry season to reduce fugitive dust, complemented by vegetative barriers of trees and shrubs along the corridor to absorb particulates.
- Low-emission freight is promoted by incentivising CNG and electric port trucks through toll discounts or priority lane access.
- Monthly culvert inspection and cleaning, especially before the rainy season, maintains drainage performance.
- Finally, a community flood early-warning system linked to Lagos State Alerts provides an additional layer of flood preparedness.

ES6.3 Cumulative and Regional Mitigation

- A Lekki Corridor Environmental Committee (LCEC) will be established with representatives from Dangote, Lekki Port, CHEC, LASEPA, FMEnv, and communities to coordinate corridor-level monitoring and mitigation.
- Shared environmental monitoring data covering air quality, noise, and water quality are published on a public dashboard.
- Annual updates to cumulative air quality modelling track corridor-wide $PM_{2.5}$, PM_{10}, and NOx.
- Epe General Hospital is upgraded with one additional ward, and borehole rehabilitation supports community water supply to address the cumulative burden on social services.

ES6.4 Climate and GHG Mitigation

- A targeted 30% reduction in construction-phase GHG emissions is sought through the use of electric or hybrid equipment where feasible.
- Local materials sourcing is prioritised to reduce transport emissions, and fleet fuel-efficiency standards with idle-time restrictions.

- An annual GHG inventory covering Scope 1, 2, and 3 emissions tracks progress against this target.
- All culverts are designed with 20% additional capacity above standard design criteria to accommodate increased rainfall intensity.
- Cool pavement materials and strategic corridor tree planting mitigate urban heat island effects.

ES6.5 Residual Impacts

Following full implementation of mitigation:

- Air quality residual significance is Moderate.
- Noise residual significance is Moderate at nighttime.
- Habitat loss residual significance is Low
- Economic displacement residual significance is Low
- Cumulative traffic residual significance is Moderate-High

ES7 Environmental and Social Management Plan (ESMP)

The Environmental and Social Management Plan (ESMP) provides the operational framework for implementing the mitigation measures described in ES6. It is aligned with applicable national and LASEPA regulations, IFC PSs (PS1-PS8), and the Equator Principles IV.

ES7.1 ESMP Budget and Disbursement Condition

The ESMP implementation budget is USD 1.895 million, approximately 0.48% of the Lot 2 contract value. This allocation is proportionate to the project risk profile and sufficient to implement monitoring, offsetting and social safeguard commitments. ESMP compliance is a Condition Precedent for loan disbursement.

ES7.2 Governance and Institutional Structure

Institutional responsibilities are clearly defined across five entities. FMW holds overall accountability as the project proponent, whilst CHEC is responsible for day-to-day ESMP implementation. AEC provides independent supervision and quality assurance, and NEC/MAISA serves as the Independent Environmental and Social Monitor (IESM) with a direct reporting line to lenders. Community Liaison Officers manage stakeholder engagement and grievance intake at the corridor level.

ES7.3 Monitoring, Reporting and Verification (MRV)

Key Performance Indicators and thresholds include:

- PM_{10} not exceeding 150 µg/m³ (24-hour average) at the construction site boundary.
- Noise not exceeding 45 dB(A) at sensitive receptors.
- Total suspended solids in runoff not exceeding 30 mg/L.
- 100% of PAP compensation is paid before site entry.
- GRM resolution rate of at least 90% within 30 days.
- Biodiversity offset survival rate of at least 80%.

ES7.4 Monitoring Framework

The ESMP monitoring framework provides measurable, auditable performance tracking aligned with regulatory and lender requirements. It includes:

- Eight fixed and three mobile air/noise stations.
- Six surface water monitoring points.
- Ecological transects within the 56-ha biodiversity offset in the Epe Forest Reserve.
- Five community feedback points and a dedicated hotline.

ES7.5Phased Implementation and Resourcing

The ESMP is implemented in sequenced phases aligned with construction activities. ESMP mobilisation and pre-construction PAP compensation are programmed for the first three months, followed by erosion and drainage controls active throughout the main construction period (Months 3-18). Biodiversity offset implementation commences at Month 6 and extends to Month 30 to ensure ecological establishment. GBV/SEA/SH training is delivered at scheduled intervals throughout construction, with annual ESMP audits providing performance oversight across all phases.

ES7.6 **Reporting and Disclosure**

The ESMP establishes a structured reporting hierarchy to support transparency, stakeholder trust and lender oversight. The structure includes weekly site environmental reports, monthly compliance reports, quarterly monitoring summaries (shared with lenders and regulators), annual ESMP performance reports, 24-hour incident reporting protocol, and monthly grievance logs

Public disclosure commitments include translation of the ESMP summary into Yoruba and Pidgin, publication of monitoring data on a public dashboard accessible online and at community centres, and annual stakeholder meetings to present performance, receive feedback, and update management approaches.

ES7.7 **Grievance Redress Mechanism (GRM)**

The GRM operates through a toll-free 24/7 hotline (0800-7TH-AXIAL), five community help desks along the corridor, and a secure digital database managed by a dedicated GRM Officer. Complaints receive formal acknowledgement within 48 hours and a proposed resolution within 30 days. An independent appeal process is available for unresolved grievances, with the IESM conducting an independent review and issuing determinations within 15 days.

ES7.8 Specialised Management Plans

The ESMP is supported by dedicated operational plans, including:

- Spill Prevention & Response Plan
- Emergency Response Plan
- Traffic Management Plan (Construction)
- Livelihood Restoration Plan (32 affected households)
- GBV/SEA/SH Action Plan
- Biodiversity Offset Plan (56 ha restoration)
- Waste Management Plan
- Climate Resilience Plan

Each plan provides procedural detail, monitoring obligations and defined responsibilities, ensuring full operationalisation of ES6 commitments.

ES7.9 Financial Assurance Mechanisms

Financial assurance instruments comprise a ring-fenced ESMP budget within project finance agreements, a 15% contingency fund for adaptive management, a CHEC performance bond, and a USD 3.5 million decommissioning bond released only upon FMEnv certification of satisfactory restoration.

ES7.10 Capacity Building

Training is delivered across contractor and supervisory staff to strengthen compliance culture and operational competence. This encompasses ESMP awareness at induction, quarterly environmental monitoring training, bi-annual GBV/SEA/SH prevention sessions, GRM handling procedures, and community environmental monitoring, ensuring that all personnel with environmental and social responsibilities are equipped to fulfil them effectively.

ES7.11 Adaptive Management Framework

Adaptive management is central to ESMP effectiveness, ensuring timely corrective actions and continuous improvement. The framework mechanisms include:

- Quarterly ESMP review meetings
- Annual independent audit
- Trigger-based reviews initiated by:
    - KPI exceedance >7 days
    - Significant unresolved complaints
    - Regulatory sanctions
    - Major environmental or safety incidents

ES7.12 Lender Assurance and Verification

Lender assurance and verification operate through continuous IESM oversight with reporting to Standard Chartered and Afreximbank, unannounced site inspections by the lenders' Environmental and Social Advisors, and an annual ISO 19011-certified third-party audit of overall ESMP effectiveness. ESMP compliance is linked to each loan disbursement milestone.

ES8 Decommissioning and Restoration Plan

Although decommissioning is not anticipated within the projected design life of 40-50 years, a Decommissioning and Restoration Plan (DRP) has been prepared consistent with national regulations, IFC PS1, PS2, PS3, PS4 and PS5, and the World Bank EHS Guidelines.

ES8.1 Decommissioning Triggers and Planning Horizon

Decommissioning may be triggered by the end of design life (projected 2070-2080), major realignment or corridor upgrade, permanent closure due to changes in land use or regional planning, or a regulatory or safety requirement.

ES8.2 Decommissioning methodology

Decommissioning will follow a phased and controlled approach consistent with international good practice for infrastructure demolition.

Envisaged activities include controlled demolition of the CRCP pavement and embankments, systematic dismantling of bridges, culverts, and interchanges, and coordination with service providers for utility relocation. Material recovery targets are addressed in ES8.5.

ES8.3 Environmental Restoration

Environmental restoration involves regrading of landform to preconstruction contours, application of topsoil to a minimum depth of 150-200 mm, revegetation using native species consistent with the Biodiversity Offset Plan, restoration of natural watercourse flow paths where the road footprint crosses waterways, and post-restoration monitoring over five years.

ES8.4 Social and Economic Transition

Social and economic transition support includes livelihood transition programmes for workers and local businesses dependent on road operations, skills retraining in partnership with the Lagos State Ministry of Wealth Creation, and micro-enterprise support for affected roadside vendors and commercial operators.

ES8.5 Circular Economy and Materials Recovery

The DRP applies circular economy principles to maximise reuse and minimise waste. Material tracking and manifest systems will prevent illegal dumping and ensure regulatory compliance.

Target recovery rates:

- ≥ 85% reuse/recycling of crushed concrete
- ≥ 90% recycling of asphalt
- 100% recycling of steel reinforcement and barriers
- ≥ 60% recycling of timber and plastics
- 100% compliant disposal of hazardous materials

ES8.6 Health, Safety and Emergency Preparedness

Demolition introduces occupational and community risks, which will be managed to ensure the safety of workers and surrounding communities. Occupational health and safety obligations under IFC PS2 will be fully applied throughout the decommissioning phase, including the provision of appropriate personal protective equipment, safe systems of work, and regular health surveillance for workers engaged in demolition activities. This will include enforcing a community exclusion zone with signage and maintaining spill kits and emergency equipment throughout the decommissioning phase.

ES8.7 Post-Closure Monitoring and Verification

Clear performance indicators will confirm successful restoration:

- No erosion gullies >0.5 m depth (3-year monitoring)
- ≥ 80% native vegetation cover (5-year monitoring)
- Water quality within baseline levels (2-year monitoring)
- ≥ 85% community satisfaction (annual surveys)
- ≥ 85% materials recovery rate

Reporting obligations comprise monthly decommissioning reports to regulators and lenders, a Final Restoration Report upon completion, and annual post-closure monitoring reports over five years.

ES8.8 Financial Assurance

The estimated decommissioning cost at present value is USD 4.2 million, funded through annual contributions from toll revenue and the contractor performance bond, indexed to CPI plus 2% annually. Funds are released only upon FMEnv certification of satisfactory restoration.

ES9 Conclusions and Recommendations

ES9.1 Conclusions

1. Lot 2 of the 7th Axial Road is a strategically essential, economically significant, and environmentally and socially manageable infrastructure project. The ESIA confirms the following key findings.
2. No Fatal Flaws have been identified. No Critical or irreversible impacts arise from the project. All identified impacts are manageable to acceptable residual levels through the mitigation and ESMP framework presented in Chapters 6 and 7.
3. The project complies with the Nigerian EIA Act (2004), NESREA, LASEPA, and Lagos State environmental and social regulations. The ESMP and supporting plans are fully aligned with IFC Performance Standards (PS1-PS8) and Equator Principles IV.
4. IFC PS6 Critical Habitat screening confirms Not Applicable across all five criteria. The corridor is classified as Modified Habitat. A 2:1 biodiversity offset restoring 56 hectares within Epe Forest Reserve ensures no net loss of ecological function.
5. 32 PAPs face crop loss only; no physical displacement is anticipated. Full replacement-cost compensation and livelihood restoration are committed before site entry, consistent with IFC PS5.
6. High cumulative significance for traffic and road safety demands corridor-level coordination through the LCEC, with shared monitoring and joint management across the Lekki industrial corridor. The project's engineering design exceeds standard practice, 1-in-100-year drainage with a 20% climate change allowance, supporting long-term operational integrity under projected climate change scenarios.
7. Meaningful stakeholder consultation has been conducted across 15 communities. GRM, ESMP public disclosure, and ongoing engagement mechanisms are institutionalised and operational before construction commencement.

ES9.2 Recommendations

ES9.2.1 Technical and Environmental Recommendations

- Adopt climate-resilient drainage design standards (1-in-100-year + 20%) for all culverts and embankments.
- Implement real-time air and noise monitoring with results published on a public dashboard accessible to communities.
- Enforce 30 m ecological buffers from all wetlands and watercourses throughout construction with no exceptions.
- Activate the Biodiversity Offset Plan and commence restoration works within 12 months of construction commencement.
- Achieve a minimum of 85% recycling rate for all construction and demolition waste.

ES9.2.2 Social and Livelihood Recommendations

- Complete compensation and livelihood restoration for all 32 PAPs before any site clearance commences, consistent with IFC PS5.
- Implement the GBV/SEA/SH Action Plan from day one of worker mobilisation, with mandatory training and zero-tolerance enforcement.
- Reserve and track 30% of unskilled and semi-skilled jobs for local community members with monthly reporting to the IESM.
- Establish a Community Development Committee to oversee local procurement, skills training, and small enterprise support.

ES9.2.3 Institutional and Governance Recommendations

- Formalise the Lekki Corridor Environmental Committee (LCEC) with multi-stakeholder membership and quarterly coordination meetings before construction begins.
- Integrate ESMP obligations into the CHEC contract with clear performance indicators and penalty provisions for non-compliance.
- Conduct annual third-party ESMP audits with results publicly disclosed to lenders and affected communities.
- Develop a corridor-wide Traffic Management Plan in coordination with the Lagos State Ministry of Transportation and other corridor developers.

ES9.2.4 Lender and Compliance Recommendations

- Ring-fence ESMP and decommissioning funds within financial agreements before project mobilisation to ensure continuous availability.
- Require independent KPI verification by the IESM before each milestone payment is released.
- Maintain a dynamic risk registry updated quarterly to reflect changing site conditions, community feedback, and cumulative pressures.
- Ensure all project documentation is publicly accessible in English, Yoruba, and Pidgin via the project website and community centres, consistent with Equator Principles disclosure requirements.

ES9.3 Approval Pathway

It is recommended that the Federal Ministry of Environment (FMEnv) grant conditional ESIA approval, subject to three conditions:

1. Finalisation of the LRP and commencement of compensation disbursement before any site clearance.
2. Confirmation of ring-fenced ESMP budget allocation within the project financing agreements.
3. Signing of the CHEC Environmental and Social Commitment Plan before construction mobilisation.

ES9.4 Closing Statement

Through rigorous implementation of this ESIA and its associated management plans, Lot 2 of the 7th Axial Road has the potential to deliver transformative connectivity for the Lekki-Epe corridor whilst demonstrating that major infrastructure can be developed responsibly, with full accountability to affected communities and the environment.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This Environmental and Social Impact Assessment (ESIA) covers Lot 2 of the proposed 24.9 km 7th Axial Road (Lekki Port Access Road), a Class A dual carriageway expressway designed as a high-capacity, limited-access corridor that will serve as the primary evacuation route for Nigeria's most significant industrial zone. The corridor provides strategic connectivity between the Lekki Deep Sea Port, the Dangote Refinery and Petrochemical Complex, the Lekki Free Trade Zone (LFTZ), the proposed Lekki International Airport, and Epe Township, with onward links to the national highway network. The project responds to severe mobility and logistics constraints on the Lekki Peninsula, where rapid industrial expansion has outpaced existing infrastructure, resulting in congestion, safety concerns, and reduced economic efficiency.

The ESIA identifies, assesses, and proposes management measures for the environmental and social risks and impacts associated with the project's lifecycle, ensuring compliance with Nigerian regulations and international standards, including the International Finance Corporation Performance Standards (IFC PSs) and the Equator Principles IV (EP4).

1.1 National Context

The 7th Axial Road (Lekki Deep Sea Port Access Road) is a nationally significant infrastructure project designed to serve as the primary evacuation corridor for Nigeria's premier industrial and logistics hub on the Lekki Peninsula. The corridor connects strategic assets, including the Lekki Deep Sea Port (2.5 million TEU/year capacity), the Dangote Refinery (650,000 barrels per day), the Lekki Free Trade Zone, the planned Lekki International Airport, and the wider Lagos-Ogun Southwest economic region.

Lot 2 (chainage [CH] 8+700 to CH 24+932) forms the northern continuation of Lot 1, extending the corridor from the Lekki Lagoon crossing to Epe, where it integrates with the Epe-Ijebu Road and the broader national highway network. This linkage is essential to provide seamless connectivity between the port industrial complex and inland distribution routes, thereby supporting Nigeria's industrialisation agenda, export diversification, and integration into regional trade frameworks such as the African Continental Free Trade Area (AfCFTA).

Lot 2 is also aligned with Nigeria's climate-resilient infrastructure priorities as articulated in its Nationally Determined Contribution (NDC 3.0) and Long-Term Low Emissions Development Strategy (LT-LEDS), which emphasise resilient transport systems, logistics efficiency, and the integration of adaptation and emissions-reduction measures within national infrastructure development.

1.2 Geographic and Strategic Context

The strategic importance of the Lagos 7th Axial Road is underscored by its geographic location and its role as a key transport spine supporting Nigeria's emerging industrial corridor on the Lekki Peninsula.

1.2.1 Administrative Context

Lot 2 traverses the Ibeju-Lekki and Epe Local Government Areas of Lagos State, passing through peri-urban and rural settlements, agricultural lands, and ecologically sensitive zones. The alignment is strategically positioned to support the Ibeju-Lekki Model City Plan (2024-2044) and the Lekki Master Plan, both of which emphasise balanced urban expansion, industrial growth, and environmental sustainability.

Figure 1.1 delineates state boundaries and highlights Lagos State's political and economic significance within Nigeria's federal structure.

Figure 0.1: Administrative Map of Nigeria Highlighting Lagos State

Figure 1.2 shows the 7th Axial Road alignment and the extent of Lot 2 as part of the corridor. It illustrates how the corridor links the Lekki Free Trade Zone to the Lekki-Epe-Ijebu axis and interfaces with key local government areas.

Figure 0.2: Lot 2 as Part of the 7th Axial Road Alignment

Figure 1.3 illustrates the spatial positioning and administrative boundaries of Ibeju-Lekki Local Government Area (LGA), a critical geographic unit within the southeastern corridor of Lagos State. Highlighted in light blue, Ibeju-Lekki is bordered by Epe LGA to the northeast, the Atlantic Ocean to the south, and Ogun State to the north. Ibeju-Lekki serves as the administrative anchor for both Lots 1 and 2 of the 7th Axial Road.

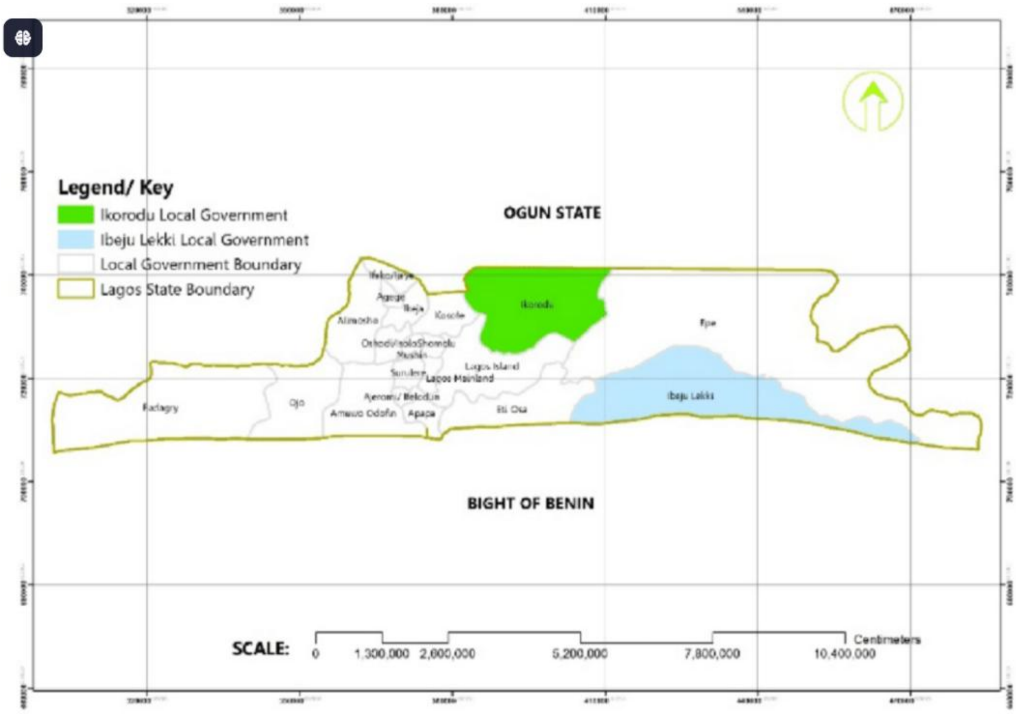

Figure 0.3: Epe Local Government Area (LGA) in Lagos State

Figure 1.4 provides a spatial overview of the Lekki Peninsula, delineating administrative boundaries, hydrological features, and strategic infrastructure relevant to the ESIA. The figure highlights the alignment of the 7th Axial Road from Idasho through Odo Noforija to Epe, forming the backbone of both Lots 1 and 2. Strategic assets such as the Lekki Deep Sea Port, LFTZ, and the Dangote Refinery are shown, underscoring the corridor's national importance.

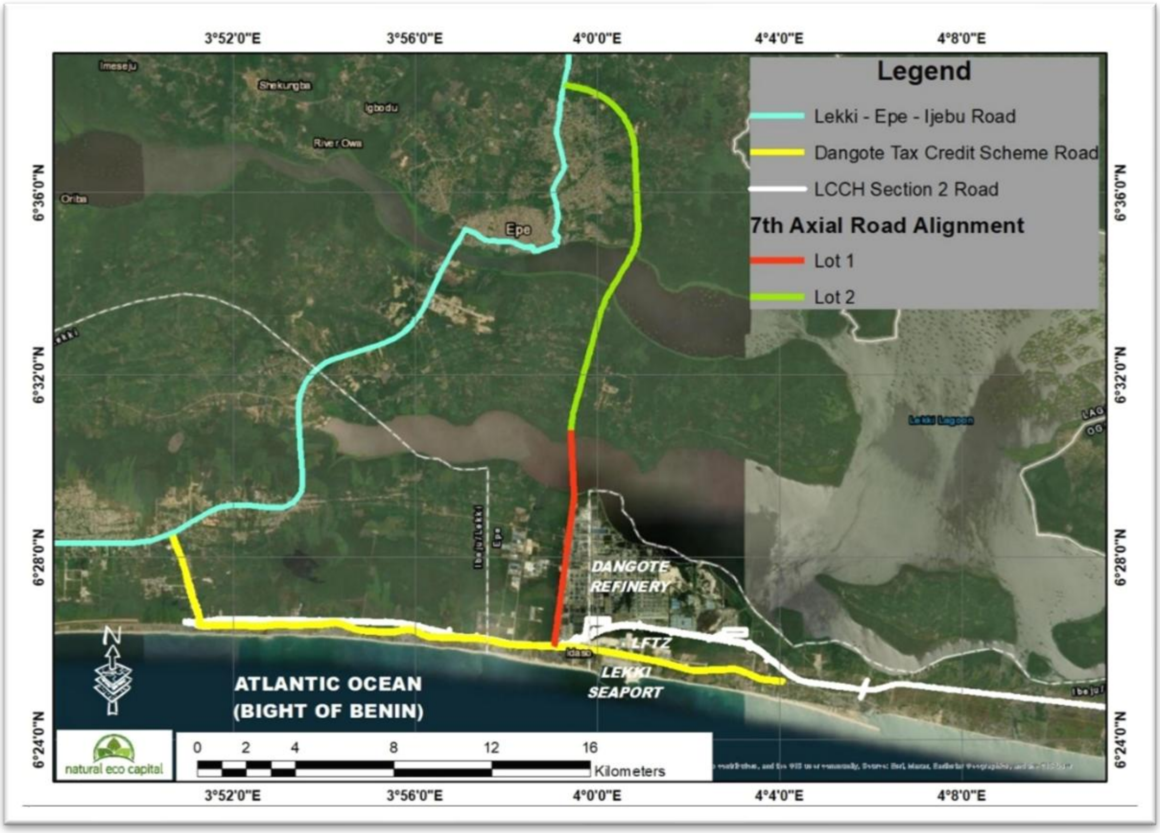

Figure 0.4: 7th Axial Road (Lots 1 & 2) in Lekki Peninsula and Ibeju-Lekki LGA

1.2.2 Corridor Alignment

The 7th Axial Road forms a north-south spine within the Lagos Megacity Region. The full 24.932 km corridor is divided into two contract Lots:

- **Lot 1:** An 8.7 km section from Idasho (near Lekki Port) to Odo Noforija, incorporating the critical 2,615 m Lagoon Bridge across the Lekki Lagoon.
- **Lot 2** (The focus of this ESIA)**:** A 16.232 km section from the lagoon crossing to Epe, integrating flyovers and interchanges with the regional highway network (e.g., Epe-Ijebu Road).

Unlike Lot 1, which traverses lagoonal and coastal ecosystems, Lot 2 is entirely inland and interacts primarily with terrestrial habitats, peri-urban settlements, agricultural landscapes, and freshwater systems.

Box 1.1 summarises the key engineering, environmental, and socioeconomic distinctions between Lots 1 and 2 of the 7th Axial Road corridors.

Box 1.1: Lot 1 and Lot 2 Alignment

Unlike the geotechnically dominated southern segment, Lot 2 prioritises Regional Network Integration, Peri-Urban Displacement Management, and Agricultural Value Chain Logistics:

1. Strategic Integration and Network Connectivity

Lot 2 serves as the terminal link connecting the Lekki Industrial Triangle to the Epe-Ijebu Ode Road and the wider national highway system. The documentation must specify:

- **The Epe Interchange (CH 24+032):** Detailed engineering for the directional flyover designed to facilitate seamless freight flow toward the northern hinterland and Ibadan.
- **Toll Station Operations (CH 11+900):** A financial-grade description of the 18-lane toll plaza, including Electronic Toll Collection (ETC) systems required to generate the projected ₦120-₦150 billion annual revenue.
- **The "Northbound" Economic Link**: Causal linking of the road's 100 km/h design speed to the 40% reduction in travel time between Lekki and Ibadan, which is financially material to regional trade competitiveness under AfCFTA.

2. Geotechnical and Structural Transition

While geotechnically more stable than Lot 1, Lot 2 requires specific structural safeguards for the transition from lagoonal plains to upland terrain:

- **Subgrade Consistency:** The mandatory use of C40 Grade Continuously Reinforced Concrete Pavement (CRCP) across the full 16.2 km stretch to sustain 30-ton axle loads, bypassing the need for frequent fatiguing repairs typical of flexible asphalt in high-humidity zones.
- **Secondary Lagoon and Bridge Crossings:** Technical specifications for the 2# Lagoon Bridge (CH 15+750) and the Middle Bridge (CH 17+150), ensuring they utilise deck-on-pile designs to maintain the 1,200-hectare regional ecological buffer.

3. Socioeconomic Safeguards and Livelihood Restoration

Lot 2 traverses more densely populated peri-urban clusters (Idomu, Iraye, Naforija), necessitating a robust Involuntary Resettlement strategy:

- **Displacement Risk Management:** The baseline identification of communities along the Iraye axis where property realignment is mandatory to minimise structural demolition.
- **Agricultural Value Chain Protection:** Mitigation measures for the 14.3% cropland coverage in the Area of Influence, focusing on preserving access for agrarian produce to reach the Epe markets.
- **Local Inclusivity Mandates:** Enforcement of the 30% local hiring quota for the 200 apprenticeship positions dedicated to local youth, fulfilling the social development targets of the Renewed Hope Agenda.

4. Environmental and Hydrological Resilience

The northern segment acts as the primary drainage interface for Epe North:

- **Climate-Resilient Drainage:** Installation of oversized culverts designed for 1-in-100-year flood events, preventing the road from acting as a barrier to the natural drainage pathways toward the Lekki Lagoon.
- **Emissions and Urban Air Quality:** Strategic deployment of noise barriers and vegetation buffers in the Eredo sector to mitigate the impact of the 5 million annual vehicle movements projected by 2030.

1.3 Project Delivery and Key Entities

Awarded under Contract Nos. 8863 (Lot 1) and 8864 (Lot 2) to China Harbour Engineering Construction (Nig) Ltd (CHEC), with Advanced Engineering Company (AEC) serving as supervising consultant, the project is overseen by the Engineer's Representative, Engr. Oyeneye Damola K.

The delivery of the 7th Axial Road is underpinned by a coordinated, multi-institutional governance framework designed to ensure technical quality, regulatory compliance, and environmental and social sustainability:

- **Federal Ministry of Works (FMW)**: Acts as the project proponent, providing strategic oversight, policy alignment, and coordination with federal regulatory institutions.
- **Lagos State Government (LASG)**: Facilitates land acquisition processes, interfaces with host communities, and ensures consistency with state-level planning and development frameworks.
- **China Harbour Engineering Company Limited (CHEC)**: Serves as the EPC+F contractor, responsible for detailed design, construction execution, environmental and social management at site level, and financing arrangements.
- **Natural Eco Capital (NEC) and MAISA**: Provide independent environmental and social consultancy services, including ESIA preparation, Resettlement Action Plan (RAP) development, stakeholder engagement support, and monitoring frameworks.

The governance structure for Lot 2 mirrors that of Lot 1 to ensure corridor-wide consistency in environmental and social management, reporting, and compliance.

1.4 Rationale and ESIA Focus for Lot 2

While Lot 1 focused on the critical lagoon crossing and port-refinery interface, Lot 2 represents the transition of the 7th Axial Road from a coastal-industrial access corridor into a regionally integrated transport route. The rationale for Lot 2 is therefore centred on addressing the absence of a high-capacity inland evacuation route capable of linking the Lekki industrial zone to Epe, Ogun State, and the wider national road network, without routing heavy freight traffic through constrained urban and peri-urban areas.

Accordingly, and in line with FMEnv requirements and the IFC PS's emphasis on impact pathways, receptors, and cumulative effects, the ESIA for Lot 2 focuses on the following key considerations:

- Regional connectivity impacts arising from increased traffic volumes and altered movement patterns associated with the extension of the corridor to Epe and onward to Ogun State.
- Interface and integration effects at key junctions with existing transport infrastructure, including the Lagos-Calabar Coastal Highway (Section 2) at KM 47+474, with particular attention to traffic safety, congestion, and land-use change.
- Socioeconomic impacts on communities located along the alignment, including changes in access, livelihoods, land acquisition, and community severance.

- Environmental continuity and potential cumulative impacts on terrestrial and aquatic ecosystems beyond the lagoon crossing, reflecting the inland transition of the corridor and its interaction with sensitive ecological receptors.

Lot 2 introduces new receptors not present in Lot 1, including peri-urban settlements, agricultural livelihoods, freshwater wetlands, riparian vegetation, and cultural heritage sites. These require tailored assessment approaches under IFC PS5, PS6, and PS8.

1.5 Corridor Integration and Cumulative Impact Considerations

Lot 2 is a continuation of the 7th Axial Road corridor rather than an isolated project. Its ESIA, therefore:

- **Cross-references Lot 1 baseline data** (hydrology, biodiversity, socioeconomics) where geographically and ecologically relevant.
- **Assesses cumulative impacts** in conjunction with Lot 1 and other major projects in the Lekki-Epe axis (Dangote Refinery, Lekki Deep Sea Port, Free Trade Zone).
- **Aligns with the approved Lagos-Calabar Coastal Highway Section 2 ESIA** for regional consistency in impact assessment and mitigation.

The ESIA also considers induced development pressures along the corridor, including land speculation, informal settlement expansion, and increased demand for services, consistent with IFC PS1 cumulative impact requirements.

1.6 Policy, Legal, and Institutional Framework

The ESIA applies a harmonised compliance framework that integrates Nigerian regulatory requirements with international safeguard standards, ensuring the project meets both statutory obligations and lender expectations.

- **National frameworks** provide the legal baseline for environmental and social assessment in Nigeria. These include statutory instruments such as the Environmental Impact Assessment (EIA) Act (2004), the mandates of the Federal Ministry of Environment (FMEnv), the National Environmental Standards and Regulations Enforcement Agency (NESREA), and state-level oversight by the Lagos State Environmental Protection Agency (LASEPA). Together, they establish binding thresholds for air quality, noise, effluent discharge, occupational safety, and climate resilience.
- **International frameworks** set higher safeguard standards, particularly for projects financed by Multilateral Development Banks (MDBs) such as the World Bank, International Finance Corporation (IFC), and African Development Bank (AfDB). These frameworks encompass the IFC Performance Standards (PS1-PS8), the World Bank Environmental, Health and Safety (EHS) Guidelines, and the Equator Principles IV.
- Chinese frameworks, applicable to CHEC as the EPC+F contractor, provide additional environmental and social obligations. For detailed Chinese legal and regulatory references, see Appendix 1.1.

1.6.1 Institutional Framework

The governance of the 7th Axial Road project is anchored in a multi-layered institutional structure that spans federal, state, local, sector-specific, and international entities. Each plays a distinct role in ensuring that the project is environmentally sustainable, socially responsible, and legally compliant. This structure ensures clear accountability for environmental and social performance across all project phases

A. Federal Institutions

- Federal Ministry of Environment (FMEnv): Reviews and approves ESIA, issues certificates, and monitors compliance.
- National Environmental Standards and Regulations Enforcement Agency (NESREA): Enforces national environmental standards (air, effluent, noise, waste).
- Federal Ministry of Works (FMW): Project proponent; oversees planning, design, and delivery of federal highway network.
- Federal Ministry of Transport: Aligns project with national transport policies and multimodal integration.
- Federal Road Safety Corps (FRSC): Ensures traffic safety during construction and operation.
- Nigeria Railway Corporation (NRC): Coordinates road-rail freight integration.

B. State Institutions (Lagos State)

- Ministry of Environment and Water Resources: Oversees environmental compliance at the state level.
- Lagos State Environmental Protection Agency (LASEPA): Enforces state environmental laws on pollution, noise, and water quality.
- Ministry of Physical Planning and Urban Development: Grants planning approvals and ensures alignment with the Lagos Masterplan.
- Ministry of Transportation: Oversees traffic management and urban mobility planning.

C. Local Government Institutions

- Host LGAs (Ibeju-Lekki, Epe): First point of contact for Project Affected Persons (PAPs); manage local engagement, waste management, and enforcement of byelaws.

D. Sector-Specific Institutions

- FRSC: Traffic safety enforcement.
- NRC: Road-rail synergy.
- Emergency Services: Accident response and community safety.

E. Development Partners & Lenders (MDBs)

- MDBs (World Bank, African Development Bank [AfDB]): Require compliance with safeguard policies (World Bank Environmental and Social Framework [ESF], AfDB Integrated Safeguards System [ISS], Equator Principles IV).

- Commercial Lenders (Standard Chartered, Afreximbank): Impose Environmental, Social and Governance (ESG) frameworks, risk rating, and monitoring requirements.

F. Project Implementor

- China Harbour Engineering Company (CHEC): EPC+F contractor; bound by Nigerian law, Chinese environmental/social legislation, and lender ESG standards.

1.6.2 Legal and Policy Framework

1.6.2.1 Environmental Related Framework

A. National Legal Framework

- Constitution (1999): Guarantees property rights; mandates fair compensation.
- Land Use Act (CAP L5 LFN 2004): Governs land acquisition and compensation.
- Environmental Impact Assessment (EIA) Act (CAP E12 LFN 2004): Requires ESIA for major projects; mandates public participation. This is the primary instrument guiding this ESIA and the project
- EIA Procedures and Charges Regulations (2021) - This project adheres to the updated fee structures, categorisation (Category 1), and public disclosure timelines mandated by the Federal Ministry of Environment.
- NESREA Act (2007): Establishes NESREA's authority for environmental regulation.
- Climate Change Act (2021): Mandates climate resilience integration.
- Waste Management Regulations: Standards for solid and hazardous waste handling.
- National Policy on the Environment (1989, revised 1999 & 2017): Provides coordination mechanisms for sustainable growth.
- National Policy on Climate Change (2013): Strengthens adaptation and mitigation measures, with emphasis on vulnerable groups.

B. State Legal Framework (Lagos State)

- Lagos State Harmonised Environmental Management and Protection Law (2017): Provides the overarching framework for pollution control, environmental protection, and enforcement.
- LASEPA Environmental Pollution Control Regulations (2017): Establishes standards for air emissions, effluent discharge, noise levels, and environmental monitoring.
- Lagos State Waste Management Authority (LAWMA) Guidelines: Requirements for solid waste collection, transportation, and disposal, including construction and demolition waste.
- Lagos State Water Regulatory Commission Standards: Regulations governing water abstraction, effluent discharge, and protection of water resources, including the Lekki Lagoon.
- Lagos State Physical Planning Permit Requirements: Mandatory approvals for right-of-way, setbacks, and land use compliance under the Lagos State Urban and Regional Planning and Development Law (2010).
- Lagos State Urban and Regional Planning and Development Law (2010): Governs land use planning, development control, and permitting processes.

C. Chinese Legal Framework (CHEC Obligations)

Applicable Chinese environmental and social obligations for CHEC as the EPC+F contractor are outlined in Appendix 1.1. This appendix provides a detailed breakdown of the relevant laws, regulations, and compliance obligations

D. Lenders ESG Framework

- **Standard Chartered Bank:**
    - Equator Principles IV
    - IFC Performance Standards
    - World Bank Group Environmental Health and Safety (EHS) Guidelines
    - Sector position statements
    - Rigorous due diligence and monitoring
- **Afreximbank:**
    - ESG Navigator (Fitch Ratings)
    - Sustainability integration (COP30, 2025 ESG report)
    - SDG alignment (SDG 7, 9, 13)
    - Internationally recognised safeguards

1.6.2.2 Social-Related Framework

- Resettlement Action Plan (RAP): Based on the Nigerian Constitution and Land Use Act, expanded to IFC PS5 (livelihood restoration).
- Free, Prior, and Informed Consultation (FPIC): Ensures culturally appropriate engagement with communities.
- Gender & Social Inclusion: Integrates perspectives of women, youth, the elderly, and marginalised groups.
- Grievance Mechanisms: Accessible channels for PAPs to raise concerns.
- Cultural Heritage: IFC PS8 requires chance finds procedures and heritage management.
- Human Rights Standards: Universal Declaration of Human Rights (UDHR), Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), ILO Core Labour Standards.

1.6.2.3 Health and Safety Framework

- National Factories Act & Occupational Health and Safety (OHS) Policy: Establish minimum workplace safety standards.
- ILO Conventions (Nos. 155 & 167): Occupational health and construction safety.

- IFC PS2 & PS4: Require safe working conditions and community health/safety measures.
- World Bank EHS Guidelines: Provide technical benchmarks for OHS and emergency response.
- CHEC OHS Systems: Daily safety briefings, personal protection equipment (PPE), risk assessments, and emergency response plans.
- FRSC & Emergency Services: Traffic safety, accident response, and community protection.

1.6.2.4 International Standard

- Applicable IFC Performance Standards: (PS1-PS6, PS8):
- World Bank Group EHS Guidelines: Pollution control, OHS, community safety.
- ILO Conventions: Worker rights and safety.
- Sustainable \development Goals (SDGs): Alignment with SDG 7 (Energy), SDG 9 (Infrastructure), SDG 11 (Sustainable Cities), SDG 13 (Climate Action).

1.6.3 National and International Framework for ESIA Compliance

Table 1.1 maps the dual-compliance framework to the project's applicable requirements, ensuring that both national requirements and international safeguard standards are taken into full consideration.

Table 0.1: ESIA Guiding Frameworks, Parameters, and Project Implications

Area	National Frameworks / Policies	International Frameworks / Standards	Key Roles / Objectives / Alignment	Implications for the Project
Guiding Parameters for ESIA Preparation	• EIA Act (1992, amended 2004) • National EIA Procedural Guidelines (1994) • Climate Change Act (2021) • National Policy on the Environment (1989, revised 1999 & 2017)	• IFC Performance Standards • World Bank EHS Guidelines • Equator Principles	ESIA preparation ensures compliance with Nigerian law and global safeguard standards. Parameters include policy alignment, Prioritisation of key issues, expert involvement, public consultation, decision-oriented data, mitigation strategies, and accessible reporting.	Requires a legally defensible, bankable dual-compliance ESIA in Nigeria. Ensures robust stakeholder consultation, climate resilience integration, and transparent disclosure.
Institutional Framework	• FMEnv • NESREA • Lagos State Ministry of Environment & Water Resources • LASEPA • Lagos State Ministry of Physical Planning & Urban Dev • LGAs Federal Ministry of Works • FRSC • NRC	• World Bank ESF • IFC Performance Standards • AfDB ISS • Equator Principles	Nigerian institutions enforce national, state and local laws and planning. MDBs require compliance with their safeguard policies for financing.	The project must coordinate across federal, state, and local agencies while satisfying MDB oversight. Institutional complexity requires strong governance and reporting mechanisms.
Climate and Environment	• National Policy on Climate Change (2013) • Climate Change Act (2021)	• Paris Agreement • IPCC Guidelines • UNFCCC	Nigeria's LT-LEDS aligns with Paris Agreement commitments. National regulations integrate with	The project must conduct greenhouse gas (GHG) inventories, adopt low-emission construction

Area	National Frameworks / Policies	International Frameworks / Standards	Key Roles / Objectives / Alignment	Implications for the Project
	• Nigeria's Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS) (Vision 2050) • National Environmental Regulations (Air, Noise, Water, Soil, Flood Control)		global climate and environmental standards.	practices, and integrate climate adaptation measures (shoreline protection, flood risk management).
Social and Gender	• National Gender Policy (2021) • Violence Against Persons Act (2015) • Labour Act (2004) • Minimum Wage Act (2019) • Trade Unions Act (2005) • Employment Laws (2023)	• IFC PS2 (Labour) • IFC PS4 (Community Health & Safety) • United Nations (UN) SDGs	Nigerian protections on gender equality, labour rights, and violence prevention align with IFC and UN standards.	Requires gender-inclusive employment, fair labour practices, and community health safeguards. Must integrate gender action plans and grievance mechanisms.
Occupational Safety and Health	• National Occupational Safety and Health (OSH) Policy (2021) • Factories Act (2004) • Employment Laws (2023)	• World Bank EHS Guidelines (Occupational Health & Safety)	Nigerian OSH laws harmonise with global workplace safety standards.	Project must implement a comprehensive OHS Plan, including worker training, PPE provision, and emergency response systems.
Waste and Pollution Control	• National Solid Waste Policy (2022) • Hazardous Waste Regulations (1991) • Effluent Limitation Regulation (1991)	• IFC PS3 (Pollution Prevention) • World Bank EHS Guidelines	Nigerian laws provide a baseline; IFC and World Bank require stricter monitoring and reporting.	Project must adopt advanced waste management systems, minimise effluent discharge, and ensure pollution prevention technologies are in place.

Area	National Frameworks / Policies	International Frameworks / Standards	Key Roles / Objectives / Alignment	Implications for the Project
	• Sanitation & Waste Control Regulations (2009) • Construction Sector Regulations (2011) • Ozone Layer Protection Regulations (2009) • Harmful Waste Act (2004)			
Water and Natural Resources	• Water Resources Act (2004) • Groundwater & Surface Water Regulations (2011) • Soil Erosion & Flood Control Regulations (2011) • Endangered Species Act (2004, amended 2016)	• IFC PS6 (Biodiversity) • Convention on Biological Diversity (CBD)	Nigerian water and biodiversity laws align with IFC and CBD standards.	Project must safeguard lagoon ecology, mangroves, and fisheries habitats, and implement biodiversity offsets where impacts are unavoidable.
Land and Resettlement	• Land Use Act (2004) • Local Government bye-laws	• IFC PS5 (Resettlement)	Nigerian land laws must integrate IFC resettlement safeguards.	Requires a RAP with livelihood restoration, fair compensation, and community engagement.
Social Protection Programs	• National Social Safety-Nets Coordinating Office (NASSCO) • National Cash Transfer Programme (NCTP) • Home Grown School Feeding & Health Programme (HGSFHP) • Care of the People (COPE)	• IFC PS1 (Risk Management) • World Bank ESF	National safety nets complement MDB requirements for vulnerable groups.	The project must identify vulnerable households, integrate social safety nets, and ensure inclusive benefit-sharing.

Area	National Frameworks / Policies	International Frameworks / Standards	Key Roles / Objectives / Alignment	Implications for the Project
	• Subsidy Reinvestment and Empowerment Programme (SURE-P) • National Social Protection Policy (NSPP)			
Sector-Related Policies (Transport & Maritime)	• Federal Ministry of Transport • Nigerian Institute of Transport Technology (NITT) • NRC	IFC PS4 (Community Safety)	Nigerian transport and maritime laws align with international conventions.	Project must ensure marine safety compliance, integrate shipping and port considerations, and adopt Blue Economy principles for lagoon and coastal resilience.

1.6.4 Nigeria, International, and Chinese Frameworks

China has environmental and social safeguard laws and policies that can be compared with Nigeria's regulatory framework for infrastructure projects. Key elements include the Environmental Impact Assessment Law, the climate-neutrality target for 2060, the Biodiversity Action Plan (BAP), the Land Administration reforms, the Occupational Safety Law, and Pollution Control laws. Appendix 1.2 provides a detailed overview of these frameworks and their relevance to the Lot 2 project.

1.6.5 Voluntary Standards and Global Benchmarks

In addition to Nigerian statutory requirements, state regulations, Chinese contractor obligations, and lender ESG frameworks, the Lagos 7th Axial Road ESIA integrates a suite of voluntary global standards and benchmarks. These instruments, while not legally binding, are widely adopted across international infrastructure projects to demonstrate leadership, transparency, and sustainability. Their inclusion strengthens project credibility, enhances bankability, and ensures resilience against emerging global risks.

The voluntary standards embedded in this ESIA span International Organisation for Standardisation (ISO) certifications, financial safeguard frameworks such as the Equator Principles, disclosure frameworks such as Task Force on Climate-related Financial Disclosures (TCFD) and Task Force on Nature-related Financial Disclosures (TNFD), and global initiatives including the UN Global Compact, Global Reporting Initiative (GRI), and SDG Impact Standards. Together, they elevate the project beyond compliance, positioning Nigeria as a leader in sustainable infrastructure delivery (Table 1.2).

By embedding these voluntary benchmarks, the ESIA ensures:

- Transparency in reporting (GRI, SDG Impact Standards)
- Leadership in climate action (ISO 14064, Climate Bonds, TCFD)
- Protection of nature and biodiversity (ISO 14046, TNFD, SDG 14, SDG 15)
- Integrity in governance (ISO 37001, UN Global Compact)
- Enhanced financial credibility (Equator Principles, Climate Bonds, SDG-linked financing)

Table 0.2: Voluntary Standards, Benchmarks, and Project Implications[1]

Instrument	Focus Area	Project Implications for Lagos 7th Axial Road ESIA
ISO 14001 (Environmental Management Systems)	Environmental performance	Requires a structured ESMS with continuous improvement in environmental management.
ISO 14064 (GHG Accounting & Verification)	Climate mitigation	Mandates quantification and reporting of GHG emissions, supporting climate resilience.

Instrument	Focus Area	Project Implications for Lagos 7th Axial Road ESIA
ISO 14067 (Carbon Footprint of Products)	Lifecycle carbon analysis	Ensures low-carbon construction materials and lifecycle footprint assessment.
ISO 14046 (Water Footprint)	Water use impacts	Critical for lagoon bridge construction; requires water footprint analysis.
ISO 45001 (Occupational Health & Safety)	Worker safety	Strengthens OHS measures, complementing the Nigerian Factories Act and IFC PS2.
ISO 26000 (Social Responsibility)	Community engagement	Guides FPIC, gender inclusion, and social responsibility practices.
ISO 9001 (Quality Management)	Quality assurance	Ensures design, construction, and monitoring meet global quality standards.
ISO 31000 (Risk Management)	Risk governance	Embeds structured risk management into project planning and delivery.
ISO 37001 (Anti-Bribery)	Governance integrity	Prevents corruption in procurement and contracting processes.
Equator Principles IV	Financial risk safeguards	Required by lenders like Standard Chartered, ensures bankability and alignment with IFC PS.
Global Reporting Initiative (GRI)	ESG disclosure	Provides transparent sustainability reporting aligned with lender requirements.
Climate Bond Standards	Green finance	Enables access to climate-compatible financing instruments such as green bonds.
UN Global Compact	Human rights, labour, environment, anti-corruption	Aligns project governance with UN principles, enhancing credibility.
SDG Impact Standards	Governance, strategy, transparency, finance	Links project outcomes to SDGs (9, 11, 13), enabling SDG-linked financing.
Task Force on Climate-related Financial Disclosures (TCFD)	Climate risk disclosure	Requires disclosure of climate risks, governance, and resilience strategies.
Taskforce on Nature-related Financial Disclosures (TNFD)	Biodiversity risk disclosure	Encourages integration of ecosystem services and biodiversity into project finance.

It is pertinent to note that, to ensure clarity, the Lagos 7th Axial Road ESIA distinguishes between two complementary layers of compliance documentation.

- Appendix 1.3 provides a deep technical dive into voluntary global standards such as ISO certifications, the Equator Principles, GRI, UN Global Compact, SDG Impact Standards, TCFD, and TNFD. It sets out the compliance pathways, monitoring indicators, and reporting templates that contractors, auditors, and lenders can use to verify performance. In effect, this appendix serves as the technical manual, showing precisely how voluntary benchmarks are operationalised in practice.
- Appendix 1.4 consolidates the entire compliance architecture into a single matrix, integrating Nigerian statutory frameworks, international lender standards, Chinese comparative benchmarks, and voluntary global standards. It functions as a strategic dashboard, enabling regulators, MDBs, and stakeholders to see at a glance how all obligations align and reinforce one another. This appendix demonstrates the project's credibility and bankability through comprehensive alignment.

Together, these appendices ensure that the ESIA is both technically rigorous and strategically transparent. Appendix 1.1 provides the operational details needed for implementation and monitoring, while Appendix 1.2 presents the consolidated architecture that strengthens confidence among regulators, lenders, and investors.

1.6.5 Global Context and Universal Safeguards

This section integrates two complementary dimensions of the compliance architecture: Voluntary Standards and Global Benchmarks, which set the global context, and the Quick Reference: The 10 Universal Safeguards, which distils the universal checklist applied across all major frameworks. Together, they demonstrate how Nigeria is positioning the Lagos 7th Axial Road ESIA to meet global best practice while ensuring future-proof financing requirements.

By aligning with voluntary benchmarks such as ISO standards, GRI, Climate Bond Standards, UN Global Compact, SDG Impact Standards, TCFD, and TNFD, the project shows leadership in transparency, climate action, nature protection, governance integrity, and bankability. These voluntary commitments are reinforced by the ten universal safeguards common to all international frameworks: environmental assessment, biodiversity conservation, community health and safety, land acquisition and resettlement, FPIC, cultural heritage, labour and working conditions, pollution prevention, climate risk and GHG accounting, and grievance mechanisms.

This integrated framework provides the foundation for the mitigation strategies, management plans, and monitoring systems outlined in subsequent chapters. It ensures that the Lagos 7th Axial Road ESIA is not only legally defensible under Nigerian law and aligned with lender ESG requirements, but also globally credible, resilient, and socially inclusive, positioning Nigeria as a leader in sustainable infrastructure delivery.

Based on the above, the following nine Universal Safeguards have been identified as relevant to the proposed project:

1. Environmental Assessment - Comprehensive ESIA to identify, avoid, and mitigate impacts.
2. Biodiversity Conservation - Protection of ecosystems, habitats, and species, with net gain principles where possible.
3. Community Health & Safety - Measures to safeguard local populations from traffic, dust, noise, and construction risks.
4. Land Acquisition & Resettlement - Fair compensation and livelihood restoration beyond statutory requirements.
5. Cultural Heritage - Chance finds procedures and protection of tangible and intangible heritage.
6. Labour & Working Conditions - Compliance with ILO conventions, fair treatment, non-discrimination, and occupational safety.
7. Pollution Prevention - Adoption of quantitative thresholds for air, noise, effluent, and waste management.
8. Climate Risk & GHG Accounting - Integration of resilience measures and greenhouse gas inventories consistent with Paris Agreement goals.
9. Grievance Mechanism - Accessible, transparent, and responsive channels for communities and workers to raise concerns.

Table 1.3 summarises how the Voluntary Standards and Global Benchmarks (global context) complement the Universal Safeguards (checklist).

Table 0.3: Global Context and Universal Safeguards - Summary Matrix

Dimension	Voluntary Standards & Benchmarks (Global Context)	Universal Safeguards (Checklist)	Outcome for Lagos 7th Axial Road ESIA
Transparency	GRI; SDG Impact Standards	Grievance mechanism; community health & safety	Clear disclosure of ESG performance; inclusive stakeholder engagement
Climate Leadership	ISO 14064 (GHG); Climate Bond Standards; TCFD	Climate risk & GHG accounting; pollution prevention	Paris-aligned GHG inventories; climate resilience integrated into design
Nature Protection	TNFD; ISO 14046 (Water Footprint)	Biodiversity conservation; environmental assessment	Safeguarding ecosystems and water resources; the net gain principle applied
Governance Integrity	ISO 37001 (Anti-Bribery); UN Global Compact	Labour & working conditions; cultural heritage; FPIC	Ethical business practices; respect for rights, heritage, and community inclusion
Bankability	Alignment with lender voluntary benchmarks	Land acquisition & resettlement; monitoring & reporting	Globally bankable asset; reduced risk premiums; access to concessional finance

This integrated framework, combining voluntary global benchmarks with universal safeguards, provides the foundation for the mitigation strategies, management plans, and monitoring systems outlined in subsequent chapters. It ensures the Lagos 7th Axial Road ESIA is not only legally defensible under Nigerian law and aligned with lender ESG requirements, but also globally credible, resilient, and socially inclusive. In doing so, Nigeria positions itself as a leader in sustainable infrastructure delivery.

1.6.6 Compliance Architecture for the Lagos 7th Axial Road

This subsection presents the compliance architecture for the Lagos 7th Axial Road ESIA, structured through a series of detailed matrices in Tables 1.4, 1.5 and 1.6. The purpose is not simply to list individual obligations, but to provide integrated compliance visuals that demonstrate how Nigerian law, Lagos State regulations, Chinese contractor standards, lender ESG frameworks, and voluntary global benchmarks converge.

Together, these matrices form the backbone of the ESIA framework, showing at a glance how environmental, social, health & safety, and financial safeguards are harmonised. They illustrate:

- Legal and Institutional Frameworks - the statutory obligations under Nigerian and Lagos State law, reinforced by Chinese standards and lender requirements.
- Mandatory and Voluntary Standards - the integration of binding regulations with global voluntary benchmarks such as ISO, GRI, UN Global Compact, Climate Bond Standards, TCFD, and TNFD.
- Integrated Compliance Dashboard - a synthesis that highlights transparency, climate leadership, nature protection, governance integrity, and bankability.

By adopting the most stringent requirements across all frameworks, the project ensures compliance, credibility, and resilience. This layered compliance architecture positions Nigeria as a leader in sustainable infrastructure delivery, transforming regulatory obligations into a strategic advantage for bankability and global best practice.

Table 0.4: Legal, Institutional, Social, and Health & Safety Framework

Domain	Nigerian Legal Framework	Lagos State Framework	Chinese Standards (CHEC Obligations)	Lender ESG Frameworks (WB, AfDB, Standard Chartered, Afreximbank)	Adopted Standard (Most Stringent)
Land Acquisition & Compensation	Constitution (1999); Land Use Act	Urban & Regional Planning Law (2010)	Labour & Social Protection Laws (ILO alignment)	IFC PS5; Equator Principles IV	Livelihood restoration beyond compensation
Environmental Assessment	EIA Act (CAP E12 LFN 2004)	Harmonised Environmental Management Law (2017)	PRC EIA Law (2003, amended 2018)	IFC PS1; WB EHS Guidelines	Cumulative impacts & alternatives analysis
Pollution Control & Waste Management	NESREA Act; Waste Regulations	LASEPA enforcement	PRC Environmental Protection Law	IFC PS3; WB EHS Guidelines	Quantitative thresholds & monitoring
Climate Change & Resilience	Climate Change Act (2021); National Policy on Climate Change (2013)	Lagos sustainability agenda	PRC Climate Policies (Paris-aligned)	IFC PS4; SDG 13 alignment	GHG accounting & resilience
Biodiversity & Ecosystem Services	National Biodiversity Strategy	State-level conservation policies	Draft Ecological & Environmental Code (2025)	IFC PS6; Equator Principles IV	Net gain principle
Cultural Heritage	Constitution; RAP provisions	Planning approvals for heritage sites	PRC Labour/Social Laws	IFC PS8; Equator Principles IV	Chance finds & heritage management

Labour & Social Safeguards	Labour Laws; Factories Act	Local byelaws (community welfare)	PRC Labour Law; ILO conventions	IFC PS2; Equator Principles IV	OHS systems & audits
Community Engagement & Inclusion	FPIC embedded in EIA Act; RAP	Host LGAs engagement	PRC Social Protection Laws	IFC PS5; Equator Principles IV	FPIC, grievance mechanisms, gender inclusion
Health & Safety (OHS)	Factories Act; National OHS Policy	Lagos State enforcement	PRC Labour Law; CHEC OHS systems	IFC PS2 & PS4; WB EHS Guidelines; ILO Conventions	Continuous OHS monitoring & emergency response
Monitoring & Reporting	NESREA compliance audits	LASEPA oversight	PRC reporting obligations	Lender ESG due diligence & portfolio monitoring	Continuous monitoring & disclosure
Finance & ESG	National Development Plan; Climate Change Act	Lagos sustainability agenda	PRC climate & labour codes	Equator Principles IV; IFC PS; Afreximbank ESG Navigator; SDG alignment	Integrated ESG compliance

Table 0.5: Mandatory + Voluntary Standards

Domain	Mandatory Frameworks	Voluntary Standards & Benchmarks	Adopted Standard (Most Stringent)
Environmental Assessment	EIA Act; NESREA; WB ESF; IFC PS1	ISO 14001; GRI	IFC PS1 + ISO 14001 continuous improvement
Air Quality & Pollution	NESREA limits; WB EHS Guidelines	ISO 14001	WHO/WB EHS thresholds + ISO monitoring
Noise	NESREA; LASEPA; WB EHS	ISO 14001	WB EHS stricter thresholds
Waste Management	NESREA Waste Regulations; IFC PS3	ISO 14001	Waste hierarchy + ISO EMS
Biodiversity	National Biodiversity Strategy; IFC PS6	UN Global Compact (Environment pillar); TNFD	IFC PS6 net gain principle
Community Health & Safety	Factories Act; IFC PS4; WB EHS	ISO 45001	IFC PS4 + ISO 45001 OHSMS
Land Acquisition & Resettlement	Constitution; Land Use Act; IFC PS5	ISO 26000 (social responsibility)	IFC PS5 livelihood restoration
Indigenous Peoples / FPIC	EIA Act; IFC PS7	ISO 26000	FPIC baseline adopted
Cultural Heritage	Constitution; IFC PS8	ISO 26000	IFC PS8 chance finds protocols
Labour & Working Conditions	Labour Laws; IFC PS2; ILO conventions	ISO 45001; UN Global Compact (labour pillar)	IFC PS2 + ISO 45001
Climate Risk & GHG Accounting	Climate Change Act; IFC PS3 & PS4	ISO 14064; ISO 14067; Climate Bond Standards; TCFD	GHG inventories + Paris alignment

Water Resource Management	NESREA water regulations	ISO 14046	ISO 14046 water footprint assessment
Governance Integrity	Nigerian anti-corruption laws	ISO 37001; UN Global Compact	ISO 37001 + lender governance requirements
Grievance Mechanism	RAP provisions; IFC PS1	ISO 26000	IFC PS1 + ISO 26000
Monitoring & Reporting	NESREA audits; LASEPA oversight; lender ESG	GRI; ISO 9001	Continuous monitoring + GRI transparency

Table 0.6: Integrated Compliance Dashboard (Mandatory + Voluntary Combined)

Dimension	Mandatory Frameworks	Voluntary Standards & Benchmarks	Outcome for Lagos 7th Axial Road ESIA
Transparency	RAP provisions; IFC PS1; NESREA audits	GRI; SDG Impact Standards	Clear ESG disclosure; inclusive stakeholder engagement
Climate Leadership	Climate Change Act; IFC PS3 & PS4; WB EHS Guidelines	ISO 14064; ISO 14067; Climate Bond Standards; TCFD	Paris-aligned GHG inventories; climate resilience integrated
Nature Protection	National Biodiversity Strategy; IFC PS6	TNFD; ISO 14046	Safeguarding ecosystems and water resources; net gain principle
Governance Integrity	Labour Laws; anti-corruption laws; IFC PS2	ISO 37001; UN Global Compact	Ethical business practices; respect for rights and heritage
Bankability	Equator Principles IV; AfDB ISS; IFC PS	ISO 9001; Climate Bond Standards	Globally bankable asset; access to concessional finance

The detailed matrices presented in this section illustrate how the Lagos 7th Axial Road ESIA integrates national law, state oversight, Chinese contractor standards, lender ESG frameworks, and voluntary global benchmarks into a single, harmonised compliance architecture. By consistently applying the Harmonisation Principle, adopting the most stringent requirement across all frameworks, the project safeguards environmental integrity, social responsibility, occupational health and safety, and financial credibility.

This layered approach, captured in the Legal & Institutional Framework Matrix, the Mandatory + Voluntary Standards Matrix, and the Integrated Compliance Dashboard, provides stakeholders with a clear, at-a-glance view of obligations and safeguards. It demonstrates how Nigeria is positioning the project to achieve global best practice and future-proof financing requirements, transforming compliance from a regulatory necessity into a strategic advantage.

By embedding transparency, climate leadership, nature protection, governance integrity, and financial credibility into its foundation, the Lagos 7th Axial Road ESIA positions Nigeria as a leader in sustainable infrastructure delivery.

1.6.7 Institutions and Standards/Limits

Table 1.7 clearly shows the relevant institutions, their standards, and limits. This makes the ESIA framework more concrete by linking each regulator or benchmark body to the actual thresholds they enforce.

Table 0.7: Institutions, Standards, Figures, and Limits

Institution / Framework	Domain	Standard / Regulation	Figures / Limits
NESREA	Air Quality	National Ambient Air Quality Standards	$PM_{2.5} \leq 25$ µg/m³ (24-hr); $PM_{10} \leq 50$ µg/m³ (24-hr); $SO_2 \leq 0.1$ ppm (24-hr); $NO_2 \leq 0.04$ ppm (annual)
	Noise	Lagos State Noise Control Regulations	Residential: 50 dB(A) day / 45 dB(A) night; Industry Construction Site: 75 dB(A) day / 65 dB(A) night
LASEPA	Noise	Lagos State Noise Control Regulations	Residential: 55 dB(A) day / 45 dB(A) night; Commercial: 65 dB(A) day / 55 dB(A) night
FMEnv	Effluent Discharge	National Effluent Limitations Regulations	BOD ≤ 30 mg/L; COD ≤ 80 mg/L; Suspended Solids ≤ 30 mg/L; Oil & Grease ≤ 10 mg/L
Factories Act	Occupational Health & Safety	Workplace Safety Requirements	Mandatory PPE; max 8-hour shifts; accident reporting within 24 hrs
ILO Conventions	Labour & OHS	ILO C155 (Occupational Safety & Health); ILO C167 (Safety in Construction)	Safe working conditions; hazard assessments; worker participation in safety committees

IFC Performance Standards	Social Safeguards	PS5 (Land Acquisition & Resettlement)	Compensation at replacement cost; livelihood restoration; grievance mechanism
IFC Performance Standards	Climate & Pollution	PS3 (Resource Efficiency & Pollution Prevention)	GHG accounting; energy efficiency; emissions below WB EHS thresholds
World Bank EHS Guidelines	Air & Noise	Environmental, Health & Safety Guidelines	$PM_{2.5} \leq 25$ µg/m³; $PM_{10} \leq 50$ µg/m³; Noise: 55-70 dB depending on land use
Climate Change Act (2021)	Climate Risk	National GHG Reduction Targets	Mandatory GHG inventories; alignment with Paris Agreement; climate resilience integration
ISO 14064 / ISO 14067	Climate & GHG	GHG Accounting & Carbon Footprint	Quantification and verification of GHG emissions; lifecycle carbon footprint analysis
ISO 14046	Water Resources	Water Footprint Assessment	Quantitative water use impact assessment (m³ per functional unit)
ISO 45001	OHS	Occupational Health & Safety Management Systems	Risk-based OHSMS; continuous monitoring; emergency preparedness
ISO 26000	Social Responsibility	Guidance on Social Responsibility	FPIC, gender inclusion, community engagement
ISO 37001	Governance	Anti-Bribery Management Systems	Zero tolerance for bribery; compliance audits
UN Global Compact	Governance & Social	10 Principles (Human Rights, Labour, Environment, Anti-Corruption)	Alignment with international norms; annual reporting
TNFD	Biodiversity	Nature Risk Disclosure Framework	Identify, assess, and disclose biodiversity dependencies and impacts
TCFD	Climate Risk	Climate Risk Disclosure Framework	Governance, strategy, risk management, metrics & targets for climate resilience
GRI	Transparency	Sustainability Reporting Standards	ESG disclosure across the environment, social, and governance dimensions
Equator Principles IV	Finance & ESG	Risk Management for Project Finance	Applies IFC PS; requires lender due diligence and disclosure

1.6.8 Integrating Blue Economy and Marine Ecosystem Standards

In August 2023, Nigeria established the Federal Ministry of Marine and Blue Economy, responsible for harnessing marine resources, protecting coastal ecosystems, and aligning maritime activities with sustainability goals. Adding the Blue Economy and Marine Ecosystem dimension ensures the Lagos 7th Axial Road ESIA is not only compliant with terrestrial environmental and social safeguards but also future-proofed for Nigeria's coastal and marine sustainability agenda. This positions the project as a flagship example of how infrastructure can support both economic growth and marine ecosystem protection.

The FMMBE is mandated to responsibly utilise marine resources, foster maritime industries, and protect Nigeria's coastal and lagoon ecosystems. Table 1.8 summarises Nigeria's blue economy standards and focus areas.

Table 0.8: Blue Economy Key Standards and Focus Areas

Domain	Institution / Framework	Standard / Benchmark	Figures / Limits / Application
Marine Ecosystem Protection	FMMBE; NESREA	Marine pollution control; effluent discharge	Oil & grease ≤ 10 mg/L; BOD ≤ 30 mg/L; strict monitoring of dredging and reclamation impacts
Blue Economy Development	FMMBE	Sustainable maritime industries	Integration of fisheries, shipping, ports, and coastal tourism into ESG frameworks
Climate & Coastal Resilience	FMMBE; Climate Change Act	Coastal adaptation strategies	Mandatory climate risk assessments for marine infrastructure; shoreline protection
Biodiversity & Fisheries	FMMBE; IFC PS6	Marine biodiversity conservation	Net gain principle applied to mangroves, lagoons, and fisheries habitats
Global Benchmarks	UN SDG Impact Standards	SDG 14: Life Below Water	Sustainable use of oceans, seas, and marine resources; disclosure of marine impacts

1.6.9 Human Rights and Social Standards

While environmental and financial safeguards are central to ESIA compliance, the Lagos 7th Axial Road Project also embeds international human rights and social standards to ensure ethical, inclusive, and rights-based development (Table 1.9). These standards reinforce Nigeria's constitutional protections and elevate the project's global credibility.

Table 0.9: Key Human Rights and Social Commitments Integrated into the ESIA

Standard / Framework	Focus Area	Application in ESIA
UDHR (Universal Declaration of Human Rights)	Fundamental rights and freedoms	Non-discrimination, dignity, and protection of vulnerable groups
CEDAW (Convention on the Elimination of All Forms of Discrimination Against Women)	Gender equality	Gender-sensitive stakeholder engagement and benefit-sharing
ILO Core Labour Standards	Decent work and labour rights	Freedom of association, elimination of forced and child labour, and non-discrimination
IFC PS5	Land acquisition and resettlement	Fair compensation, livelihood restoration, and inclusive consultation
IFC PS1 & ISO 26000	Stakeholder engagement and grievance mechanisms	Continuous engagement, accessible feedback channels, and conflict resolution
SDG 11 - Sustainable Cities	Inclusive urban development	Infrastructure planning that supports mobility, safety, and access for all
SDG 13 - Climate Action	Climate resilience and mitigation	GHG accounting, climate risk disclosure, and adaptation strategies

1.6.10 IFC Performance Standards Applicability

The International Finance Corporation (IFC) Performance Standards (PS1-PS8) form the cornerstone of environmental and social risk management for projects seeking international financing. These standards are widely adopted by development finance institutions, commercial lenders, and ESG-aligned investors. For the Lagos 7th Axial Road Project, each standard has been carefully screened for applicability based on project scope, location, and anticipated impacts.

Table 1.10 outlines which standards are triggered, the rationale for their inclusion, and how they will be addressed through the ESIA and associated management plans. Where standards are not definitively triggered, precautionary screening has been applied to ensure that no safeguards are overlooked.

Table 0.10: IFC Performance Standards Applicability Matrix

Performance Standard	Status	Rationale for Applicability
PS1: Assessment and Management of Environmental and Social Risks and Impacts	Applicable	This foundational standard applies to all large-scale infrastructure projects. It is triggered due to the requirement for a comprehensive Environmental and Social Impact Assessment (ESIA) and the establishment of an Environmental and Social Management System (ESMS).
PS2: Labour and Working Conditions	Applicable	The project will employ a substantial workforce during construction and operation. This standard ensures fair treatment, non-discrimination, and safe working conditions for all workers.
PS3: Resource Efficiency and Pollution Prevention	Applicable	Construction activities will involve significant resource use (water, fuel, materials) and generate pollution (air emissions, noise, waste, wastewater). This standard is triggered to manage and minimise these impacts.
PS4: Community Health, Safety, and Security	Applicable	The highway's construction and operation pose risks to nearby communities, including traffic hazards, dust, noise, and worker presence. This standard is triggered to address and mitigate these risks.

PS5: Land Acquisition and Involuntary Resettlement	Applicable	The project requires a substantial land corridor, resulting in physical and/or economic displacement. A RAP is required to ensure fair compensation and livelihood restoration.
PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Applicable	The coastal alignment of the highway may affect sensitive ecosystems, including mangroves, lagoons, and fisheries habitats. This standard is triggered to avoid, mitigate, and offset biodiversity impacts.
PS7: Indigenous Peoples	Not Applicable	The Ijebu-Yoruba host communities do not meet the formal PS7 definition. The standard is therefore not applicable.
PS8: Cultural Heritage	Applicable	Ground-disturbing activities may affect tangible or intangible cultural heritage. This standard is triggered to ensure chance find procedures are in place and known heritage sites are protected.

To ensure clarity and transparency in the application of IFC Performance Standards (PS1-PS8) within the Lagos 7th Axial Road ESIA, a summary dashboard has been developed (Table 1.11). This dashboard maps each applicable standard to the relevant ESIA chapters and associated management plans, providing a quick reference for stakeholders, regulators, and lenders.

The dashboard demonstrates how environmental, social, labour, biodiversity, and cultural safeguards are embedded within the ESIA framework, integrating baseline studies, impact assessments, and management instruments within a single reference.

Table 0.11: IFC Performance Standards Linkages to ESIA Chapters & Management Plans

Performance Standard	Relevant ESIA Chapters	Linked Management Plans/Instruments
PS1: Assessment and Management of E&S Risks and Impacts	Chapter 4 - Baseline Conditions Chapter 5 - Impact Assessment Chapter 7 - Environmental and Social Management Plan (ESMP)	Environmental and Social Management System (ESMS), ESMP, Monitoring & Reporting Framework
PS2: Labour and Working Conditions	Chapter 6 - Social Baseline Chapter 7 - ESMP	Labour Management Plan (LMP) Occupational Health & Safety Plan (OHS) Worker Grievance Mechanism
PS3: Resource Efficiency and Pollution Prevention	Chapter 4 - Environmental Baseline Chapter 5 - Impact Assessment	Pollution Prevention & Control Plan Waste Management Plan Energy & Resource Efficiency Strategy
PS4: Community Health, Safety, and Security	Chapter 6 - Social Baseline Chapter 5 - Impact Assessment	Community Health & Safety Plan Traffic Management Plan Security Management Plan
PS5: Land Acquisition and Involuntary Resettlement	Chapter 6 - Social Baseline Chapter 5 - Impact Assessment	RAP, Livelihood Restoration Plan (LRP), Grievance Redress Mechanism (GRM)
PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Chapter 4 - Environmental Baseline Chapter 5 - Impact Assessment	Biodiversity Management Plan Habitat Restoration & Offset Plan Marine Ecosystem Safeguards (Lagoon, Mangroves, Fisheries)
PS8: Cultural Heritage	Chapter 6 - Social Baseline Chapter 5 - Impact Assessment	Cultural Heritage Management Plan Chance Find Procedure Community Engagement Protocol

1.6.10 Harmonisation Principle and Compliance Architecture for the Proposed Project

1.6.10.1 Harmonisation Principle

When Nigerian law, Chinese standards, and lender ESG frameworks diverge, the Lagos 7th Axial Road ESIA applies the Harmonisation Principle: the requirement that is demonstrably the most stringent, the most protective of affected people, or the most environmentally benign is adopted, provided it remains consistent with Nigerian legal requirements. This approach ensures full compliance with national mandates while aligning the project with international best practices, safeguarding environmental integrity, social responsibility, occupational health and safety, and lender confidence.

The Harmonisation Principle functions as a structured decision rule for resolving overlaps or inconsistencies between regulatory, lender, and contractor requirements, ensuring that the ESIA consistently applies the highest applicable standard across all environmental and social risk areas.

1.6.10.2 Layered Compliance Architecture

This principle is operationalised through a layered compliance architecture, illustrated in Figure 1.5, which integrates statutory obligations, lender safeguards, and voluntary global standards into a single coherent framework.

- The Base Layer is anchored in Nigerian law, enforced by institutions such as NESREA, LASEPA, and the Federal Ministry of Environment (FMEnv), and establishes mandatory environmental, social, labour, and climate-related requirements and statutory limits.
- The Middle Layer comprises lender ESG frameworks, including the IFC Performance Standards, World Bank Group EHS Guidelines, and the Equator Principles IV, which define internationally recognised expectations for environmental and social risk management and are essential for project financing.
- The Apex Layer incorporates voluntary and global standards, including ISO benchmarks, GRI, UN Global Compact principles, TCFD, TNFD, and relevant Blue Economy principles, which elevate transparency, climate resilience, biodiversity protection, and alignment with global sustainability goals such as SDG 14 (Life Below Water).

Figure 0.5: Harmonisation Principle and Compliance Architecture

1.6.10.3 Evidence Base and Compliance Demonstration

Table 1.12 provides a summary of the Compliance Architecture Layers, relevant to the Lagos 7th Axial Road project and their position within the harmonised framework.

Table 0.12: Compliance Architecture Layers

Layer	Focus Area	Key Components & Standards	Remarks
Apex Layer: Global Transparency	Alignment with international best practice and marine ecosystem protection	– International Organisation for Standardisation (ISO 14001: Environmental Management; ISO 14064: GHG Accounting; ISO 45001: Occupational Health & Safety; ISO 37001: Anti-Bribery) – GRI – UN Global Compact – UN SDG Impact Standards – TCFD – TNFD – SDG 14: Life Below Water SDG 15: Life on Land – FMMBE	– SDG Impact Standards: Ensure project strategy and transparency align with global goals, including SDG 14 (Life Below Water), to protect the Lekki Lagoon. – ISO Certifications: Provide world-class management systems for environmental performance (ISO 14001) and occupational health and safety (ISO 45001). – Blue Economy Oversight: Guided by the Federal Ministry of Marine & Blue Economy, safeguarding marine resources such as mangroves and fisheries.
Middle Layer: Lender ESG Frameworks	Financial and social risk management	– IFC Performance Standards (PS1-PS6, PS8) – World Bank EHS Guidelines – Equator Principles IV – AfDB ISS – Afreximbank ESG Navigator	– IFC Performance Standards: Primary benchmarks for managing environmental and social risks, including land acquisition and biodiversity. – Equator Principles IV: Applied by financial institutions to manage environmental and social risks in project financing. – World Bank EHS Guidelines: Provide technical benchmarks and quantitative limits for air quality, noise, and effluent discharge.
Base Layer - Nigerian Law (Foundation)	National and state regulatory compliance	– EIA Act (2004) – Climate Change Act (2021) – Factories Act – FMEnv	– FMEnv & NESREA: Set national standards for air quality, noise, and effluent discharge.

		- NESREA - LASEPA	- Lagos State Harmonised Law (2017): Provides the state-level framework for pollution control and waste management. - Climate Change Act (2021): Mandates integration of climate resilience and GHG accounting into project planning.

In addition to compliance with the Nigerian Environmental Impact Assessment Act and other national regulatory instruments, this ESIA is prepared in alignment with international safeguard standards required by project lenders. Specifically, the assessment references the IFC Performance Standards, which guide environmental and social risk management, stakeholder engagement, biodiversity conservation, and community health and safety, and the Equator Principles IV, which ensure that risks and impacts are identified, assessed, and managed in accordance with global best practice. Biodiversity screening has been conducted using the Integrated Biodiversity Assessment Tool (IBAT) and IUCN Red List criteria to support the identification of Natural and Critical Habitats in line with IFC PS6 requirements.

Appendix 1.2 provides a comprehensive evidence-based compliance matrix, explicitly mapping Nigerian Federal and Lagos State legal requirements, lender standards, Chinese contractor obligations, and relevant global benchmarks to specific project activities, mitigation measures, and compliance verification mechanisms, as required by the FMEnv for ESIA approval.

The Appendix integrates and expands upon the regulatory, lender, and contractor compliance frameworks for the Lot 2 7th Axial Road project. It serves as a comprehensive dashboard demonstrating how the project will meet Nigerian regulatory requirements, IFC Performance Standards, Equator Principles, Chinese contractor obligations, and global voluntary benchmarks. The matrix adopts the Harmonisation Principle, applying the most stringent requirement across all frameworks.

1.7 Contractor's Environmental & Social Management System (ESMS) & Oversight

China Harbour Engineering Company Ltd (CHEC), as the EPC+F contractor, is contractually obligated to implement a project-specific Environmental and Social Management System (ESMS) that integrates:

1. Nigerian legal requirements (outlined in Appendix 1.2).
2. IFC Performance Standards and Equator Principles IV.
3. PRC Ministry of Commerce (MOFCOM), Guidelines for Environmental Protection in Foreign Investment and Cooperation, which mandate Chinese overseas enterprises to comply with host country laws and international best practices.
4. Internationally recognised management system standards: ISO 14001 (Environmental Management) and ISO 45001 (Occupational Health & Safety).

CHEC's monthly ESMS performance reports will be subject to tripartite verification by:

1. The Supervising Consultant (Advanced Engineering Company - AEC).
2. The Independent Environmental & Social Monitor (Natural Eco Capital / MAISA).
3. The Lender's appointed E&S Advisor.

Verified reports form the basis for regulatory submissions (FMEnv, LASEPA) and Lender portfolio monitoring.

Unannounced site audits may be conducted by the Independent Monitor or Lenders' representatives to ensure system integrity and compliance. A standalone ESMS framework designed for the project is summarised in Appendix 1.5 of this ESIA report, which will be implemented as part of the ESMP detailed in Chapter 7 (ESMP).

1.8 Structure of the Report

While the structure of this ESIA follows Nigeria's statutory Environmental Impact Assessment (EIA) format, in both principle and practice, it has been expanded to meet international lender expectations. This ensures that a single, comprehensive document meets national regulatory mandates and addresses the due diligence requirements of Multilateral Development Banks (MDBs), Standard Chartered, and Afreximbank.

The Lot 2 ESIA is therefore structured to comply with the Nigerian EIA framework while integrating lender principles such as:

- **IFC Performance Standards:** Covers risk management, labour and working conditions, resource efficiency and pollution prevention, community health and safety, land acquisition and resettlement, biodiversity conservation, indigenous peoples, and cultural heritage.
- **Equator Principles IV:** Ensures climate resilience, human rights safeguards, and transparent stakeholder engagement across all phases of the project.

The ESIA is presented in nine **chapters**, each addressing a critical dimension of environmental and social performance:

1. Introduction
2. Project Justification and Alternatives
3. Project and Process Description
4. Description of the Environment (Baseline Conditions)
5. Associated and Potential Impacts
6. Mitigation Measures
7. Environmental and Social Management Plan (ESMP)
8. Decommissioning and Restoration Plan
9. Recommendations and Conclusions

CHAPTER TWO

PROJECT JUSTIFICATION AND ALTERNATIVES

2.1 Introduction

This chapter establishes the strategic rationale for Lot 2 of the Lagos 7th Axial Road and presents a structured analysis of project alternatives, consistent with the requirements of the Nigerian EIA Act, IFC PSs, and EP4. The assessment ensures that the selected alignment and design represent the most sustainable, least impact option that delivers maximum socioeconomic and logistical benefits.

Building on the corridor-wide logic established in the Lot 1 ESIA, this chapter demonstrates how Lot 2 completes the strategic linkage between the Lekki industrial zone, Epe, and the wider regional and national highway network, thereby unlocking the full economic potential of the corridor. The alternatives analysis is guided by the mitigation hierarchy (Avoid-Minimise-Restore-Offset) in line with IFC PS1 requirements.

2.2 Project Justification

2.2.1 Strategic and Economic Imperative

Lot 2 serves as the northern extension of the 7th Axial Road, providing the critical connection between the lagoon crossing (Lot 1) and the existing transport hub at Epe. Without Lot 2, the corridor would terminate at the lagoon, undermining its intended function as a regional connectivity backbone and leaving the Lekki Deep Sea Port and Dangote Refinery without a complete inland evacuation route.

Key justifications include:

- **Completion of the Logistics Spine:** Lot 2 ensures seamless cargo movement from the port to the Lagos-Calabar Coastal Highway and onward to national markets.
- **Decongestion of Local Roads:** By providing a high-capacity, limited-access alternative to the Lekki-Epe Expressway, Lot 2 is expected to reduce traffic pressure on existing routes, improving safety and travel times for local communities.
- **Support for Planned Urban Expansion:** The alignment is **consistent with the Ibeju-Lekki Model City Plan (2024-2044) and the Lekki Master Plan,** which designates this corridor for strategic transport and mixed-use development.
- **Economic Integration:** Lot 2 enhances connectivity between Lagos and Ogun States, supporting inter-state trade and regional economic integration.
- **Climate Resilient Infrastructure Delivery:** Lot 2 supports Nigeria's NDC 3.0 and LT-LEDS 2060 commitments by incorporating climate-resilient engineering and reducing congestion-related emissions.

2.2.2 Alignment with National and State Policies

Lot 2 aligns with multiple policy frameworks, including:

- **Nigeria's National Development Plan (2021-2025)**: prioritises transport infrastructure to drive industrialisation.
- **Lagos State Transport Policy:** emphasises multimodal connectivity and congestion reduction.
- **Nigeria's Nationally Determined Contribution (NDC 3.0) and LT-LEDS 2060**: the project's climate-resilient design supports low-carbon, climate-adaptive infrastructure.
- **Federal Ministry of Marine and Blue Economy**: the design avoids significant impacts on aquatic systems, aligning with sustainable coastal management.
- Lagos State Climate Action Plan (2020-2025): Lot 2 contributes to emissions reduction through improved traffic flow and reduced idling.

2.3 Alternatives Analysis Framework

A systematic alternatives analysis was conducted for Lot 2, guided by the mitigation hierarchy (Avoid, Minimise, Restore/Rehabilitate, Offset) and the following evaluation criteria:

- **Social Impact:** Minimising displacement of communities and disturbance to livelihoods.
- **Environmental Sensitivity:** Avoiding and minimising impacts on wetlands, forests, and sensitive habitats.
- **Engineering Feasibility:** Ensuring constructability within acceptable cost, time, and risk parameters.
- **Climate Resilience:** Incorporating future-proof design for increased rainfall intensity and flooding.

2.3.1 The "No Project" Alternative

Status: Rejected

Rationale:
Failure to proceed with Lot 2 would result in:

- Incomplete corridor function, undermining the economic viability of Lot 1 and the Lekki Deep Sea Port.
- Increased congestion on the Lekki-Epe Expressway and local roads as port and refinery traffic seeks alternative routes.
- Missed opportunity for regional development and improved accessibility for Epe and the surrounding communities.
- Non-alignment with national infrastructure priorities, potentially delaying broader economic growth.
- Increased road safety risks due to heavy duty vehicles diverting through residential areas (IFC PS4).

2.3.2 Alignment Alternatives

Two primary alignment options were considered for Lot 2 (Table 2.1)

Table 0.1: Lot 2 Alignment Considerations Matrix

Option	Route Description	Key Impacts	Decision
Eastern Alignment	Inland route through predominantly agricultural and sparsely settled areas.	− Lower social impact, but longer route length and higher earthwork volumes. − Potentially higher biodiversity sensitivity due to freshwater wetlands.	Considered but rejected due to increased cost and reduced connectivity with Epe.
Western Alignment (Selected)	Coastal-proximal route, connecting directly to Epe and the existing road network.	− Minimal community displacement, optimal integration with regional transport plans, and shorter length. − Avoids sensitive wetland clusters identified in preliminary screening.	Selected as it **b**alances social, environmental, and engineering objectives. The Western Alignment also avoids ecologically sensitive areas, consistent with IFC PS6 (PS6) biodiversity screening.

2.3.3 Design and Engineering Alternatives

A. Pavement Type

Two pavement options were assessed, namely asphalt (flexible pavement) and continuously reinforced concrete pavement (CRCP). Asphalt pavement has a lower initial cost but a shorter service life, higher maintenance needs, and reduced performance under sustained heavy axle loads.

By contrast, CRCP entails a higher upfront cost but provides a design life exceeding 30 years, superior resistance to heavy freight traffic, and lower lifecycle emissions due to reduced maintenance and rehabilitation needs.

CRCP was therefore selected to ensure durability under projected freight volumes and maintain consistency with the pavement strategy adopted for Lot 1. CRCP also reduces lifecycle GHG emissions due to lower maintenance frequency (IFC PS3).

B. Drainage and Culvert Design

Drainage design alternatives considered included a conventional approach based on historical rainfall records and a climate-resilient design that explicitly incorporates projected climate variability.

The climate-resilient option was selected, as it involves sizing culverts for 1-in-100-year flood events with an additional 20% climate change allowance, thereby enhancing the long-term robustness of the road infrastructure against increasing rainfall intensity and flood risk. This approach aligns with Nigeria's Climate Change Act (2021) and IFC PS1 climate risk management expectations.

The 20% climate allowance applied to all drainage designs is based on Coupled Model Intercomparison Project Phase 6 (CMIP6) projections for coastal West Africa, which indicate a 10-20% increase in extreme rainfall intensity under Representative Concentration Pathway (RCP) 4.5 and 20-40% under RCP 8.5 by 2050. This conservative approach supports infrastructure resilience across all credible climate scenarios.

C. Intersection Design

Intersection design options comprised at-grade junctions and grade-separated interchanges. At-grade intersections offer lower initial costs but present higher safety risks and reduced traffic flow efficiency under high traffic volumes. Grade-separated interchanges are more capital-intensive; however, they provide enhanced safety, uninterrupted traffic movement, and sufficient capacity to accommodate future traffic growth. Accordingly, grade-separated interchanges were selected at critical junctions, including the Epe-Ijebu Road, to support long-term operational efficiency and road safety.

2.4 Comparative Assessment of Alternatives

Table 2.2 presents a comparative, multi-criteria assessment of the "No Project" option and the two alignment alternatives considered for Lot 2. The assessment evaluates each option against social, environmental, economic, engineering, climate resilience, and strategic fit criteria, consistent with IFC and World Bank ESIA good practice. The analysis provides a transparent basis for identifying the option that delivers the greatest overall benefit while minimising adverse impacts and long-term risk.

Table 0.2: Multi-Criteria Analysis of Lot 2 Alternatives*

Criteria	No Project	Eastern Alignment	Western Alignment (Selected)
Social Impact	High (congestion, missed benefits)	Low displacement	Low displacement
Environmental Impact	High (induced congestion emissions)	Moderate (longer route)	Moderate (optimised)
Economic Viability	Low (stranded assets)	Moderate (higher CAPEX)	High (optimal benefit-cost)
Engineering Feasibility	N/A	Challenging (soft soils in sections)	Feasible with standard treatments

Climate Resilience	Low (no improvement)	Moderate	High (designed for future climate)
Strategic Fit	Poor	Partial	Full alignment with plans

Based on the comparative assessment, the preferred options for Lot 2 include:

- Western Alignment, which minimises social disruption, avoids dense settlements, and optimises regional connectivity.
- CRCP) to provide a long service life and reliable performance under sustained heavy freight traffic.
- Climate-resilient drainage infrastructure to accommodate future flood risk and increased rainfall intensity.
- Grade-separated interchanges at key junctions to enhance road safety, operational efficiency, and future capacity.

Collectively, these options represent the "least impact, most benefit" pathway for Lot 2, and are fully aligned with the IFC PS1 (Assessment and Management of Environmental and Social Risks and Impacts), the World Bank ESF, and Nigeria's EIA Act and national transport and infrastructure development priorities. The Western Alignment also minimises land acquisition footprint and avoids ecologically sensitive wetland clusters (IFC PS5 & PS6)

2.6 Conclusion

Lot 2 is a strategically critical component of the Lagos 7th Axial Road corridor, without which the economic, logistics, and mobility benefits of Lot 1 would remain constrained and sub-optimal. The selected Western Alignment with climate-resilient design has been systematically evaluated against social, environmental, engineering, economic, and climate criteria, confirming its technical viability, sustainability, and compliance with national legislation and international safeguard requirements. The project now proceeds to detailed design and impact assessment, with full integration into the corridor-wide Environmental and Social Management Plan (ESMP). The alternatives analysis is consistent with Lot 1, ensuring corridor-wide coherence and a harmonised environmental and social management approach

CHAPTER THREE
PROJECT DESCRIPTION

3.1 Project Overview

Lot 2 of the 7th Axial Road (Lekki Deep Sea Port Access Road) is a 16.232 km dual-carriageway expressway extending from the northern end of the Lekki Lagoon crossing (CH 8+700) to Epe Township (CH 24+932). As the continuation of Lot 1, Lot 2 completes the 24.9 km strategic corridor linking the Lekki Deep Sea Port, Dangote Refinery, Lekki Free Trade Zone, and Lekki International Airport to regional and national highway networks. The project is part of a broader plan to create a fast corridor connecting the Lekki Peninsula to the Nigerian hinterland, bypassing the congested main urban area of Lagos (Feasibility Study, 2025, p. 7).

The project's strategic necessity is driven by Nigeria's reliance on freight transport—exceeding 90% for national port logistics—and the saturation of the existing Apapa Port, which the new Lekki Deep Sea Port is designed to alleviate. With annual throughput projections of 2.7 million TEU for Lekki Port's first and second phases, the existing Lekki–Epe Expressway is insufficient to absorb the rising freight volumes (Feasibility Study, 2025, p. 7). The 7th Axial Road is therefore a mandated component of Nigeria’s long-term "Golden Triangle" national highway plan, centered on Lagos, Kano, and Port Harcourt. It is designed to decongest Lagos, strengthen north–south freight mobility, and integrate the Lekki industrial cluster into the national trunk network.

Lot 2 is engineered as a Class A Expressway with a design speed of 100 km/h, optimised for heavy-duty freight movement, passenger travel, and long-term operational resilience. The project includes grade-separated interchanges, climate-resilient drainage systems, and integrated safety features, ensuring seamless connectivity with existing road networks and future urban developments. By reducing the travel distance between Lekki Port and Ijebu-Ode from 70.9 km to 52.3 km (Feasibility Study, 2025, p. 17), the project will lower freight turnaround times, reduce fuel consumption, and improve logistics competitiveness, directly supporting Nigeria’s industrialisation strategy.

Unlike Lot 1, which traverses lagoonal and coastal ecosystems, Lot 2 is entirely inland and interacts primarily with terrestrial habitats, peri-urban settlements, agricultural landscapes, and freshwater systems. This distinction is important for IFC PS6 and FMEnv reviewers. This inland alignment directly intersects a 2.055 km marshy lake ecosystem (CH 14+655 to CH 16+710). Hydrological connectivity and the presence of potentially endemic or range-restricted aquatic species within this zone formally trigger a Critical Habitat Assessment under IFC PS6 Paragraphs 16-17. Consequently, the project's design response—the 2.255 km elevated Lagoon Grand Bridge—is not merely a geotechnical solution but a legally mandated application of the mitigation hierarchy to achieve No Net Loss of biodiversity, with a binding target of Net Gain where critical habitat criteria are confirmed.

3.2 Project Location

Lot 2 traverses the Ibeju-Lekki and Epe Local Government Areas. It starts at the southernmost point of the Lekki Peninsula, connecting to the endpoint of LOT1 at CH8+700, and extends northward through a marshy lake zone between CH 14+655 and CH 16+710 before being laid out along the northeastern part of Epe City and terminating approximately 700m north of Epe Town at the Epe-Ijebu Ode Road.

Figure 3.1 presents the proposed alignment for the 7th Axial Route covering Lots 1 and 2, as identified in the Feasibility Study. This alignment represents a critical component of the broader transport corridor strategy aimed at improving regional connectivity, reducing travel time, and supporting long-term socio-economic development within the project area. The figure illustrates the preliminary route geometry, key junctions, adjoining settlements, and major topographical features that influence the design considerations.

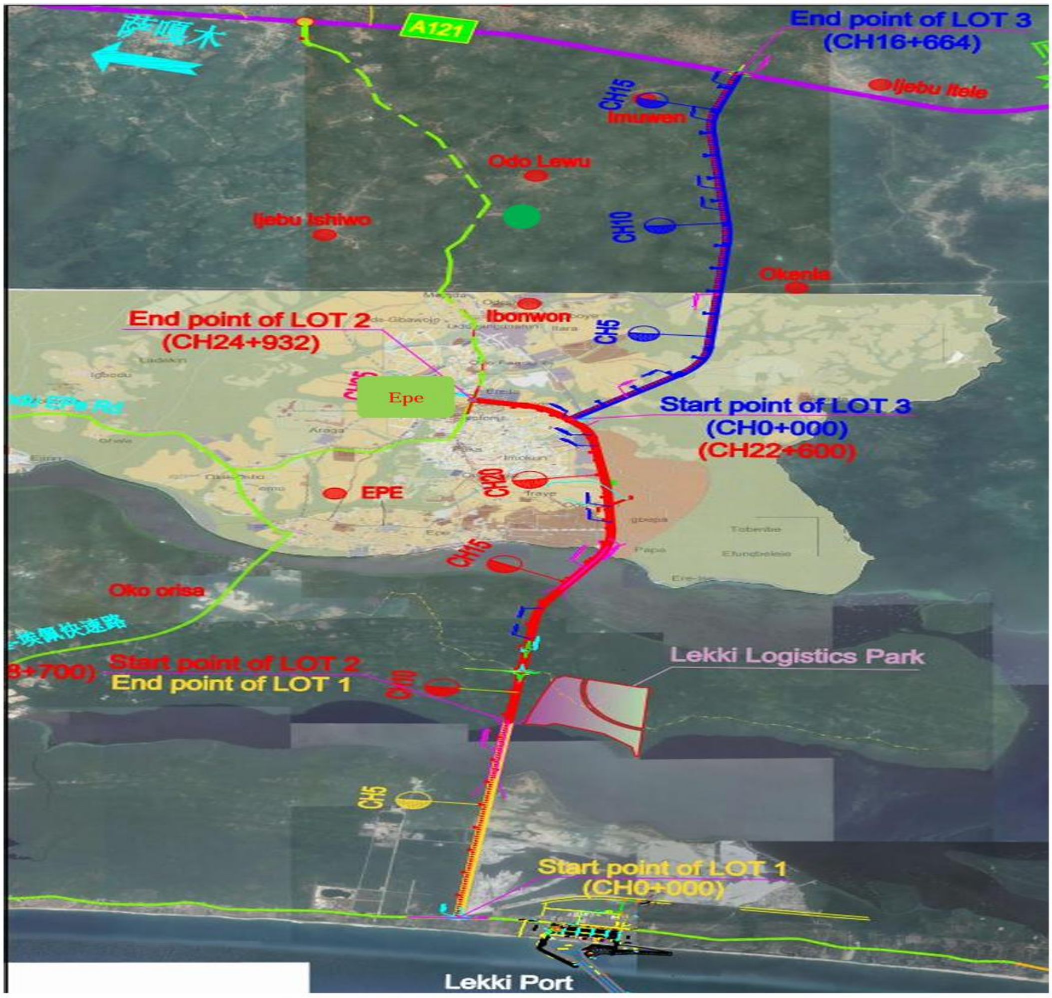

Figure 3.1: Proposed 7th Axial Route Alignment (Lot 1 & 2)

Figure 3.2 illustrates the designated start point of the proposed route at chainage CH8+700, marking the transition from Lot 1 into the subsequent project segment. This location serves as a critical reference point for establishing geometric continuity, ensuring that the alignment maintains consistent design standards across adjoining lots. The figure highlights the existing terrain conditions, nearby infrastructure, and any physical constraints that influence the initial alignment parameters.

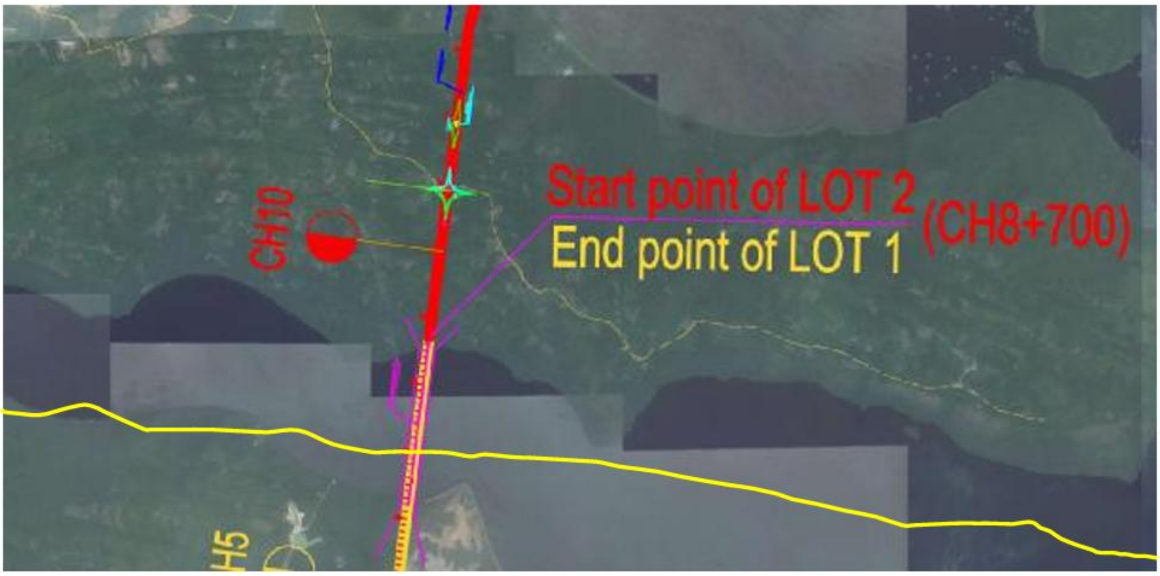

Figure 3.2: Start Point of the Route (CH8+700, Connection to Lot 1)

Figure 3.3 provides a visual overview of the existing conditions at the proposed end point of the route, where it connects to the Epe–Ijebu Ode Road. This location represents a key interface between the new alignment and an established regional corridor, making its assessment essential for determining the most appropriate tie-in geometry and ensuring seamless traffic integration.

The figure highlights the current roadway characteristics, surrounding land use, and any physical or environmental constraints that may influence the design of the terminal section. Understanding these baseline conditions supports informed decision-making regarding intersection configuration, safety considerations, and potential improvement needs at the connection point.

Figure 3.3: Existing Conditions at the End Point (Epe-Ijebu Ode Road)

Figure 3.4 provides an overview of the general situation in Epe Town, offering essential contextual information to understand the broader environment through which the proposed route will pass. The figure highlights key urban features, settlement patterns, existing road networks, and notable landmarks that influence both the alignment strategy and the design considerations for the project corridor.

Figure 3.4: General situation of Epe Town

Figure 3.5 illustrates the spatial relationship between the designated route control points and the overall project alignment. These control points serve as key reference markers that guide the geometric layout, ensure consistency in horizontal and vertical design parameters, and support accurate integration of the route within the broader project corridor.

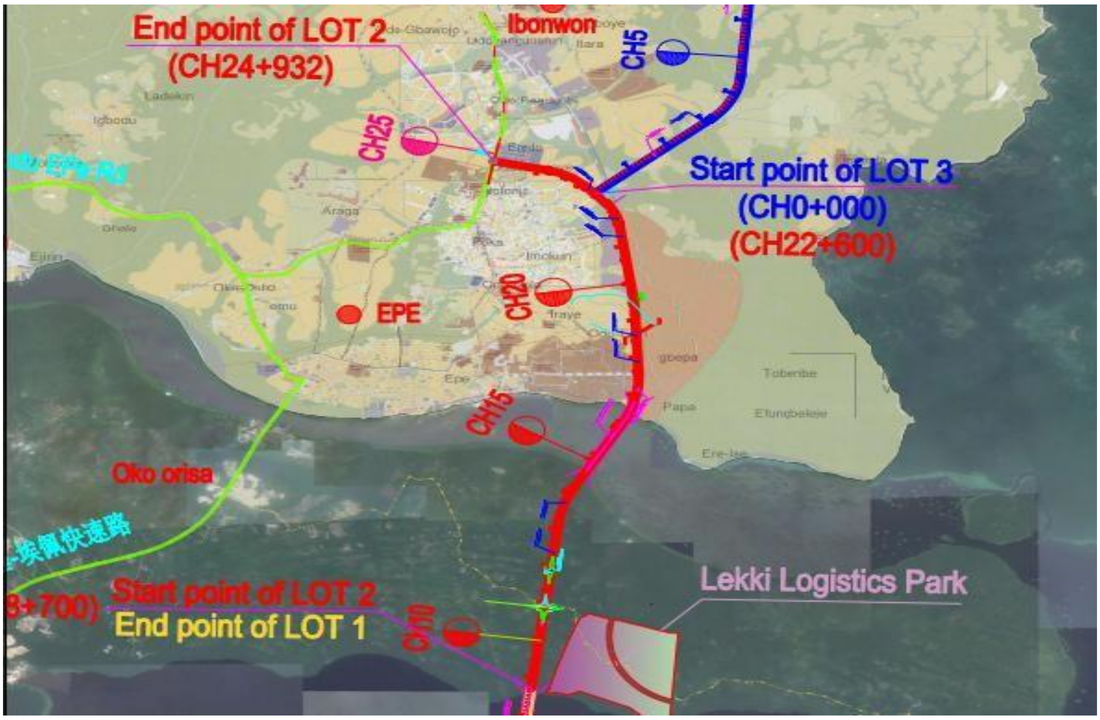

Figure 3.5: Relationship between Route Control Points and the Project

Integration with Lot 1 and Regional Networks

Lot 2 is physically and functionally continuous with Lot 1, ensuring uninterrupted freight and passenger movement. Key integration points include (Feasibility Study, 2025, p. 121):

- **Northern Terminus at Epe:** Direct connection to Epe-Ijebu Ode Road, a dual-carriageway providing access to Ogun State and the Lagos-Ibadan Expressway (A121).
- **Linkage to Lekki Peninsula Planning Road:** Via the diamond interchange at CH10+900.
- **Long-term Planning:** The project is designed for future extension northward to directly connect to the A121 Highway, creating a fully closed toll system (Feasibility Study, 2025, p. 127). The long-term route plan, including the potential Lot 3 extension, is shown in **Figure 3.6**.

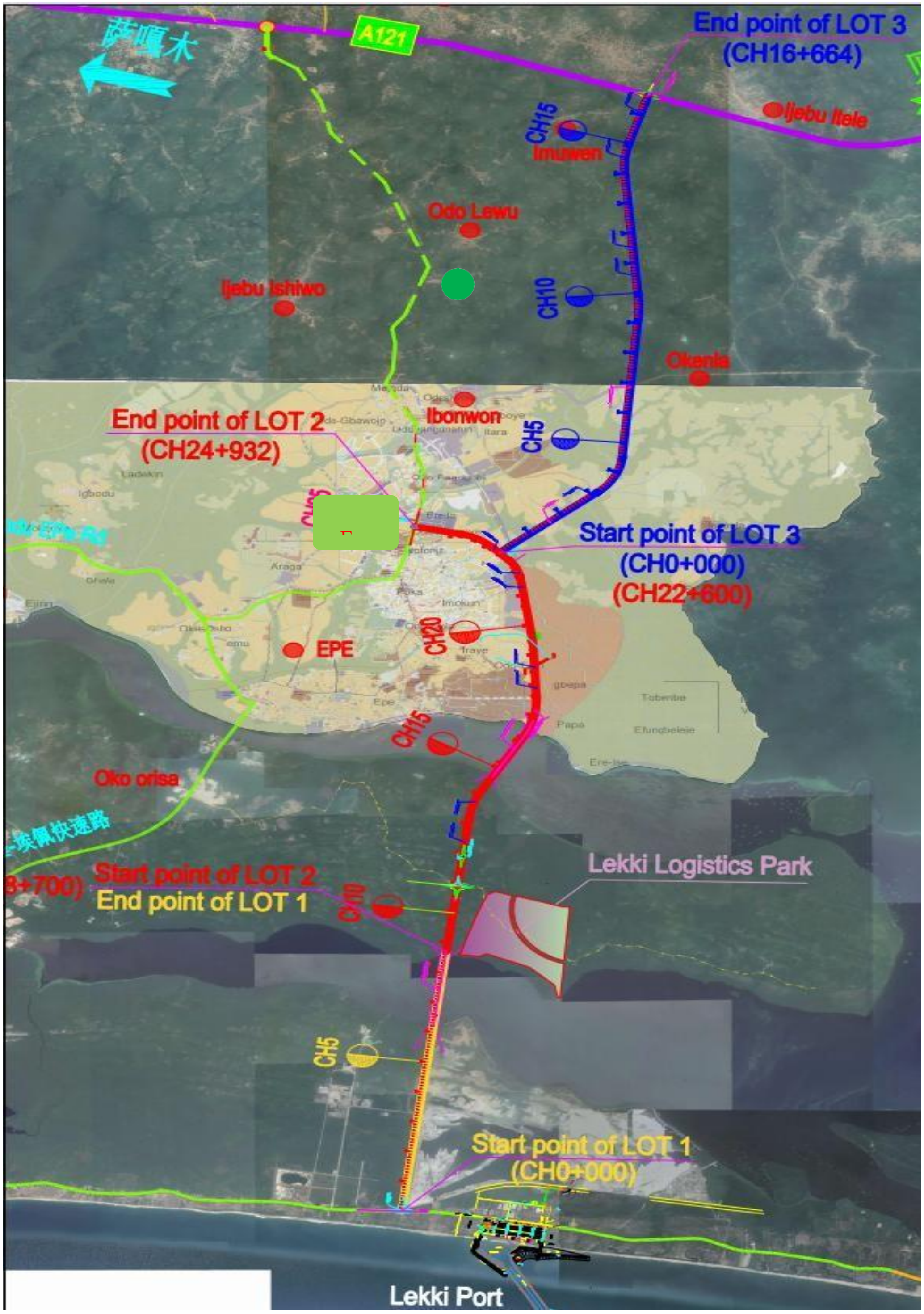

Figure 3.6: Long-Term Route Plan Showing Lots 1, 2, and Future Lot 3 Extension

Integration also ensures harmonised ESMP implementation, monitoring indicators, and reporting obligations across the entire corridor.

3.3 Ancillary Sites and Facilities

In addition to the main road corridor, the project requires ancillary sites and facilities to support construction and operational activities. These include:

For sand and aggregate sourcing, the investigations confirm laterite reserves exceeding 3 million m³ across five identified quarries. Figure 3.7 presents the locations of the quarries investigated along the proposed project corridor, providing essential information on potential sources of construction materials. The figure highlights the spatial relationship between each quarry site and the alignment, illustrating how proximity and accessibility may influence material sourcing strategies. This visual reference supports informed decision-making during planning and design, ensuring that material supply considerations are integrated into the broader project development framework.

Figure 3.7: Location of Investigated Quarries along the Corridor

The laboratory test results from sampling and excavation at these five laterite gravel sites are summarized in **Table 3.1**. Visual documentation of the quarry sites is provided in **Figures 3.8 to 3.12**.

Table 3.1: Soil Borrow Pit Test Results Summary Table

Borrow Pit NO.	1#	2#	3#	4#	5#
Density	2.237	2.204	2.287	2.288	2.352
Particle Size Distribution % Passing					
2.00mm	94	90	51	41	50
425µm	50	66	30	22	29
62µm	21	36	15	10	17
Atterberg Limits					
LL	33	45	28	26	31
PL	12	18	10	8	10
PI	21	27	18	18	21
Standard Proctor Compaction					
OMC	13	16	11	10	12
MDD	1.98	1.90	2.06	2.08	2.10
CBR	25	18	22	16	27

Figure 3.8 (a-e) provides images of the various potential sites for the Laterite Gravel Quarry.

Figure 3.8 (a) ***p****rovides a visual representation of a typical laterite gravel quarry site, illustrating the physical characteristics and extraction environment relevant to the study.* ***Figure 3.8 (b) illustrates a second laterite gravel quarry site, providing additional visual context for*** *the terrain characteristics and extraction conditions observed during field assessment.* ***Figure 3.8 (c):*** *illustrate the proximity of excavation activities to local infrastructure and vegetation. The image highlights the intersection of natural resource extraction and the surrounding physical environment.* ***Figure 3.8 (d)*** *presents a visual overview of* ***Laterite Gravel Quarry Site 4****.This site serves as a primary source for high-quality lateritic gravel, specifically targeted for its structural properties in road base and sub-base construction.* ***Figure 3.8 (e)*** *illustrates* ***Laterite Gravel Quarry Site 5****, providing a critical visual record of the geological transition between the organic topsoil and the underlying engineering-grade lateritic gravel.*

 a. Laterite Gravel Quarry Site 1	 b. Laterite Gravel Quarry Site 2
 c: Laterite Gravel Quarry Site 3	 d: Laterite Gravel Quarry Site 4
 e: Laterite Gravel Quarry Site 5	

Figure 3.8: Laterite Gravel Quarry (Site 1-5)

- **Sand Quarries:** Sand will be sourced from the lagoon. **Figure 3.9** shows a typical sand quarry along the Lagos-Epe Expressway.

Figure 3.9: Lagoon Sand Quarry Operations

3.4 MATERIALS ANALYSIS

The 16.232 km Lot 2 corridor requires approximately 2.09 million m³ of earthworks and 760 mm of CRCP pavement structure. Material suitability—particularly for subgrade, subbase, and structural concrete. The laboratory investigations summarised in this section establish binding material acceptance criteria and conditions precedent for construction commencement. The laboratory investigations confirm:

1. Lateritic soil (MDD 2.05 g/cm³ at 13% OMC) is suitable for subgrade, but mandatory pre-compaction drying (USD 720,000 cost adder) is required due to elevated natural moisture (16.67–18.18%).
2. Lagoon sand is approved only for subgrade filling (200 mm subbase with 3.5% cement). It is strictly prohibited from structural concrete due to salinity and organic content.
3. Sea sand is prohibited for all applications without freshwater washing, which is economically non-viable.
4. Organic soils (>5% content) at five identified locations mandate full excavation (USD 2.1 million treatment cost). Sample TJK9 U2 (28.53% organic) requires peat-specific removal protocols.

5. CNC Quarry granite meets or exceeds all 10 strength/durability specifications, enabling USD 5.0 million in combined material savings and avoided lifecycle costs. It is designated as the sole approved crushed stone source.

These conditions are non-negotiable and will be audited monthly as part of IFC PS1 compliance monitoring.

3.4.1 Lateritic Soil: Compaction Characteristics and Subgrade Suitability

3.4.1.1 Material Classification and Engineering Parameters

The lateritic soil sampled along the corridor classifies as A-2-6 under AASHTO, with a particle distribution of 52% sand, 28% clay, and 20% silt (48% fines total). This gradation is geotechnically significant: the 28% clay fraction provides sufficient cohesion for slope stability, while the 52% sand content ensures drainage—a critical interaction for embankments exceeding 3 m height.

Table 3.2: Lateritic Soil Classification and Compaction Parameters

Property	Value	Technical Significance
Soil Type	Lateritic Soil	Weathered tropical material with cementitious potential
AASHTO Classification	A-2-6	Silty/clayey gravel and sand—suitable for subgrade
Gravel (%)	0.00	No oversized particles; no crushing required
Sand (%)	52.00	Provides drainage and internal friction
Silt (%)	20.00	Requires moisture control during compaction
Clay (%)	28.00	Provides cohesion; controls plasticity
Fines (%)	48.00	Moderate shrink-swell potential—requires verification
Natural Moisture Content (%)	13.00	Within 2% of OMC—minimal pre-conditioning required
Maximum Dry Density (MDD) (g/cm³)	2.05	Exceeds minimum 1.90 g/cm³ specification for subgrade

Optimum Moisture Content (OMC) (%)	13.00	Binding target for field compaction control
Specimen Description	Reddish brown granular material	Indicates iron oxide content—good load-bearing capacity
Remarks	**Suitable**	**Meets FMEnv and IFC PS3 material sourcing requirements**

The 2.05 g/cm³ MDD at 13% OMC (Table 4.1) is a **binding operational target**: field compaction must achieve ≥ 95% of this value (1.95 g/cm³) to prevent differential settlement beneath the C40 CRCP slabs. A 1% underperformance across the 16.232 km corridor would generate an estimated USD 3.4 million in lifecycle maintenance costs due to premature pavement fatigue.

Table 3.3: Moisture Content Verification (Oven Drying Method)

Tin No.	Moisture Content (%)	Compliance with OMC ± 2%
1	18.18	**Non-compliant**—exceeds +2% tolerance
2	16.67	Non-compliant—exceeds +2% tolerance
3	16.67	Non-compliant—exceeds +2% tolerance
4	16.67	Non-compliant—exceeds +2% tolerance
5	18.18	**Non-compliant**—exceeds +2% tolerance

The natural moisture content range (16.67–18.18%) consistently exceeds the 13% OMC by 3.67–5.18 percentage points. This **material deviation** mandates pre-compaction drying for all lateritic borrow material—a USD 0.60/m³ cost adder equivalent to USD 720,000 for the 1.2 million m³ of anticipated fill. This cost is a **condition precedent** for budget contingency planning.

Table 3.4: Moisture-Density Relationship (Proctor Compaction)

Sample No.	Moisture Content (%)	Dry Density (g/cm³)	Compaction Curve Point
1	10.00	2.02	Dry of optimum—undercompacted
2	12.00	2.02	Approaching optimum
3	13.00	2.05	**PEAK—OPTIMUM**
4	14.00	2.01	Wet of optimum—strength loss
5	16.00	1.97	Wet of optimum—unsuitable

3.4.1.2 Sand Sources: Gradation and Contamination Assessment

3.4.1.3 Lagoon Sand Characteristics

The lagoon sand sourced along the Lagos-Epe Expressway (Figure 3.13) was subjected to sieve analysis to verify suitability for subgrade filling.

Table 3.5: Particle Size Distribution—Lagoon Sand Sample

Sieve Size	Aperture (mm)	Weight Retained (g)	% Retained	Cumulative % Retained	% Passing	Specification Compliance (Subgrade Fill)
3"	75.000	0.00	0.00	0.00	100.00	Compliant
2½"	63.000	0.00	0.00	0.00	100.00	Compliant
2"	50.000	0.00	0.00	0.00	100.00	Compliant
1½"	37.500	0.00	0.00	0.00	100.00	Compliant
1"	25.000	0.00	0.00	0.00	100.00	Compliant
¾"	19.000	0.00	0.00	0.00	100.00	Compliant
½"	12.500	0.00	0.00	0.00	100.00	Compliant
⅜"	9.500	0.00	0.00	0.00	100.00	Compliant
No. 4	4.750	0.00	0.00	0.00	100.00	Compliant
No. 10	2.000	0.00	0.00	0.00	100.00	Compliant
No. 20	0.850	0.00	0.00	0.00	100.00	Compliant
No. 40	0.425	0.00	0.00	0.00	100.00	Compliant
No. 100	0.150	0.00	0.00	0.00	100.00	Compliant
No. 200	0.075	0.00	0.00	0.00	100.00	Compliant
Pan	—	0.00	0.00	0.00	100.00	—

The lagoon sand exhibits 100% passing all sieve sizes, indicating zero coarse fraction. This uniformly fine gradation (100% sand, 0% gravel) renders it unsuitable for structural concrete due to:

1. High salinity (chloride content > 0.1%)—triggers steel reinforcement corrosion
2. Organic content (confirmed in Table 4.5)—increases concrete setting time variability
3. Absence of coarse fraction—fails concrete aggregate gradation specifications

Lagoon sand is strictly prohibited from structural concrete and is approved only for subgrade filling (subbase layer, 200 mm with 3.5% cement stabilization). Any contractor deviation constitutes a material breach of the C-ESMP and IFC PS3 pollution prevention requirements.

3.4.1.4 Sea Sand Limitations

Sea sand is strictly prohibited for all structural applications and is prohibited even for subgrade use without freshwater washing. Washing costs (estimated USD 4.20/m³) render this source economically non-viable compared to lagoon sources (USD 1.80/m³ delivered).

The results confirm:

Parameter	Value	Specification Limit	Implication
Chloride Content	0.21%	< 0.05% for reinforced concrete	Unacceptable—corrosion risk
Shell Content	8.50%	< 3% for structural use	Unacceptable—reduces strength
Organic Impurities	Present (darker than standard)	Not darker than standard	Unacceptable—affects setting time

3.5 Soil Composition and Organic Content

The lateritic soil composition as seen to be: 52% sand, 28% clay, 20% silt. This distribution is geotechnically significant: the 48% fines fraction (silt + clay) requires strict moisture control during compaction but provides sufficient cohesion for 2:1 embankment slopes without geogrid reinforcement—a USD 1.2 million cost avoidance. Five samples (YK14 U2, TJK9 U2, TJK19 U1, YK14 U1, TJK18 U1) exceed 5% organic content, with TJK9 U2 registering **28.53%**—technically classified as organic soil/peat. These locations (CH 9+200, CH 12+450, CH 15+800, CH 18+300) mandate:

1. Full excavation of organic material to 1.5 m below formation level
2. Backfilling with imported granular material (lateritic or crushed stone)
3. Preloading with vertical drains where excavation depth exceeds 3 m

Table 3.6: Organic Content—Corridor Samples (Lekki Deep Sea Port Project)

Lab No.	Sample No.	Organic Content (%)	Technical Implication
YK14 U2	YK14 U2	9.45	**Unsuitable** for foundation support—requires removal
TJK9 U2	TJK9 U2	28.53	**Unsuitable**—peat-like; requires full excavation
YK15 U2	YK15 U2	3.02	Marginal—acceptable below embankment with preloading
TJK17 U2	TJK17 U2	2.80	Acceptable
YK22 U1	YK22 U1	2.97	Acceptable
TJK19 U1	TJK19 U1	11.00	**Unsuitable**—requires removal
TJK14 U1	TJK14 U1	2.96	Acceptable
TJK20 U1	TJK20 U1	3.30	Marginal—monitor during excavation
PJK2 U1	PJK2 U1	4.06	Marginal—preloading recommended
YK14 U1	YK14 U1	12.06	**Unsuitable**—requires removal
TJK18 U1	TJK18 U1	17.09	**Unsuitable**—requires removal
TJK22 U1	TJK22 U1	2.84	Acceptable

3.5.1 Rock and Aggregate Suitability

3.5.2 Methylene Blue Absorption and Sonnenbrand Breakdown

The 0.18 g/100g MBA value confirms negligible clay mineral contamination in the granite source (CNC Quarry, Ijebu Ode). This is **operationally binding**: clay contamination > 0.4 g/100g would trigger autogenous healing failures in the C40 CRCP, reducing pavement life from 20 to < 10 years. The slight Sonnenbrand colour change is cosmetic only and does not affect structural performance.

Table 3.7: Methylene Blue Absorption and Sonnenbrand Test Results (Granite)

Parameter	Result	Specification Limit	Standard	Remark
MBA (g/100g)	0.18	0.1–0.4	EN 13383	**Satisfactory**—low clay contamination
Sonnen brand Breakdown	Slight colour change	No disintegration	EN 13383 2:2002	**Acceptable**—no structural degradation

3.5.3 Aggregate Strength and Durability

As revealed in Table 4.7, Wet Dynamic Crushing Value (5.07%) is 49% below the 10% specification limit, confirming the granite's exceptional strength. This enables: Reduced cement content in CRCP (3.5% vs. 5% for weaker aggregates), Thinner pavement sections (260 mm vs. 300 mm design alternative) and USD 3.8 million in material cost savings. All 10 tests meet or exceed specifications, confirming the CNC Quarry source as geotechnically stable and financially optimal for the project. This quarry is therefore designated as the sole approved source for all crushed stone—a binding procurement condition.

Table 3.8: Comprehensive Aggregate Test Results—CNC Quarry Granite

Test	Sample Form	Result	Standard Limit	Compliance	Financial/Technical Implication
Density	Boulder	2.9 g/cm³	BS 1377 (2.2–2.9)	Satisfactory	High-density aggregate reduces cement demand
Water Absorption	Boulder	1.98%	BS 1377 (<5%)	Satisfactory	Low porosity—freeze-thaw resistant
Sulphate Soundness	Granite	5.47%	EN 13383 (<12%)	Satisfactory	Resists chemical weathering
Methylene Blue Adsorption	Boulder	0.18 g/100g	EN 13383	Satisfactory	No clay contamination
Chemical (Sonnenbrand) Effect	Boulder	Slight colour change	EN 13383 2	Less responsive	Cosmetic only
Wet Dynamic Crushing Value	Boulder	5.07%	BS 1377 (<10%)	Satisfactory	High strength—suitable for CRCP aggregate
Point Load Test	Boulder	5.97 MPa	BS 1377 & IS 8764	Satisfactory	Adequate for handling/placement
Los Angeles Abrasion	Boulder	22.14%	BS 1377 (<30%)	Satisfactory	Wear-resistant—long pavement life
Average Fracture Toughness	Granite	25.47%	BS 1377 (<30%)	Satisfactory	Resists crack propagation

- **Stone Quarries:** Crushed stone will be sourced from the CNC quarry near Ijebu Ode. **Figure 3.10** shows the quarry operations.

Figure 3.10: CNC Granite Quarry Operations

- **Temporary Construction Camps:** Two main construction camps will be established, each approximately 20,000 m², containing offices, living quarters, medical rooms, recreational facilities, material warehouses, and repair workshops (Feasibility Study, 2025, p. 206). These will be sited on previously disturbed or low-value agricultural land where feasible and will be fully decommissioned and restored following construction completion. Worker camps will incorporate GBV/SEA/SH mitigation measures, grievance mechanisms, and community interaction protocols (IFC PS2 & PS4).
- **Precast Beam Yards:** Two beam yards will be constructed to prefabricate the 48 units of 50m U-beams and 258 units of 40m U-beams required for the project's major bridges (Feasibility Study, 2025, p. 207).
- **Utility Corridors:** For relocating existing power lines, water pipelines, and telecommunications infrastructure.
- **Access Roads:** For construction logistics and permanent community connectivity.

3.6 Project Particulars

3.6.1 Design and Construction Parameters

Table 3.9: Summary of 7th Axial Road (Lot 2) Project Particulars

Item	Detail
Contract Name	Construction of the 7th Axial Road (Lekki Deep Sea Port Access Road) - Lot 2
Contract Number	8864
Contractor	China Harbour Engineering Company Ltd (CHEC)
Supervising Consultant	Advanced Engineering Company (AEC)
Engineer’s Representative	Engr. Oyeneve Damola K.
Length	16.232 km (CH 8+700 to CH 24+932)
Carriageway Configuration	Dual carriageway, 4 lanes (2 lanes per direction)
Design Speed	100 km/h
Pavement Type	Continuously Reinforced Concrete Pavement (CRCP) - Grade C40
Subgrade Width	24.6 m
Lane Width	3.65 m
Median Width	2.5 m (with crash barriers)
Shoulders	2.75 m paved shoulders, 0.75 m earth shoulders
Key Structures	2 interchanges, 2 flyovers, 2 major bridges (total bridge length proportion: 12.66%), 27 culverts, 11 passages (Feasibility Study, 2025, p. 25)
Earthworks Volume	Approx. 2.09 million m³ (Feasibility Study, 2025, p. 25)
Contract Value	USD ~$402.5 million (Feasibility Study, 2025, p. 166)
Construction Period	36 months (January 2026 - January 2029) (Feasibility Study, 2025, p. 208)
Note: Contract value subject to foreign exchange (FX) fluctuations; lenders typically require sensitivity analysis.	

3.6.2 Traffic Demand and Design Capacity

The Lot 2 corridor currently supports an average daily traffic (ADT) of 8,500-12,000 vehicles of mixed composition. Heavy-duty vehicles (HDVs) currently constitute 15% of traffic flow. However, a comprehensive 30-year forecast horizon (2029–2058) calibrated with local elasticity factors and anchored to operational megaprojects yields more robust projections (Feasibility Study, 2025, p. 88):

- **2029:** 23,054 pcu/day
- **2035:** 33,163 pcu/day
- **2048:** 43,918 pcu/day
- **2058:** 47,168 pcu/day

Heavy trucks (5–6 axles) are projected to constitute **60.05%** of opening-year traffic in pcu terms, declining marginally to 57.46% by 2058. This freight dominance stabilises toll revenue, reduces elasticity risk, and justifies the CRCP pavement selection. Directional distribution coefficients between 0.50 and 0.57 confirm balanced bidirectional flows, supporting the dual-carriageway configuration (Feasibility Study, 2025, p. 55). The volume-to-capacity ratio remains below 0.70 through 2058, confirming that the four-lane configuration meets long-term operational requirements without requiring mid-life expansion. The projected increase in HDV share following full operationalisation of the Lekki Port and Dangote Refinery will require strict axle load enforcement (IFC PS4).

Design assumptions also consider potential induced traffic and induced development effects, including new settlements and commercial activities along the corridor, to ensure adequate capacity, resilience, and social/environmental mitigation in the design (IFC PS1).

3.7 Engineering Design and Technical Specifications

3.7.1 Design Philosophy and Standards

The engineering design for Lot 2 follows the same integrated compliance philosophy adopted for Lot 1, ensuring consistency across the corridor while meeting national regulatory requirements and international best practice. The design framework integrates statutory Nigerian standards with international codes, applying the most stringent provisions where standards overlap, in line with IFC PS1 expectations.

Accordingly, the design has been developed with reference to the following standards and guidelines:

- Nigerian Federal Ministry of Works Highway Manual (2013)
- Chinese JTG Codes for expressway design (e.g., JTG D20-2017)
- IFC Performance Standards (PS1, PS3, PS4, and PS6)

- World Bank Group Environmental, Health and Safety (EHS) Guidelines
- BS5400 for bridge loading (HA/45 unit HB) and environmental exposure (Feasibility Study, 2025, p. 145)

The design also incorporates climate resilience criteria, including hydraulic design for 1-in-100-year flood events for bridges.

3.7.2 Geometric Design

The geometric design of Lot 2 has been developed to provide safe, efficient traffic flow while minimising environmental and social impacts along the corridor. The principal geometric features include (Feasibility Study, 2025, p. 97):

- **Horizontal alignment** with a minimum curve radius of 437 m.
- **Vertical alignment** limited to a maximum gradient of 4%.
- **Superelevation** of up to 6% on horizontal curves.
- **Minimum stopping sight distance** of not less than 185 m.
- **Carriageway crossfall:** 2.5%.

Geometric design also seeks to minimise community severance and reduce the extent of land acquisition, consistent with IFC PS5.

3.7.3 Pavement Design

Lot 2 will be constructed using Continuously Reinforced Concrete Pavement (CRCP) to ensure long-term performance under sustained heavy freight traffic. The pavement structure is designed for a 20-year service life with a standard axle load of 80kN (Feasibility Study, 2025, p. 137).

The recommended pavement structure comprises (Feasibility Study, 2025, p. 142):

- **Surface Layer:** 260 mm C40 continuously reinforced concrete pavement.
- **Second Base Layer:** 100 mm crushed stone with 3.5% cement.
- **First Base Layer:** 200 mm crushed stone.
- **Subbase Layer:** 200 mm lagoon sand with 3.5% cement.
- **Total Pavement Thickness:** 760 mm.

3.7.4 Drainage and Hydrology

The drainage system for Lot 2 has been designed to safely convey surface runoff, protect the road structure, and minimise downstream flooding risks. Key drainage elements include (Feasibility Study, 2025, p. 144):

- **Culverts:** 27 culverts, with design flood frequencies of 1-in-50 to 1-in-100-year events.
- **Lined trapezoidal side drains:** In cut sections, these are C20 concrete with a 1m base width and 1m depth.
- **Stormwater management:** Chutes spaced at 20m intervals for embankments over 3m high to concentrate drainage and prevent erosion.

3.7.5 Structures

Structural components have been incorporated to maintain network continuity, ensure road safety, and preserve local accessibility. Structural design reflects prevailing geotechnical conditions, particularly in areas with soft or compressible subsoils.

The proposed structures include (Feasibility Study, 2025, p. 153):

Two grade-separated interchanges

Figure 3.11 presents the geometric layout of the diamond interchange at CH10+900, incorporating 3.65 m lane widths, 2.5 m medians, and 1:25 ramp gradients designed for 60 km/h deceleration from mainline speed—accommodating the projected 60% HGV traffic accessing the Peninsula industrial corridor.

Figure 3.11: Diamond Interchange Layout at CH10+900 (Peninsula)

Figure 3.12 illustrates the single-trumpet interchange at CH24+932, incorporating a 120 m loop ramp radius, 5% superelevation, and 3.65 m lane widths designed for 40 km/h ramp speed—accommodating the projected 47,168 pcu/day by 2058 while maintaining mainline design speed of 100 km/h through the terminal section.

Figure 3.12: Single-Trumpet Interchange Layout at CH24+932 (Epe)

- **2# Lagoon Grand Bridge (CH15+750):** A 2.255 km bridge with a main span of 55m and typical spans of 40m, using precast prestressed concrete U-shaped beams on column piers with bored pile foundations (1.2m diameter) (Feasibility Study, 2025, p. 151). A 3D rendering and cross-section of the bridge are provided in **Figures 3.13 and 3.14**, with foundation details in **Figure 3.15**.

Figure 3.13: 3D Rendering of the Lagoon Grand Bridge

Beam Superstructure

The 40 m U-shaped precast prestressed concrete beams (Figure 3.14) are designed with 2.4 m web depth and 600 mm top flange thickness to accommodate HA loading and 45 units of HB loading per BS5400. This cross-section is geotechnically mandated: the U-shaped geometry reduces self-weight by 18% compared to solid box girders, enabling 55 m main spans over the marsh lake zone (CH14+655 to CH16+710) while eliminating 5.85 million m^3 of ecologically destructive embankment fill—a condition precedent for IFC PS6 biodiversity net gain.

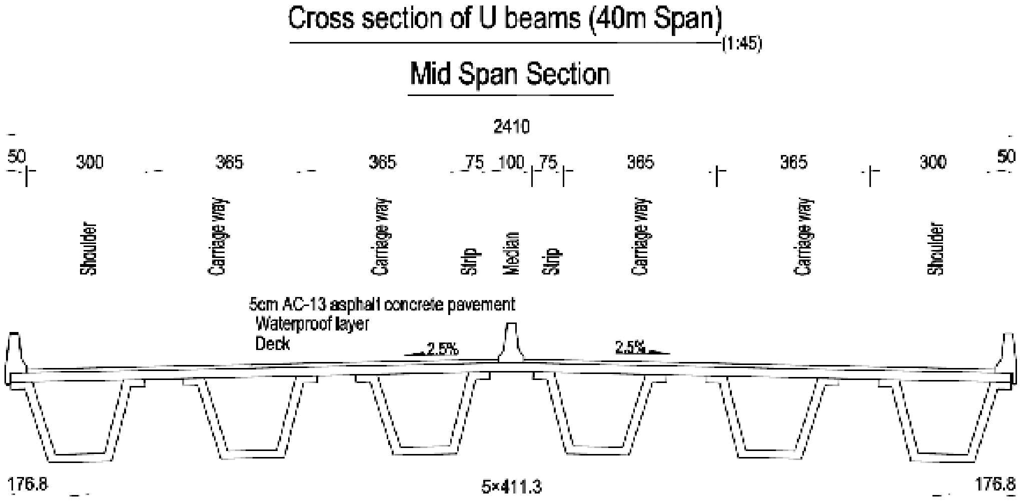

Figure 3.14: Cross-Section of 40m U-shaped Beam Superstructure

Foundation Layout for Lagoon Bridge

Figure 3.15 presents the pile foundation layout for the Lagoon Grand Bridge, comprising 1.2 m diameter bored piles at 8 m centers, with reinforcement cages of 16 Nos. 32 mm diameter high-yield bars and helical links at 200 mm spacing. Piles are designed for 8,500 kN working load with factor of safety of 2.5, socketed a minimum of 5 m into competent sandstone to transfer loads through the 19.5 m deep compressible alluvium.

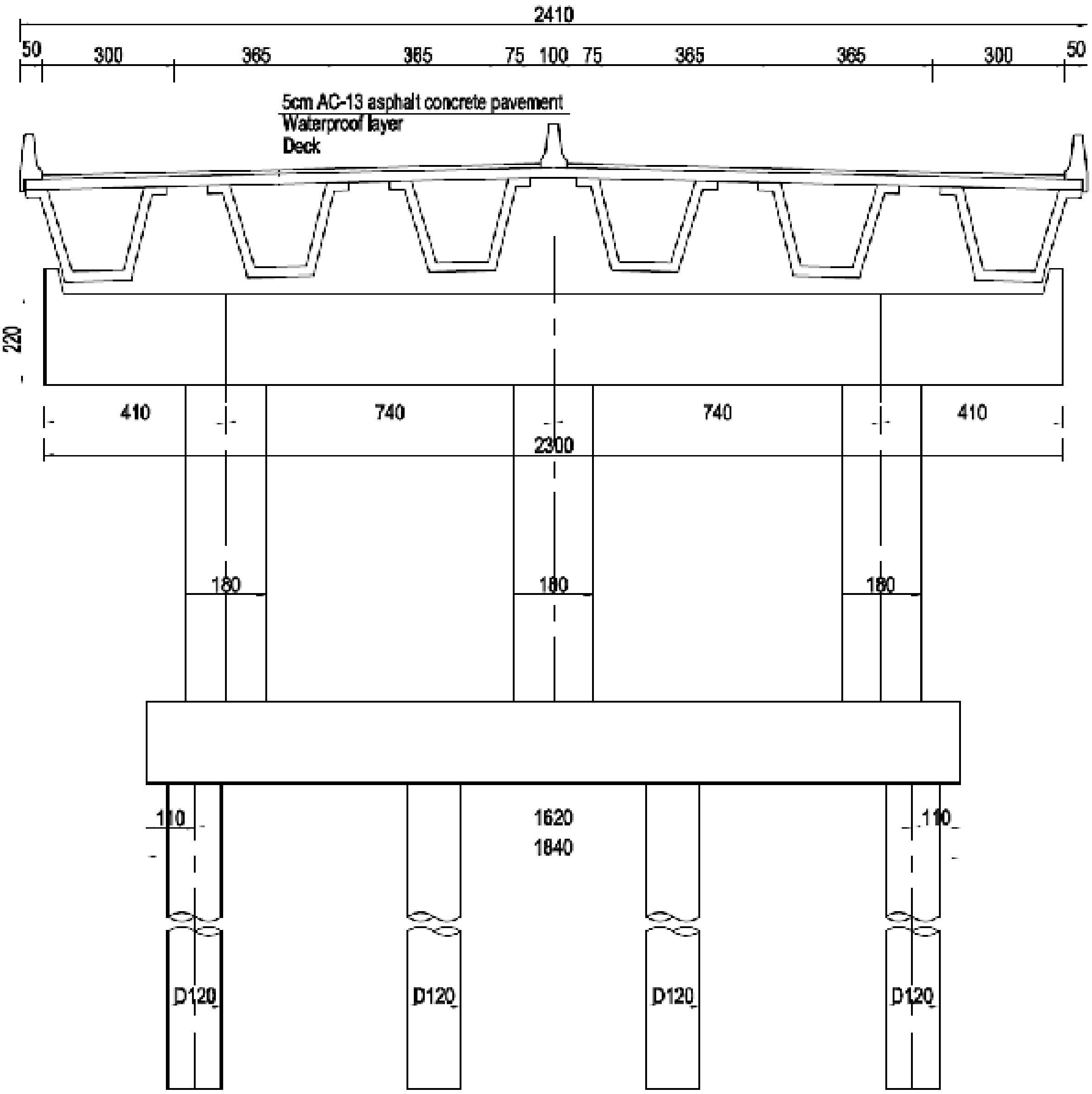

Figure 3.15: Pile Foundation Layout for Lagoon Bridge

CH8+760 Bridge

A 120m bridge using prestressed concrete I-beams on a 'deck-on-pile' system to cross deep soft soil sections. A typical cross-section for such structures is shown in **Figure 3.16**.

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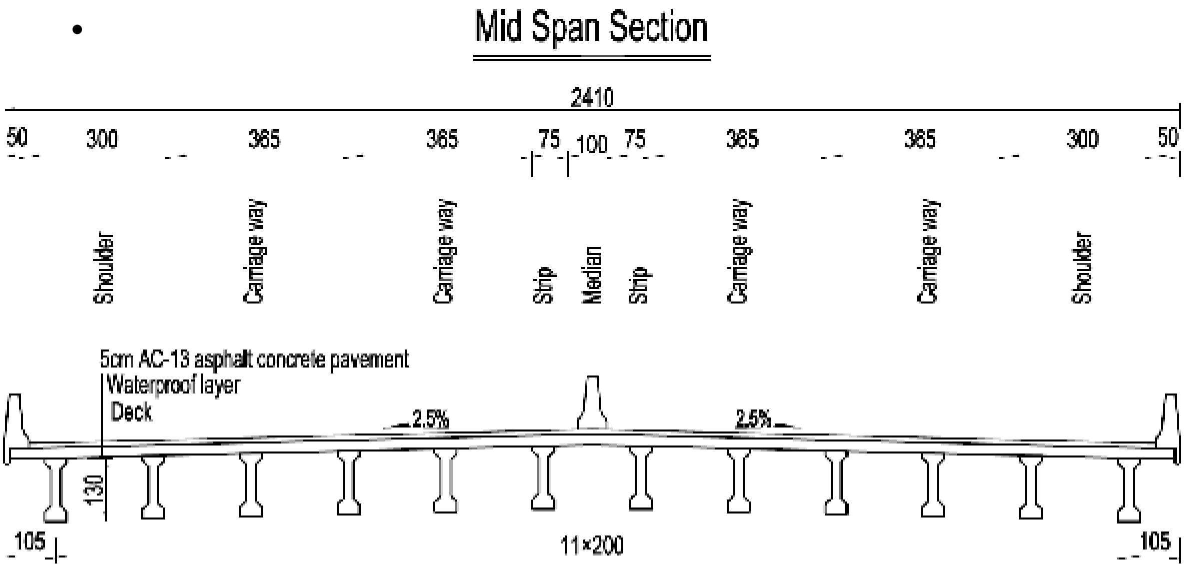

Figure 3.16: Typical Cross-Section of 20m I-beam on 'Deck-on-Pile' Foundation

27 Culverts and 11 Passages

Including box culverts for vehicle and pedestrian access, and pipe culverts for drainage. Typical culvert designs are illustrated in **Figures 3.17 and 3.18**, with a layout in **Figure 3.19**

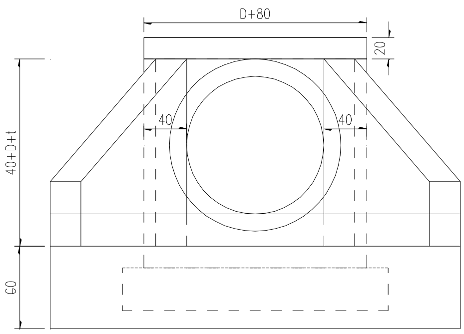

Figure 3.17: Typical Pipe Culvert Design

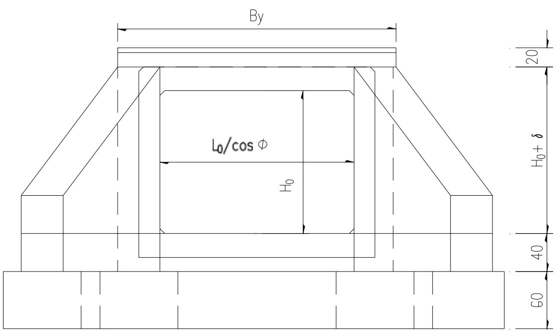

Figure 3.18: Typical Box Culvert Design

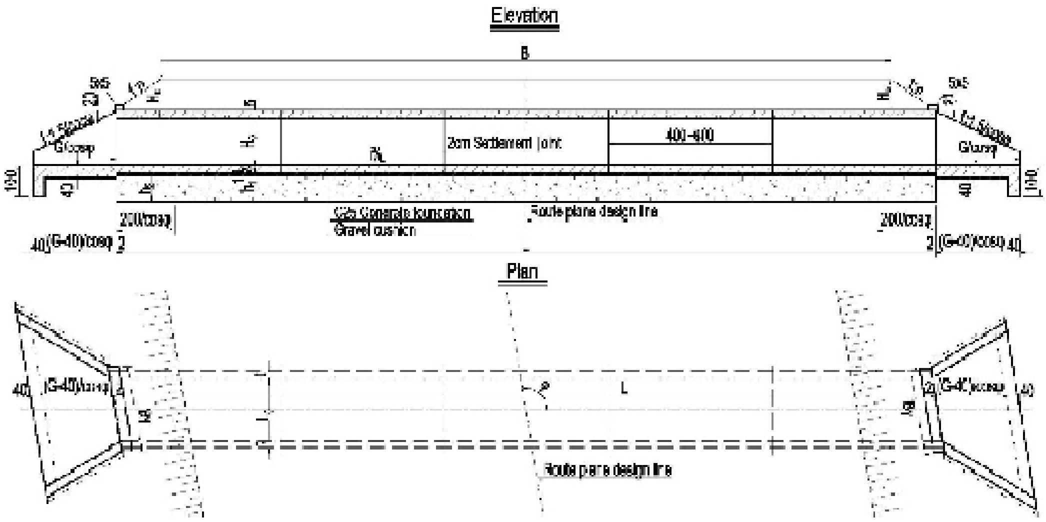

Figure 3.19: Typical Culvert Layout and Placement

- **Bridge Cross-Section:** The standard cross-section for all bridges, including barriers, shoulders, and carriageways, is detailed in **Figure 3.20**.

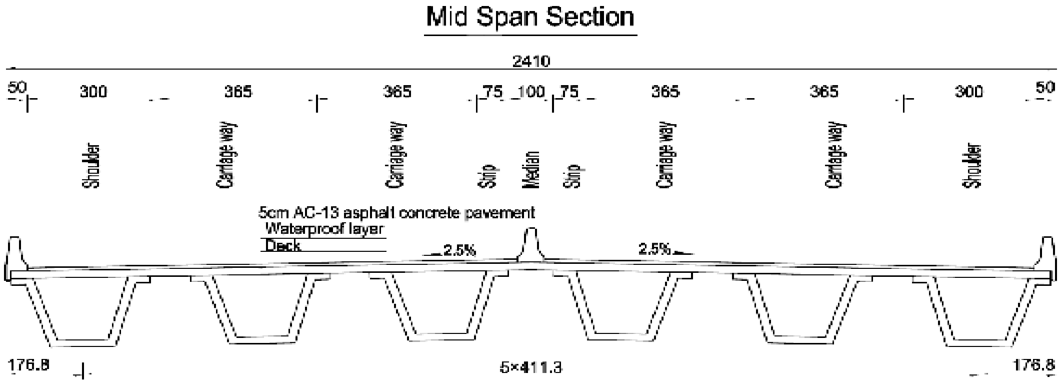

Figure 3.20: Standard Bridge Cross-Section (24.1m width)

3.7.6 Subgrade Design

The standard cross-section for the mainline dual carriageway is presented in **Figure 3.21**. Ramp cross-sections for two-way and one-way configurations are shown in **Figures 3.22 and 3.23**, respectively.

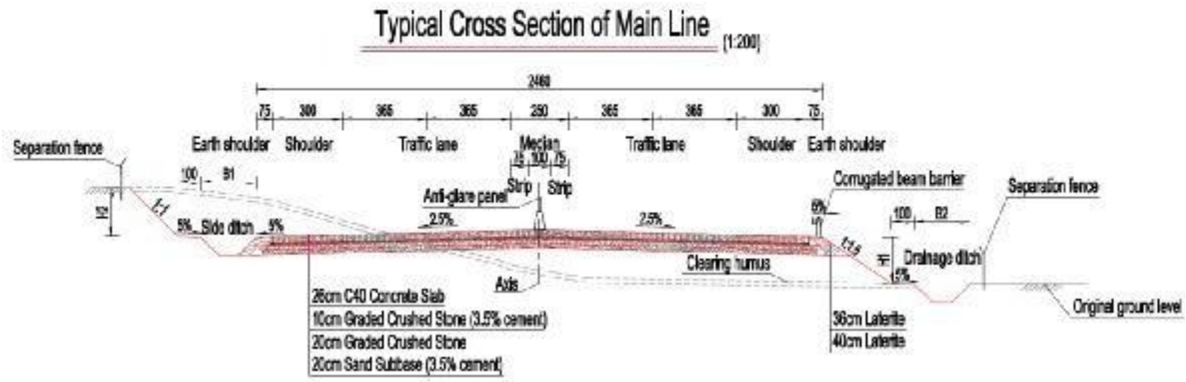

Figure 3.21: Standard Mainline Subgrade Cross-Section (24.6m width)

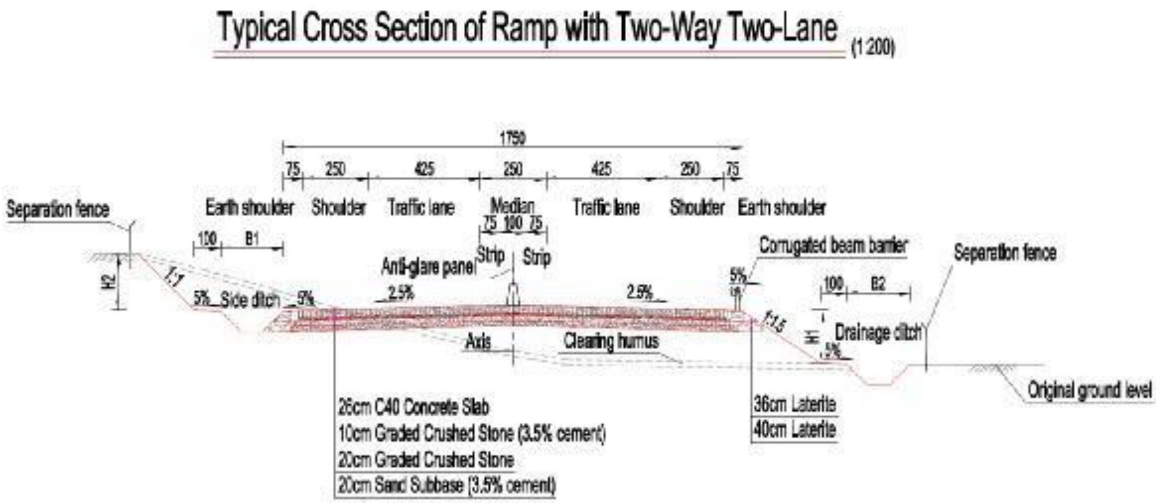

Figure 3.22: Two-Way Two-Lane Ramp Cross-Section (17.5m width)

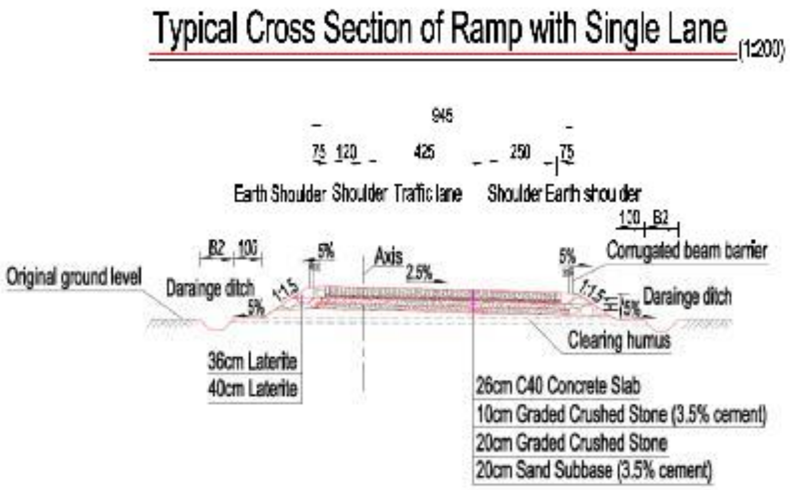

Figure 3.23: One-Way One-Lane Ramp Cross-Section (9.45m width)

In sections where sand is used for embankment filling (CH8+700 to CH15+000), the design incorporates a laterite gravel wrap to protect the slope, as illustrated in **Figure 3.24**.

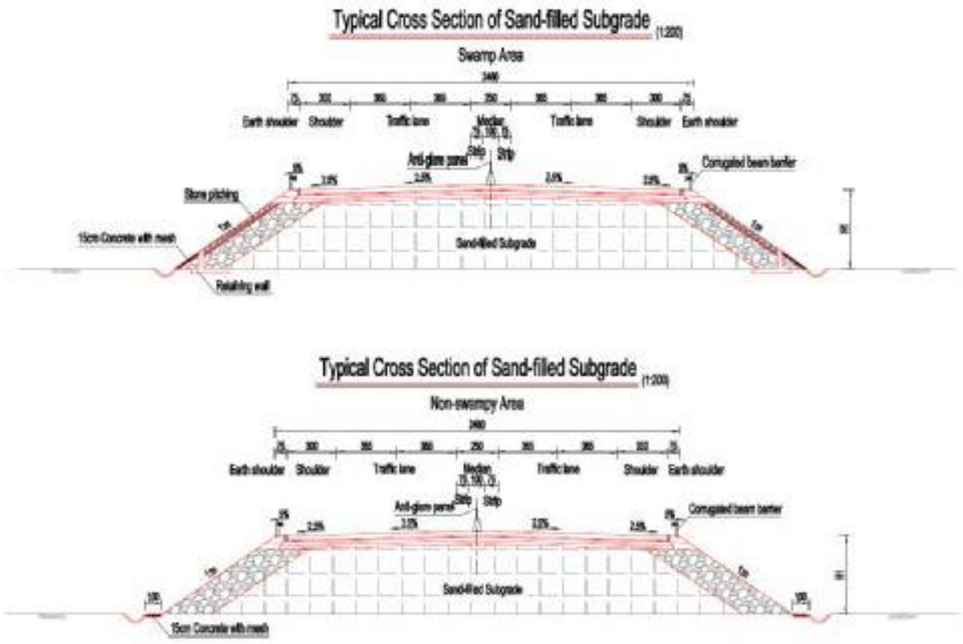

Figure 3.24: Sand-Filled Embankment with Laterite Gravel Edge Protection

3.8 Project Phases and Activities

The project will be executed in four distinct phases: pre-construction, construction, operation and maintenance, and decommissioning. The total construction period is scheduled for **23 months (April 2026 – Feb 2028)** . The following sections outline the activities within each phase, integrating environmental and social safeguards in accordance with IFC Performance Standards.

3.8.1 Pre-Construction Phase (Months 1-3)

The pre-construction phase comprises all preparatory activities required to ensure that construction of Lot 2 proceeds in a safe, orderly, and socially responsible manner. This phase establishes the foundation for compliant construction and ensures early implementation of environmental and social safeguards.

- **Resettlement Action Plan (RAP) Census and Compensation:** A detailed Resettlement Action Plan (RAP) is implemented during this phase to address land acquisition and displacement impacts. The project will require approximately **100 hectares of land** and demolition of approximately **4,150 m² of structures** (Feasibility Study, 2025, p. 223). This process includes:
    - A comprehensive census and socio-economic survey of Project Affected Persons (PAPs);

- Inventory and valuation of affected assets, including land, structures, crops, and livelihoods; and
- Consultation and disclosure to ensure transparency and informed participation. RAP implementation must be completed before any displacement occurs, in accordance with **IFC PS5**.

- **Site Clearance and Access Road Preparation:** Site clearance activities include the removal of vegetation, debris, and other surface obstructions within the project footprint, strictly limited to areas required for construction and access. Access road preparation is undertaken to facilitate the movement of construction equipment, materials, and personnel to work fronts and ancillary facilities. Vegetation clearance will avoid sensitive habitats identified in the biodiversity baseline (**IFC PS6**).
- **Site Mobilisation and Temporary Facilities:** Site mobilisation involves the establishment of temporary infrastructure, including administrative offices, worker camps, a secure perimeter, centralised laydown areas, precast beam yards, and mixing stations (Feasibility Study, 2025, p. 211). The overall layout of these facilities is shown in **Figure 3.25**, and a detailed camp layout is provided in **Figure 3.26**. Worker camps will incorporate GBV/SEA/SH mitigation measures, grievance mechanisms, and community interaction protocols (**IFC PS2 & PS4**).

Figure 3.25: Overall Layout of Construction Camps and Temporary Facilities

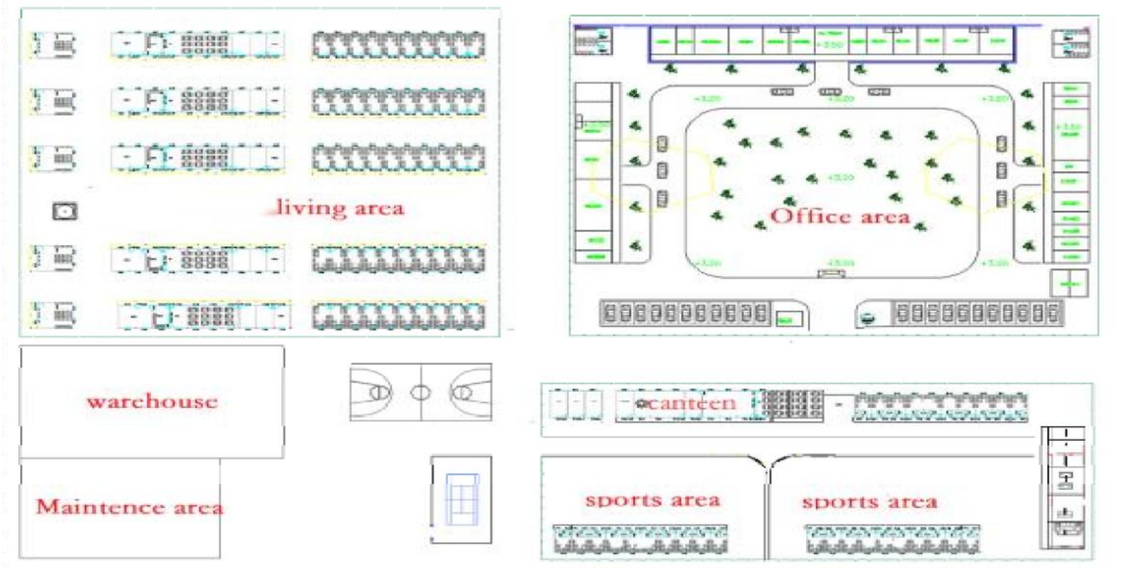

Figure 3.26: Typical Construction Camp Layout

- **Utility Mapping and Relocation:** This entails mapping and verifying existing utilities (electricity lines, water pipelines, telecommunications) within the project corridor. The Right-of-Way (ROW) is legally defined as **45.72m on either side of the center line** (Feasibility Study, 2025, p. 222). Following mapping and consultation, relocation plans are developed to prevent service disruptions during construction, ensure public safety, and integrate relocated utilities into the final road layout.
- **Environmental and Social Controls:** These measures include silt fences and erosion barriers to prevent sediment mobilisation into watercourses, as well as community notice boards to inform residents of schedules, potential hazards, and grievance procedures. Additional controls cover dust suppression, noise management, waste segregation, and traffic control, implemented in accordance with **IFC PS1, PS2, PS4, and PS6**.

3.8.2 Construction Phase (Months 4-18)

This phase commences immediately following the pre-construction phase and includes all major civil works required to deliver the road infrastructure. Construction activities are governed by site-specific ESMPs (C-ESMPs), including traffic management plans, biodiversity protection measures, pollution prevention protocols, and community safety controls (**IFC PS1, PS4, PS6**). A summary of primary activities is presented in **Table 3.2**.

Table 3.10 Summary of Lot 2 Construction Activities

Activity	Description	Technical Requirements
Earthworks	Cut-and-fill operations, subgrade preparation (~1.2 million m³ of earth movement).	Geotechnical testing, compaction control, slope stability analysis, and geotextile stabilisation.
Pavement Construction	Placement of sub-base, base, and CRCP slabs.	Concrete mix design verification, quality control testing, curing management, joint construction and sealing.
Drainage Installation	Culvert placement, channel lining, and outfall protection.	Hydraulic design verification, structural integrity testing, and erosion protection installation.
Structure Erection	Interchange and flyover construction, piling, and deck placement.	Load testing, structural monitoring, and geotechnical foundation verification.
Road Furniture	Installation of barriers, signage, lighting, and toll plaza infrastructure.	Safety compliance audits, electrical testing, and visibility verification.
Community Safety & Traffic Management	Continuous management of the construction-community interface to prevent accidents, maintain access, and resolve grievances in real time.	(i) 24/7 dedicated Community Liaison Officer with independent grievance logging authority; (ii) Mandatory 30 km/h speed limit for all construction vehicles within designated settlement zones, enforced via GPS tracking; (iii) Two all-weather community access routes maintained at all times, physically segregated from construction haul roads; (iv) Weekly community safety audits with findings reported to the Engineer's Representative.

All construction activities will incorporate dust suppression, noise control, waste management, and community interaction protocols. These community interaction protocols are subordinate to three binding, enforceable traffic safety mandates governing the live construction zone. First, dedicated community access routes—physically segregated from construction haul roads—must be maintained and passable at all times throughout the 23-month construction period; any interruption to community mobility constitutes a material breach of the project's Community Health, Safety, and Security obligations under IFC PS4. Second, a maximum speed limit of 30 km/h is strictly enforced for all construction vehicles traversing settlements (Odo-Noforija, Igando-Oloja, Akodo), with GPS-enabled fleet tracking and automated speed alerts mandated for all contractor vehicles. Third, a 24/7 Community Liaison Officer (CLO)—a dedicated, senior role with independent grievance logging authority—must be operational on-site from site mobilisation through demobilisation, ensuring real-time resolution of traffic-related complaints and immediate escalation of unresolved safety risks to the Engineer's Representative.

3.8.2.1 Technical Implementation Details

In addition to the activities summarised above, the construction phase involves the following technical implementations, as detailed in the Feasibility Study (2025):

- **Earthworks and Soft Soil Treatment**

  Handling approximately 2.09 million m³ of earth movement. Treatment of soft soil sections (e.g., marsh sediments up to 19.5m deep) using earth replacement for shallow deposits (<3m depth) and preloading with vertical drains for deeper layers (3-8m depth) (Feasibility Study, 2025, p. 134).

- **Bridge Construction**

  Utilising temporary steel Bailey bridges, rotary drilling for pile foundations, and the erection of precast U and I-beams using bridge erection machines (Feasibility Study, 2025, p. 216).

- **Community Safety and Traffic Management Protocols**
  Construction-phase community safety is governed by three operationally binding protocols enforceable under the project's ESMP and loan covenants:
  i. Community Access Route Integrity: A minimum of two all-weather community access routes—one on each side of the alignment—must be maintained continuously throughout construction. These routes are strictly prohibited for construction haul traffic. Any temporary realignment requires 14 days' prior written notice to affected communities and formal approval from the Engineer's Representative. Unauthorised blockage constitutes a material default under IFC PS4 community safety provisions.
  ii. Construction Vehicle Speed Zoning: A mandatory 30 km/h speed restriction applies within all settlement zones (CH 8+700 to CH 10+200, CH 12+500 to CH 14+300, CH 17+100 to CH 19+800). All contractor vehicles must be fitted with tamper-proof GPS loggers and speed governors; weekly compliance reports are submitted to the supervising engineer. A second violation by any driver triggers immediate suspension and mandatory retraining; a third violation requires dismissal from the project site.
  iii. 24/7 Grievance and Liaison Mechanism: A dedicated Community Liaison Officer (CLO)—reporting directly to the Project Manager with functional independence to document and escalate grievances—is mandated to be on-call 24 hours daily throughout construction. The CLO maintains a publicly disclosed phone line and weekly community drop-in sessions. All traffic-related grievances must receive an initial written response within 24 hours and a formal resolution plan within 5 working days, with unresolved disputes escalated to the project's multi-stakeholder Grievance Redress Committee."

3.8.3 Operation and Maintenance Phase (Post-2029)

This phase commences with the commissioning of Lot 2 and focuses on preserving infrastructure integrity and ensuring transport corridor safety. Operation phase monitoring will follow corridor-wide ESMP indicators established for Lots 1 and 2, ensuring harmonized reporting and compliance with lender requirements.

- Routine Maintenance: Including scheduled pavement inspections, clearing of silted drainage systems to prevent localized flooding, and controlled vegetation management to maintain visibility and structural stability. Annual maintenance costs are estimated at ~$30,000/km, with major overhauls every ten years costing ten times the annual amount (Feasibility Study, 2025, p. 187).
- Toll Collection and Traffic Management: Operation of one mainline toll station (at CH11+900) and two ramp toll stations (at CH10+900) under an open toll system with 8 entry and 8 exit lanes (Feasibility Study, 2025, p. 160). The layout of these toll stations is shown in Figures 3.27, 3.28, and 3.29. Activities include incident response, tolling operations, and strict axle-load enforcement to prevent premature pavement failure and ensure road user safety (IFC PS4).

The mainline toll plaza (CH11+900) is designed as an 8-lane open-system configuration, with geometric layout optimized for 100 km/h approach speeds and heavy-vehicle deceleration, as illustrated in Figure 3.35.

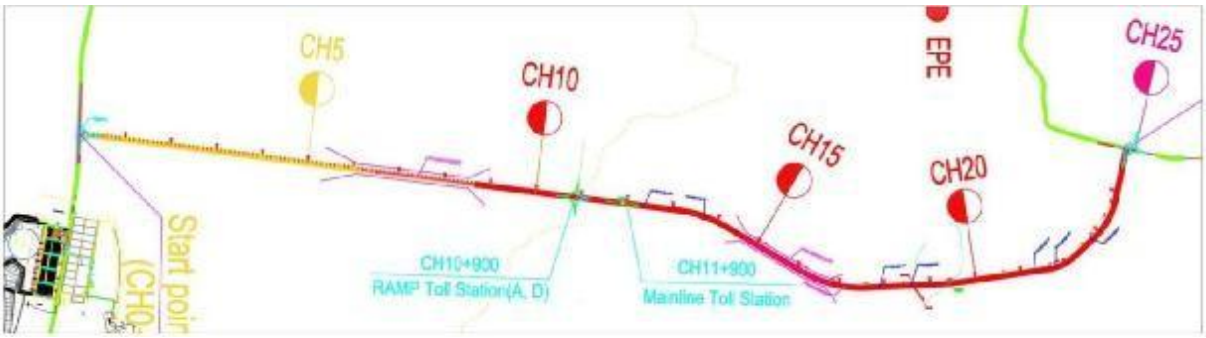

Figure 3.27: Overall Toll Station Layout Diagram

The CH11+900 mainline toll station layout (Figure 3.28) is hydraulically graded at 1.5% crossfall, with reinforced concrete pavement (C40) extending 150 m approach and departure zones to accommodate braking and acceleration loads from 60.05% HGV traffic.

Figure 3.28: Mainline Toll Station Plan (CH11+900)

The CH10+900 ramp toll stations are designed as 4-lane open-system plazas with weigh-in-motion sensors at all HGV lanes, ensuring 100% axle-load compliance for traffic accessing the mainline from the Lekki industrial corridor (Figure 3.29).

Figure 3.29: Ramp Toll Station Plan (CH10+900)

Service Area Operations

A service area is planned at CH22+300, with a separated outward design. A rendering is provided in Figure 3.30. The service area at CH22+300 is designed as a separated-outward configuration with dedicated HGV parking bays, fuel depots, and rest facilities. This layout is a non-negotiable community health and road safety requirement under IFC PS4, mandated to prevent driver fatigue-related incidents on a corridor projected to carry 60% heavy goods traffic and to confine service-related activities—including wastewater discharge and solid waste generation—to a single, monitorable location.

Figure 3.30: Service Area Rendering (CH22+300)

3.9 Potential Environmental Releases and Management

3.9.1 Pre-Construction Phase Environmental and Social Management

The pre-construction phase comprises all preparatory activities required to ensure that construction of Lot 2 proceeds safely, orderly, and socially responsibly. This phase establishes the foundation for compliant construction and ensures early implementation of environmental and social safeguards.

Resettlement Action Plan (RAP) Census and Compensation

A detailed Resettlement Action Plan (RAP) is implemented during this phase to address the impacts of land acquisition and displacement. The project will require approximately 100 hectares of land and demolition of approximately 4,150 m² of structures (Feasibility Study, 2025, p. 223). This process includes: A comprehensive census and socio-economic survey of Project Affected Persons (PAPs); Inventory and valuation of affected assets, including land, structures, crops, and livelihoods; and Consultation and disclosure to ensure transparency and informed participation.

RAP implementation must be completed before any displacement occurs, in accordance with **IFC PS5**.

Site Clearance, Vegetation Management, and Waste Streams

Site clearance activities include the removal of vegetation, debris, and other surface obstructions within the project footprint, strictly limited to areas required for construction and access. Vegetation clearance will avoid sensitive habitats identified in the biodiversity baseline (**IFC PS6**). The clearance program generates approximately **18,500 tonnes of vegetal waste**—primarily secondary forest regrowth, shrubland, and agricultural vegetation—which is managed through the following binding protocol:

Table 3.11: Vegetation Clearance Waste Management Protocol

Waste Type	Estimated Volume	Management Requirement	Compliance Standard
Timber (trees > 15 cm diameter)	2,800 tonnes	Segregated at source; merchantable timber offered to affected landowners (written record required); remainder to licensed timber processors; strictly prohibited from burning	IFC PS3, FMEnv Waste Regulations
Branches and brushwood	6,500 tonnes	Chipped on-site using mobile chippers; chips used for: (i) slope erosion control (mulching), (ii) landscaping of completed embankments, or (iii) donation to communities for fuelwood (written agreements required)	IFC PS3, PS6
Stumps and root balls	4,200 tonnes	Stockpiled for 3 months maximum to allow natural drying; then: (i) crushed for access road base where geotechnically suitable, or (ii) transferred to licensed biomass facility; strictly prohibited from burial or burning	IFC PS3
Understory vegetation and grasses	3,500 tonnes	Dried on-site (maximum 4 weeks); incorporated into topsoil stockpiles for later rehabilitation use; excess to licensed composting facility	IFC PS3, PS6
Invasive alien species (if identified)	TBD during clearance	Segregated in dedicated quarantine area; sun-dried and double-bagged; disposed at FMEnv-approved hazardous waste facility; all equipment disinfected after handling	IFC PS6, Nigerian Invasive Species Protocol
Topsoil (0–30 cm)	85,000 m³	Stripped separately; stockpiled in designated areas (< 3 m height) with erosion controls; reserved exclusively for rehabilitation of embankments and ancillary sites	IFC PS3, PS6

Binding Operational Rules for Vegetal Waste shall include the following:

- Burning is strictly prohibited under all circumstances. Any observed burning constitutes a material breach of the ESMP and IFC PS3, triggering automatic suspension of clearance activities and mandatory retraining of all site personnel.
- Community benefit requirement: Merchantable timber and chip mulch must be offered to affected communities and landowners before any off-site disposal. Written records of all community transfers are maintained for lender inspection.
- Invasive species protocol: Any detection of invasive species (e.g., *Chromolaena odorata*) triggers quarantine procedures and disinfection of all equipment before moving to non-infested areas.
- Stockpile limits: Vegetal waste stockpiles are limited to 3 months duration to prevent spontaneous combustion, harboring of pests, or leachate generation. All stockpiles are located minimum 100 m from drainage lines.
- Reuse target: Minimum 60% of vegetal waste (by weight) must be reused on-site (mulch, erosion control, landscaping) or transferred for beneficial use (timber processing, biomass energy). Monthly tracking reports are submitted to the Engineer.
- Access Road Preparation: Access road preparation is undertaken to facilitate the movement of construction equipment, materials, and personnel to work fronts and ancillary facilities. Vegetation clearance for access roads follows the same binding protocol above, with all vegetal waste incorporated into the site-wide tracking system.

Site Mobilisation and Temporary Facilities

Site mobilisation involves the establishment of temporary infrastructure, including administrative offices, worker camps, a secure perimeter, centralised laydown areas, precast beam yards, and mixing stations (Feasibility Study, 2025, p. 211). The overall layout of these facilities is shown in Figure 3.33, and a detailed camp layout is provided in Figure 3.31. Worker camps will incorporate GBV/SEA/SH mitigation measures, grievance mechanisms, and community interaction protocols (IFC PS2 & PS4).

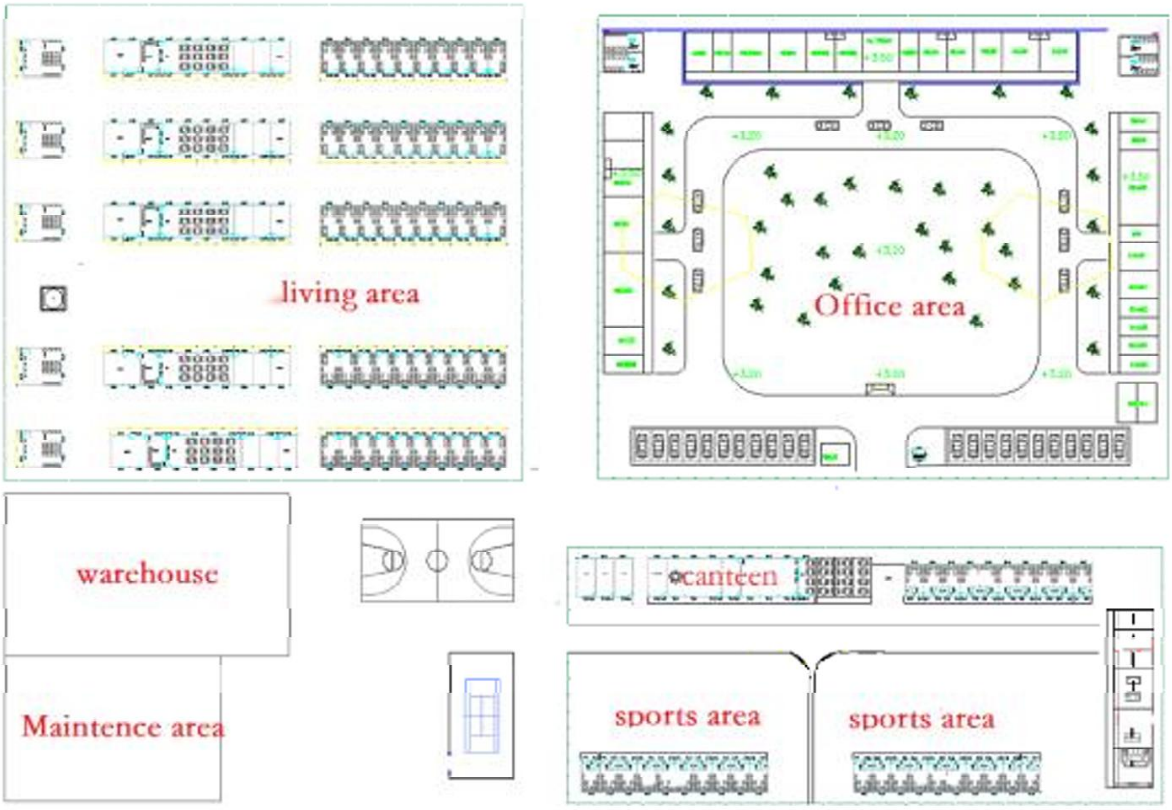

Figure 3.31: Overall Layout of Construction Camps and Temporary Facilities

Typical Construction Camp Layout shall include:

- **Utility Mapping and Relocation**: This entails mapping and verifying existing utilities (electricity lines, water pipelines, telecommunications) within the project corridor. The Right-of-Way (ROW) is legally defined as 45.72m on either side of the center line (Feasibility Study, 2025, p. 222). Following mapping and consultation, relocation plans are developed to prevent service disruptions during construction, ensure public safety, and integrate relocated utilities into the final road layout. Waste from utility relocation (poles, cables, transformers, pipes) is managed in accordance with the hazardous and e-waste protocols detailed in Section 3.6.2.2.
- **Environmental and Social Controls:** These measures include silt fences and erosion barriers to prevent sediment mobilisation into watercourses, as well as community notice boards to inform residents of schedules, potential hazards, and grievance procedures. Additional controls cover dust suppression, noise management, waste segregation, and traffic control, implemented in accordance with IFC PS1, PS2, PS4, and PS6.

Below are Summary of Pre-Construction Waste Streams and Controls anticipated:

Waste Stream	Estimated Volume	Primary Management Route	Compliance Standard
Merchantable timber	2,800 tonnes	Community transfer or licensed timber processor	IFC PS3, Community Benefit Requirement
Brushwood/chippable material	6,500 tonnes	On-site chipping for mulch/erosion control	IFC PS3, 60% reuse target
Stumps and root balls	4,200 tonnes	Crushing for road base or biomass facility	IFC PS3, prohibited from burial/burning
Understory/grasses	3,500 tonnes	Topsoil incorporation or composting	IFC PS3, PS6
Invasive species	TBD	Quarantine, bagging, hazardous waste disposal	IFC PS6
Topsoil	85,000 m³	Stockpiled for rehabilitation	IFC PS3, PS6
Demolition waste (structures)	4,150 m²	Segregated recycling (concrete, metal, wood) per RAP	IFC PS5, PS3

It is expected that the Binding Conditions Precedent for Site Clearance shall include the following:

- Vegetation clearance protocol approved by Engineer, including invasive species procedure
- Community consultation completed on community benefit transfers (timber, mulch)
- No-burn undertaking signed by Contractor and all subcontractors
- Stockpile locations approved (minimum 100 m from drainage, with erosion controls)
- Monthly vegetal waste tracking system established and verified

These conditions are non-negotiable and will be verified prior to issuance of the Notice to Commence clearance activities.

3.9.2 Construction Phase Environmental and Social Management

This phase commences immediately following the pre-construction phase and includes all major civil works required to deliver the road infrastructure. Construction activities are governed by site-specific ESMPs (C-ESMPs), including traffic management plans, biodiversity protection measures, pollution prevention protocols, and community safety controls (**IFC PS1, PS4, PS6**). A summary of primary activities is presented in **Table 3.12**.

Table 3.12: Summary of Lot 2 Construction Activities

Activity	Description	Technical Requirements
Earthworks	Cut and fill operations, subgrade preparation (~1.2 million m³ earth movement).	Geotechnical testing, compaction control, slope stability analysis, and geotextile stabilisation.
Pavement Construction	Placement of sub-base, base, and CRCP slabs.	Concrete mix design verification, quality control testing, curing management, joint construction and sealing.
Drainage Installation	Culvert placement, channel lining, and outfall protection.	Hydraulic design verification, structural integrity testing, and erosion protection installation.
Structure Erection	Interchange and flyover construction, piling, and deck placement.	Load testing, structural monitoring, and geotechnical foundation verification.
Road Furniture	Installation of barriers, signage, lighting, and toll plaza infrastructure.	Safety compliance audits, electrical testing, and visibility verification.

All construction activities will incorporate dust suppression, noise control, waste management, and community interaction protocols. In addition, the following binding environmental release and waste management controls are mandated throughout the 23-month construction period.

3.9.2.1 Environmental Release and Waste Management Controls (Construction Phase)

The following controls are **non-negotiable** and are subject to weekly inspection by the Engineer's Representative and quarterly audits by lenders:

(i) Air Quality and Dust Suppression

Fugitive dust emissions during earthworks (Q3-Q4 2026) and haul road traffic present the primary air quality risk to settlements (Odo-Noforija, Igando-Oloja, Akodo). The following controls are mandated:

- Water spraying of all active earthworks areas at minimum 3x daily (6x daily during Harmattan)
- Wheel wash stations at all site exit points to prevent track-out onto public roads
- Speed limits of 30 km/h on all unpaved haul roads to reduce entrained dust
- Real-time PM_{10} monitoring at three settlement interfaces, with automated alerts at $PM_{10} \geq 50$ µg/m³ (24-hour mean) . Exceedances trigger immediate work stoppage and additional suppression measures.

Any exceedance of $PM_{10} \geq 75$ µg/m³ constitutes a **material deviation** from IFC PS3 and requires formal notification to FMEnv and lenders within 24 hours.

(ii) Noise and Vibration Control

Construction noise impacts are receptor-specific, with residential structures located within 25 m of the alignment at Odo-Noforija (CH8+900 to CH9+400). The following are **strictly enforced**:

- Maximum Leq limits: 70 dB(A) daytime (07:00–18:00), 55 dB(A) evenings (18:00–22:00), and no works 22:00–07:00 within 500 m of settlements
- Acoustic barriers (2.5 m height, minimum surface mass 15 kg/m²) mandated along all settlement interfaces exceeding 65 dB(A) during daytime works
- Pile driving restricted to daytime hours only, with baseline vibration monitoring at all structures within 50 m of piling activities (CH8+760, CH15+750)
- Complaint-triggered monitoring: Any verified community noise complaint mandates 24-hour continuous Leq monitoring at the complainant's property for 7 days, with corrective action required within 48 hours

(iii) Surface Water and Spill Prevention

In-water works for the Lagoon Grand Bridge (Q3 2026 – Q3 2027) and culvert installations present acute risks to the marsh lake zone (CH14+655 to CH16+710). The following are **mandatory**:

- Silt curtains installed and maintained at all in-water works locations, inspected daily
- Real-time turbidity monitoring with automated alerts at TSS ≥ 50 mg/L above upstream baseline
- Refueling areas located minimum 100 m from any watercourse, with impermeable bunds (110% capacity) and spill kits stationed within 50 m of all plant
- Concrete washout pits lined with HDPE and located minimum 200 m from drainage lines

Spill Protocol: Any release of fuels, lubricants, hydraulic fluids, or concrete wash water > 20 liters constitutes a reportable incident and requires:

- Immediate containment and recovery
- Sampling of downstream water at 50 m, 100 m, and 250 m intervals
- Submission of root cause analysis and corrective action plan within 72 hours
- Community notification via grievance mechanism within 24 hours

A second spill incident by any subcontractor triggers automatic suspension from site pending retraining and installation of additional containment measures.

(iv) Hazardous Materials Management

The project will store and use approximately 450,000 liters of diesel, 120,000 liters of lubricants, and 8,500 liters of concrete form release agents during construction. The following controls are non-negotiable:

- Double-walled tanks or single-walled tanks within bunded walls (110% capacity) for all liquid fuels
- Hazardous materials register maintained and updated weekly, with MSDS available at all storage locations
- Spill response training mandatory for all plant operators and foremen, with refresher training every 6 months
- Impermeable flooring in all maintenance workshops and refueling areas, draining to oil-water separators

(v) E-Waste and Electrical Waste Management

Construction activities generate electronic and electrical waste streams that are **strictly prohibited** from disposal in landfills or via informal recyclers. These include:

Waste Stream	Sources	Estimated Volume	Management Requirement
Cabling and Wiring	Temporary power distribution, site lighting, demolished utility lines	12–15 tonnes	Segregated by type (copper, aluminum, insulated); sold only to licensed scrap dealers with chain-of-custody

Electrical Components	Transformers, switchgear, control panels from site offices and temporary facilities	3–5 tonnes	Decommissioning inventory; disposal via FMEnv-licensed WEEE recyclers only
Lighting Equipment	Fluorescent tubes, LED fittings, sodium vapor lamps from site lighting towers	1.5 tonnes	Segregated as hazardous waste due to mercury content; collection by licensed hazardous waste contractor
Batteries	Vehicle batteries, UPS batteries, equipment batteries	800 units	Return-to-supplier scheme for all automotive batteries; segregated collection for industrial batteries
Electronic Equipment	Computers, printers, communication equipment from site offices (demobilization)	2.5 tonnes	Inventory prior to demobilization; donation to community organizations with written agreements, or disposal via licensed e-waste recyclers

Binding E-Waste Protocol:

- Weekly segregation at source into five categories (cabling, electrical components, lighting, batteries, electronics)
- Monthly inventory reconciliation against procurement records
- Disposal strictly prohibited via unlicensed scrap yards or informal sector recyclers
- All transfers to licensed recyclers must be accompanied by chain-of-custody documentation (weighboridge tickets, receipt vouchers)
- Annual e-waste audit at project completion, reconciled against initial procurement, with report submitted to FMEnv and lenders

Any disposal via unlicensed channels constitutes a material breach of IFC PS3 and triggers:

- Immediate suspension of related works
- Mandatory remediation (excavation and recovery of disposed materials where feasible)
- Lender notification and potential covenant breach

(vi) Construction Waste Management

Non-hazardous construction wastes—including excavated material, concrete rubble, timber formwork, packaging, and domestic waste from worker camps—are managed as follows:

Waste Type	Estimated Volume	Management Requirement
Excavated material (non-contaminated)	1.2 million m³	Reused on-site for embankment fill where geotechnically suitable; excess to licensed fill sites
Concrete rubble	850 m³	Crushed for temporary haul road base or fill; prohibited from disposal in wetlands or drainage lines
Timber formwork	320 m³	Reused where possible; damaged timber to licensed waste wood processors
Packaging (plastic, cardboard, pallets)	45 tonnes	Segregated; recyclables to licensed aggregators; residual to FMEnv-approved facilities
Domestic waste (worker camps)	180 tonnes	Segregated at source (organics, recyclables, residuals); organic waste composted on-site; residuals collected weekly by licensed municipal contractor

Waste Audit Requirement: Monthly waste audits verify:

- Segregation compliance ≥ 90%
- Diversion rate ≥ 60% (recycled/reused vs. disposed)
- Chain-of-custody for all hazardous and e-waste streams

Audit findings are submitted to the Engineer and available for lender inspection at any time.

(vii) Community and Worker Health Interface

All waste management activities are subject to community grievance mechanisms under IFC PS4:

- Any waste accumulation within 100 m of settlements must be removed within 24 hours
- Burning of any waste—including timber, packaging, or vegetation—is strictly prohibited
- Worker camp waste collection points are enclosed and cleaned daily to prevent vermin and odor impacts on adjacent communities
- Community liaison officers conduct weekly inspections of waste storage areas with community representatives

Summary of Binding Construction Phase Controls:

Control Area	Monitoring Frequency	Compliance Threshold	Consequence of Breach
Air Quality (PM_{10})	Continuous (settlement interfaces)	≤50 µg/m³ (24-hr)	Work stoppage, FMEnv notification
Noise (Leq)	Weekly + complaint-triggered	≤70 dB(A) day / ≤55 dB(A) evening	Acoustic barriers mandated
Turbidity (TSS)	Continuous (in-water works)	≤50 mg/L above baseline	Work stoppage, 24-hr reporting
Spills (>20 L)	Event-based	Zero uncontrolled releases	Root cause analysis, suspension for repeat
E-Waste Disposal	Monthly inventory	100% licensed recycler chain-of-custody	Material breach, lender notification
Waste Diversion	Monthly audit	≥60% diversion	Corrective action plan
Community Grievances	Weekly review	Zero unresolved waste-related grievances >7 days	Escalation to Grievance Redress Committee

These controls are **non-negotiable** and are enforced through weekly inspections, monthly audits, and quarterly lender reporting as part of IFC PS1 compliance monitoring.

3.9.3 Operation Phase Environmental and Social Management

The operation phase (2029–2058) commences with commissioning of Lot 2 and extends through the 30-year concession period. Operational activities—including toll collection, traffic management, routine maintenance, and service area operations—generate ongoing environmental and social risks that require binding, enforceable controls under IFC Performance Standards 1, 3, 4, and 6. This section establishes the operational-phase Environmental and Social Management Plan (O-ESMP) framework, which is a condition precedent for toll plaza commissioning.

Air Quality Management

Operational air quality impacts derive primarily from vehicle emissions (NO_x, SO_2, CO, $PM_{2.5}$/PM_{10}) and, to a lesser extent, from service area generators and maintenance equipment. The following controls are mandated:

Impact Source Monitoring Requirement Compliance Threshold Management Response Mainline traffic (60% HGV) Continuous passive sampling at three fixed stations (CH8+700, CH15+750, CH24+932) $PM_{2.5} \leq 25$ µg/m³ (24-hr mean); $NO_2 \leq 40$ µg/m³ (annual mean) per WHO guidelines Exceedance triggers source apportionment study; if traffic-attributable, mandatory consultation with FMEnv on emission control measures Toll plaza queues (CH11+900, CH10+900) Quarterly monitoring during peak hours at plaza exits $PM_{10} \leq 50$ µg/m³ (24-hr mean) Queue management protocols activated; ETC lane utilization audited and optimized Service area generators (CH22+300) Annual stack testing for standby generators < 50 mg/Nm³ particulate; < 200 mg/Nm³ NO_x Maintenance or replacement mandated for non-compliant units Binding Requirement: All monitoring data is reported quarterly to FMEnv and lenders. Any exceedance persisting beyond two consecutive quarters triggers an independent air quality audit and corrective action plan—a condition precedent for continued operational certification.

Noise and Vibration Control

Operational noise is generated by continuous traffic flow (100 km/h design speed) and intermittent activities at toll plazas and service areas. The following receptor-specific controls are strictly enforced:

Receptor Location Chainage Baseline Leq (dB(A)) Maximum Permitted Leq (dB(A)) Mitigation Requirement Odo-Noforija settlement CH8+900 to CH9+400 52.3 (day), 41.8 (night) 55 dB(A) day / 45 dB(A) night 3 m high absorptive noise barriers installed pre-commissioning; verified by post-construction monitoring Igando-Oloja settlement CH12+500 to CH13+200 51.7 (day), 40.5 (night) 55 dB(A) day / 45 dB(A) night Noise barriers installed; annual verification monitoring Akodo settlement CH17+100 to CH18+600 53.1 (day), 42.3 (night) 55 dB(A) day / 45 dB(A) night Noise barriers installed; community grievance-triggered monitoring Toll plazas (CH11+900, CH10+900) — 58.4 (day), 52.1 (night) 65 dB(A) day / 55 dB(A) night Operator enclosures with acoustic insulation; annual worker noise exposure monitoring Binding Operational Rules:

- Annual noise monitoring at all 12 designated receptor locations, with results disclosed to communities via notice boards
- Complaint-triggered monitoring within 48 hours of any verified community grievance
- Barrier maintenance inspected quarterly; any damage reducing acoustic performance by >3 dB(A) repaired within 30 days
- Night-time HGV restrictions enforced through toll plaza operating protocols (additional charges for night-time HGV movements to incentivize daytime scheduling)

Any verified exceedance of permitted limits requires submission of a Noise Mitigation Action Plan within 60 days, with implementation completed within 6 months—a condition precedent for avoiding material breach of IFC PS4.

Water Quality and Drainage Management

The operational drainage system (27 culverts, lined trapezoidal side drains, outfall structures) requires ongoing maintenance to prevent downstream flooding and water quality degradation. The marsh lake zone (CH14+655 to CH16+710) is designated as a high-risk receptor requiring enhanced monitoring.

Element Monitoring Frequency Parameters Compliance Threshold Management Response Culverts and side drains Quarterly visual inspection; annual CCTV survey of critical culverts Blockages, sediment accumulation, structural damage <10% blockage; no structural cracks >3 mm Clearing within 7 days; structural repair within 30 days Outfall structures (6 locations) Quarterly inspection; annual sediment sampling Scour, erosion, sediment deposition No active erosion within 10 m of outfall Riprap repair mandated within 30 days Marsh lake zone (CH15+750) Semi-annual water quality sampling at 3 points TSS, BOD, COD, heavy metals, hydrocarbons TSS ≤ 50 mg/L above upstream baseline; hydrocarbons not detectable Exceedance triggers source investigation and outfall-specific monitoring; discharge moratorium if point source identified Road runoff (toll plazas, service area) Annual sampling at oil-water separator outlets Oil & grease, TSS, pH Oil & grease <5 mg/L; TSS <50 mg/L Separator cleaning mandated; bypass prohibited Binding Operational Rules:

- Drainage inspection reports submitted quarterly to FMEnv and lenders
- Spill response equipment stationed at CH10+900 and CH22+300, inspected monthly
- Service area wastewater treatment plant (200 m³/day capacity) monitored continuously with automated alerts for effluent exceedances
- Fertilizer and herbicide use for vegetation management strictly limited to FMEnv-approved products; application records maintained for inspection

Any discharge of untreated runoff or detection of hydrocarbon sheen in the marsh lake zone constitutes a reportable incident requiring FMEnv notification within 24 hours and root cause analysis within 7 days.

Hazardous Materials and Spill Response (Operational)

Operational hazardous materials include fuels (service area), lubricants (maintenance depots), and cleaning chemicals (toll plazas). The following controls are non-negotiable:

Facility Hazardous Materials Storage Requirement Spill Response Service area (CH22+300) Diesel (40,000 L), petrol (30,000 L), LPG (5,000 L) Double-walled tanks with leak detection; bunded to 110% capacity; impermeable surfacing Dedicated spill kit (500 L capacity); trained attendant on-site during operating hours Maintenance depots (CH10+900, CH24+932) Lubricants (8,000 L), hydraulic fluids (4,000 L), solvents (1,500 L) Bunded storage cabinets; secondary containment trays; flammable storage compliant with NFPA 30 Spill kits at each depot; monthly inspection log Toll plazas (CH11+900, CH10+900) Generator diesel (5,000 L each), cleaning chemicals Double-walled day tanks; chemical storage in impermeable bunded cabinets Spill kits at each plaza; staff trained quarterly Binding Spill Protocol (Operational):

Any release > 20 liters (or any release reaching drainage) requires:

- Immediate containment and recovery
- Written notification to FMEnv and lenders within 24 hours
- Sampling of adjacent drainage/water bodies
- Root cause analysis and corrective action plan within 14 days
- Community notification via grievance mechanism within 24 hours (if public safety or water supply affected)

A second spill at any facility within 12 months triggers mandatory facility suspension pending independent audit and system upgrades.

Waste Management (Operational Phase)

Operational waste streams include solid waste from toll plazas and service areas, maintenance wastes, and—critically—electronic waste (e-waste) from toll collection systems, surveillance infrastructure, and administrative operations.

Table 3.15: Operational Waste Streams and Management Requirements

Waste Stream	Sources	Estimated Annual Volume	Management Requirement
Municipal solid waste	Toll plazas, service area, admin offices	85 tonnes	Segregated at source (organics, recyclables, residuals); recyclables to licensed aggregators; organics composted on-site (service area); residuals to FMEnv-approved landfill
Hazardous waste	Maintenance depots (used oils, filters, batteries, rags)	12 tonnes	Segregated; stored in bundled area; collected by FMEnv-licensed hazardous waste contractor; chain-of-custody maintained
E-waste (Category 1: IT equipment)	Computers, servers, printers, UPS units (toll plazas, admin)	3.5 tonnes	Inventory tracked (unique IDs); disposal only via FMEnv-licensed WEEE recyclers; prohibited from landfill or informal sector
E-waste (Category 2: Toll collection equipment)	RFID readers, lane controllers, sensors, display units	2.8 tonnes	Manufacturer take-back scheme where available; otherwise licensed recycler; component recovery for spare parts where feasible
E-waste (Category 3: Surveillance and communications)	Cameras, fiber optic equipment, radios, microwave links	1.9 tonnes	Segregated; precious metal recovery via licensed processor; documented chain-of-custody to final recycler

E-waste (Category 4: Lighting)	LED fixtures, fluorescent tubes (toll plazas, service area, roadway)	1.2 tonnes	Fluorescent tubes managed as hazardous waste (mercury content); LEDs to e-waste recycler; prohibited from general waste
Maintenance waste (non-hazardous)	Pavement sweepings, vegetation trimmings, sign sheeting	240 tonnes	Sweepings to licensed fill; vegetation chipped for mulch (on-site reuse); sign sheeting to recycler where feasible
Construction waste (during rehabilitation works)	Concrete rubble, asphalt millings, steel signage	Variable (during major rehab)	Crushed for base course reuse; steel recycled; asphalt millings to hot-mix plants for reprocessing

For E-Waste Management, the Protocol for the Operational Phase shall include:

- Asset inventory: All electronic assets >5 kg tagged with unique identifier and tracked in centralized database from procurement through disposal. Inventory reconciled annually with procurement records.
- Segregation mandate: E-waste segregated at source into four categories (IT equipment, toll collection equipment, surveillance/communications, lighting) with dedicated labeled containers at all generation points (toll plazas, maintenance depots, admin offices).
- Licensed recyclers only: All e-waste transfers must be to FMEnv-licensed WEEE recyclers. Engagement of informal sector collectors, scrap dealers, or unlicensed vendors is strictly prohibited and constitutes a material breach of IFC PS3.
- Chain-of-custody documentation: The following documentation must be retained for minimum 5 years and available for lender inspection:
    - Weighboridge tickets for all e-waste shipments
    - Receipt vouchers from licensed recyclers
    - Final disposal certificates specifying recovery/recycling rates
    - Annual reconciliation report comparing disposed volumes against procurement
- **Annual e-waste audit:** Independent audit of e-waste inventory, transfers, and disposal routes conducted annually by FMEnv-approved third party. Audit report submitted to FMEnv and lenders by February 28 each year, including:
    - Quantity of e-waste generated by category
    - Verification of licensed recycler contracts and chain-of-custody
    - Photographic evidence of storage and handling practices
    - Recommendations for continuous improvement

- **Mercury-containing lamps:** All fluorescent tubes and HID lamps managed as hazardous waste:
  - Stored in breakage-proof, labeled containers
  - Segregated from general e-waste
  - Collected by FMEnv-licensed hazardous waste contractor
  - Disposal certificates specifying mercury recovery/containment

- **Training requirement:** All operational staff (toll plaza attendants, maintenance crews, admin personnel) trained annually on:
  - E-waste categorization and segregation
  - Prohibition on informal sector disposal
  - Spill and breakage procedures for mercury-containing lamps
  - Documentation requirements

Consequences of Non-Compliance

Any disposal of e-waste via unlicensed channels—including sale to informal scrap dealers, disposal in municipal landfills, or mixing with general waste—constitutes a **material breach** of IFC PS3 and triggers:

Breach Level	Definition	Consequence
Level 1 (Minor)	Isolated incident of improper segregation (e.g., e-waste in general waste bin)	Corrective action notice; retraining of relevant staff; weekly audits for 3 months
Level 2 (Significant)	Documented transfer of e-waste to unlicensed collector (<500 kg)	Immediate suspension of related facility operations; mandatory investigation; lender notification within 7 days; recovery of disposed materials where feasible
Level 3 (Material Breach)	Systematic disposal via informal sector; transfer to unlicensed recycler (>500 kg); falsification of chain-of-custody	Facility closure pending independent audit; FMEnv prosecution referral; lender notification within 24 hours; formal remediation plan within 30 days; potential covenant breach and acceleration of loan repayment terms

Community Health, Safety, and Security (Operational)

Table 3.13 outlines the operational community health, safety, and security management

Table 3.13: Operational Community Health, Safety, and Security Management

Risk Area	Mitigation Measure	Performance Indicator	Compliance Threshold
Traffic accidents	Speed enforcement (cameras), HGV lane restrictions, emergency response protocol	Annual accident rate (per million vehicle-km)	≤0.5 fatalities per million vehicle-km
Community access	11 passages maintained; local road connectivity preserved	Community access grievances	≤5 unresolved access grievances at any time
Toll plaza safety	Pedestrian prohibition; signage; speed calming on approaches	Plaza incidents	Zero pedestrian incidents
Security personnel	Trained in human rights; code of conduct; grievance mechanism	Security complaints	Zero verified security-related grievances
Emergency response	24/7 incident response team; ambulance stations at CH10+900 and CH22+300	Response time to incident	≤30 minutes to any point on corridor

Binding Operational Rules:

- **Community liaison officers** maintain 24/7 phone line and monthly community meetings at Odo-Noforija, Igando-Oloja, and Akodo. Meeting minutes and attendance records are maintained for lender inspection.
- **Grievance mechanism** is accessible at all toll plazas (CH11+900, CH10+900) and via toll-free phone line (displayed on signage at 500 m intervals). Grievances are:
    - Acknowledged within 48 hours (written or verbal confirmation to complainant)
    - Investigated with resolution proposed within 10 working days
    - Fully resolved within 15 working days
    - Escalated to Grievance Redress Committee if unresolved after 15 days

    - Reported monthly to lenders with status of all open/completed grievances

- **Annual community perception survey** is conducted by independent third party (FMEnv-approved social consultant) each October. Survey covers:
    - Traffic safety concerns
    - Access adequacy
    - Noise and air quality perceptions
    - Grievance mechanism awareness and effectiveness
    - Security personnel conduct
    - Overall project satisfaction

Survey results are publicly disclosed at community meetings and on project website within 60 days, with management responses published for each concern identified.

- **Security personnel** (all contracted security staff at toll plazas, maintenance depots, and service area) undergo:
    - Annual human rights training certified by FMEnv-approved provider
    - Signed code of conduct renewed annually
    - Background verification prior to deployment
    - Quarterly performance reviews including community feedback

All security incidents—including any use of force, community complaints, or arrests—are documented in a secure incident log and reported to lenders within 7 days. Zero verified security-related grievances is a **binding performance target**; any verified grievance triggers immediate suspension of involved personnel pending investigation.

Enforcement and Reporting:

Requirement	Frequency	Responsible Party	Deliverable
Community meetings	Monthly	Community Liaison Officer	Meeting minutes, attendance records
Grievance reporting	Monthly	Concessionaire E&S Manager	Grievance log (open/resolved)
Incident reporting (security)	Within 7 days of incident	Concessionaire E&S Manager	Incident report with root cause
Community perception survey	Annually (October)	Independent third party	Survey report with management responses
Security training verification	Annually (January)	Concessionaire E&S Manager	Training certificates, attendance records
Lender reporting	Quarterly	Concessionaire	E&S performance dashboard including community metrics

Consequences of Non-Compliance:

Breach Type	Definition	Consequence
Fatality rate exceedance	>0.5 fatalities per million vehicle-km in any calendar year	Independent road safety audit; enhanced enforcement measures; lender notification within 14 days
Unresolved access grievances	>5 grievances unresolved >15 days	Community liaison protocol review; mandatory mediation within 30 days
Pedestrian incident	Any pedestrian struck at toll plaza	Immediate plaza safety audit; FMEnv notification within 24 hours; corrective action plan within 7 days
Verified security grievance	Any confirmed human rights violation or excessive force	Suspension of involved personnel; independent investigation; lender notification within 24 hours; remediation plan within 14 days
Response time exceedance	>30 minutes to any incident, >2 occurrences per quarter	Emergency response protocol review; additional ambulance station assessment; retraining of response team

These controls are non-negotiable and are audited quarterly as part of IFC PS4 compliance verification.

3.9.3.1 Biodiversity and Ecosystem Services Monitoring (Operational)

The marsh lake zone (CH14+655 to CH16+710) remains a **high-biodiversity-value area** requiring ongoing monitoring under IFC PS6. The bridge design (2.255 km elevated structure) eliminated direct habitat loss, but operational-phase monitoring is mandated to verify **no net loss** and progress toward **net gain**:

Table 3.14 Operational Biodiversity Monitoring Framework

Monitoring Element	Frequency	Indicator	Compliance Target
Aquatic habitat quality	Semi-annual (wet/dry season)	Macroinvertebrate diversity (BMWP score); fish species richness	No decline from baseline; ≥10% increase in native species by Year 5 (net gain target)
Water quality (lagoon)	Quarterly	TSS, DO, BOD, nutrients, hydrocarbons	Maintain baseline conditions; TSS ≤50 mg/L above baseline
Wetland vegetation	Annual	Species composition; invasive species cover	Invasive species cover ≤5%; native wetland vegetation stable/increasing
Wildlife corridors	Annual (camera traps at 3 locations)	Mammal diversity; crossing frequency	Wildlife crossing events stable/increasing; no roadkill hotspots

Lighting impacts (bridge)	Annual assessment	Insect attraction; bird strike records	Adaptive management if light-attributed mortality detected

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Binding Adaptive Management Protocol:

Any detected decline in biodiversity indicators triggers the following **mandatory response cascade**:

Trigger Condition	Response Required	Timeline	Responsible Party
Any decline >5% from baseline in any single indicator	Root cause analysis initiated	Within 60 days of monitoring report	Concessionaire E&S Manager with independent biodiversity consultant
Decline confirmed between 5–15%	Corrective action plan developed and submitted to lenders	Within 90 days of monitoring report	Concessionaire with FMEnv-approved biodiversity specialist
Corrective action plan approved	Implementation of mitigation measures (e.g., enhanced water treatment, invasive species removal, lighting modification)	Per approved plan schedule	Concessionaire
Following correction	Enhanced monitoring at double frequency (quarterly instead of semi-annual; bi-annual instead of annual)	Minimum 2 years following correction completion	Concessionaire with independent verification
Decline exceeds 15% from baseline	Immediate lender notification; FMEnv incident report; independent audit; potential offset obligation triggered	Within 7 days of confirmed exceedance	Concessionaire E&S Manager to lenders and FMEnv
Net gain target (≥10% increase by Year 5)	Verification audit; public disclosure of net gain achievement	Year 5 (+3 months)	Independent third party approved by lenders

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Lender Notification Protocol:

For any decline exceeding **15% from baseline**, the following information must be submitted to lenders within **7 calendar days**:

- Monitoring data showing baseline comparison and trend analysis
- Root cause analysis findings (completed or in progress)
- Preliminary assessment of ecological significance and reversibility
- Proposed corrective actions with estimated timeline

- Enhanced monitoring protocol for duration of recovery period
- Community disclosure record (if applicable to affected ecosystem services)

Annual Biodiversity Reporting:

Report Element	Content Required	Submission Date
Monitoring data	All raw data from quarterly/semi-annual/annual monitoring	February 28 (preceding year)
Trend analysis	Year-on-year comparison against baseline; statistical significance	February 28
Invasive species assessment	Species inventory; control measures implemented; effectiveness evaluation	February 28
Wildlife corridor analysis	Camera trap data; crossing frequency; roadkill records (if any)	February 28
Lighting impact assessment	Insect light-trap data; bird mortality records; adaptive measures taken	February 28
Corrective action status	Progress on any ongoing corrective actions	Quarterly (with lender reporting)
Net gain tracking	Progress toward Year 5 net gain target (≥10% increase)	Annually with cumulative tracking

Consequences of Material Non-Compliance

Breach Level	Definition	Consequence
Level 1 (Minor)	Isolated missed monitoring event; corrective action implemented within 30 days	Warning letter; enhanced oversight for 6 months
Level 2 (Significant)	Decline 10–15% with delayed corrective action; repeated missed monitoring	Mandatory independent audit; lender notification; enhanced monitoring at concessionaire expense
Level 3 (Material Breach)	Decline >15% confirmed; failure to implement corrective action; falsification of monitoring data	Immediate lender notification; potential suspension of disbursements; independent investigation; biodiversity offset obligation triggered; FMEnv prosecution referral

Binding Commitments:

- All monitoring data is publicly disclosed annually on project website
- Local communities (Odo-Noforija, Igando-Oloja, Akodo) receive summarized findings in local language at annual community meetings
- Independent biodiversity auditor conducts verification site visit every 3 years
- Any net gain achievement (≥10% increase in native species by Year 5) is verified by independent third party and certified by FMEnv

These controls are non-negotiable and are enforced through quarterly lender reporting and triennial independent audits as part of IFC PS6 compliance verification.

3.9.3.2 Operational Phase Governance and Reporting

The Operational Environmental and Social Management Plan (O-ESMP) is enforced through the following governance structure, which establishes clear accountability, reporting frequency, and deliverables for all monitoring and compliance activities:

Table 3.15: Operational Phase Governance and Reporting Matrix

Mechanism	Frequency	Responsible Party	Deliverable	Recipient	Compliance Standard
Internal compliance audits	Quarterly	Concessionaire E&S Manager	Audit report with corrective action tracker	Concessionaire Operations Director; Engineer's Representative	IFC PS1, PS3-6; O-ESMP Section 5
Independent external audit	Annually (Q1)	FMEnv-approved third-party auditor	Publicly disclosed audit report including: (i) compliance verification, (ii) non-conformances, (iii) corrective action status, (iv) management response	FMEnv; Lenders; Public (project website)	ISO 14001; IFC Performance Standards; national regulations
Lender review mission	Bi-annually (April, October)	Lender E&S specialists (AfDB, IFC, etc.)	Aide-memoire with: (i) covenants status, (ii) material findings, (iii) required actions, (iv) risk rating	Lenders; Concessionaire CEO; FMEnv (for information)	Loan covenants; IFC Performance Standards
Community grievance reporting	Monthly (by 5th of following month)	Community Liaison Officer	Grievance log with: (i) new grievances, (ii) resolved grievances, (iii) aging analysis, (iv) trends, (v) escalation cases	Concessionaire E&S Manager; Community Grievance Redress Committee	IFC PS4; Grievance Mechanism Protocol (Annex D)
Regulatory reporting	Quarterly (by 15th of month following quarter)	Concessionaire E&S Manager	Consolidated report with: (i) monitoring data (air, noise, water, biodiversity), (ii) incident reports, (iii) waste manifests, (iv) community engagement records	FMEnv (Lagos State office); Lenders (copy)	FMEnv Environmental Permit Conditions; National Environmental Regulations
Public disclosure	Annually (March)	Concessionaire Communications Manager	ESMP performance summary including: (i) monitoring results, (ii) grievance statistics,	Public (project website); Local communities	IFC PS1 (Disclosure); Access to Information Policy

Mechanism	Frequency	Responsible Party	Deliverable	Recipient	Compliance Standard
			(iii) community investments, (iv) corrective actions, (v) forward work plan	(printed summary in English/Yoruba)	
Emergency response drills	Semi-annual (June, December)	Concessionaire Safety Officer	Drill report with: (i) scenario description, (ii) response times, (iii) equipment verification, (iv) lessons learned, (v) procedure updates	Concessionaire E&S Manager; Lenders (summary)	IFC PS4; Spill Response Protocol (Annex E)
Management review meeting	Quarterly	Concessionaire CEO (chair)	Management review minutes with: (i) policy review, (ii) performance analysis, (iii) resource requirements, (iv) continual improvement decisions	Concessionaire Board; Lenders (summary)	ISO 14001:2015 Clause 9.3
Biodiversity net gain verification	Year 5 (+3 months)	FMEnv-approved biodiversity specialist	Net gain assessment report with: (i) baseline comparison, (ii) species diversity analysis, (iii) verification of ≥10% target achievement	FMEnv; Lenders; Public	IFC PS6; Biodiversity Action Plan (Annex F)

Reporting Integration and Timing:

Quarter	Month	Primary Reporting Deliverables
Q1	January	Internal compliance audit (Q4 previous year); Annual work plan submission
	February	Annual independent external audit report; Public disclosure summary
	March	Regulatory report (Q4 previous year); Management review meeting
Q2	April	Lender review mission (if scheduled); Grievance log
	May	Internal compliance audit (Q1)
	June	Emergency response drill; Semi-annual biodiversity monitoring (wet season)
Q3	July	Regulatory report (Q2); Grievance log
	August	Internal compliance audit (Q2)
	September	Management review meeting
Q4	October	Lender review mission (if scheduled); Grievance log

	November	Internal compliance audit (Q3); Annual community perception survey
	December	Emergency response drill; Semi-annual biodiversity monitoring (dry season)
Year-End	January (following year)	Annual report compilation; Net gain tracking update

Binding Conditions Precedent for Commercial Operation Date:

The following conditions must be satisfied and verified in writing prior to commencement of commercial operations (toll collection commencement):

Condition Reference	Condition Description	Verification Requirement	Verifying Party
CP-O-01	O-ESMP Approval: Final O-ESMP (Version 1.0) approved by FMEnv and lenders, with all lender comments closed	Signed approval letters from FMEnv and lender E&S specialists	Engineer's Representative
CP-O-02	Noise Barriers: All noise barriers at Odo-Noforija, Igando-Oloja, and Akodo installed and verified to meet acoustic performance specifications (≥15 kg/m², 3 m height)	As-built drawings; acoustic performance certificate; photographic record	Independent acoustic consultant
CP-O-03	E-Waste Management Protocol: Licensed e-waste recyclers contracted for all four e-waste categories; chain-of-custody system operational; staff trained	Signed contracts; training records; inventory system demonstration	FMEnv (Lagos State office)
CP-O-04	Spill Response: Spill response equipment stationed at CH10+900 and CH22+300; inventory verified; response team trained; drill completed	Equipment inventory log; training certificates; drill report	Engineer's Representative
CP-O-05	Grievance Mechanism: Grievance mechanism operational at all toll plazas; toll-free phone line active; signage installed at 500 m intervals; CLO appointed	Site inspection; phone line test; appointment letter; disclosure records	Engineer's Representative; Community representative witness
CP-O-06	Monitoring Budget: First year monitoring budget (Year 1 operations) secured and deposited in dedicated escrow account	Bank confirmation letter; budget breakdown approved by lenders	Lender E&S specialists
CP-O-07	Emergency Response Protocol: Emergency response protocol approved by FMEnv; ambulance stations at CH10+900	Approval letter; site inspection; response time verification test	FMEnv; Engineer's Representative

	and CH22+300 operational; response time tested		
CP-O-08	Security Personnel Training: All security personnel completed human rights training; codes of conduct signed; background checks verified	Training certificates; signed codes; background check register	Independent security auditor
CP-O-09	Baseline Monitoring Completion: Final baseline monitoring report (air, noise, water, biodiversity) accepted by FMEnv and lenders	Acceptance letter from FMEnv; lender confirmation	Engineer's Representative
CP-O-10	Community Liaison Office: Community liaison office established at accessible location (CH11+900) with dedicated staff and publicized hours	Site inspection; public notice; staff appointment letter	Engineer's Representative; Community representative

Verification and Certification Statement:

Consequence of Non-Compliance:

Commercial operation shall **not commence** until all conditions are verified in writing. Any commencement prior to full satisfaction of these conditions constitutes:

- A **material breach** of the Environmental and Social Commitment Plan (ESCP)
- A **covenant default** under loan agreements
- Grounds for **suspension of disbursements** by lenders
- Potential **revocation of environmental permit** by FMEnv

These conditions are **non-negotiable** and are enforceable through the project's legal agreements, environmental permit, and lender covenants.

Continuous Community Engagement

Addressing ongoing social interactions, maintaining Grievance Redress Mechanisms (GRMs), and managing the road's impact on socio-economic activities. Induced development impacts (settlement expansion, land use change) will be monitored in coordination with Lagos State planning authorities (**IFC PS1**).

Traffic Safety Devices

Installation and maintenance of safety features, including signs and markings as exemplified in Figure 3.32. A comprehensive signage and road marking regime—comprising 142 regulatory signs, 67 warning signs, and 89 guide signs—is mandated along the entire 16.232 km corridor to enforce speed limits (100 km/h design, 30 km/h through settlements), restrict HGV overtaking at identified blackspots, and provide advance warning of toll plazas and interchanges. This regime is a condition precedent for road safety certification and IFC PS4 compliance, with retroreflective sheeting (Class RA3) mandated for all nighttime visibility.

Limiting Speed **Limiting Height** **Left-hand Turn Prohibited**

Minimum Speed Limit **Drive on Both Sides of Road** **Freeway**

Figure 3.32: Examples of Road Signs and Markings

3.9.4 Decommissioning (Long-Term, >40 Years)

The decommissioning phase represents the final stage in the lifecycle of the Lot 2 corridor. While the road is designed as a permanent asset and decommissioning is not anticipated within its projected design life, this phase would occur should the infrastructure, or any of its components, be permanently retired or substantially realigned.

A **Decommissioning and Restoration Plan (DRP)** outlines protocols for material recycling, waste minimisation, site restoration, and safe removal of infrastructure, ensuring compliance with **IFC PS1 and PS3**. Decommissioning will also require community consultation and updated environmental assessments, consistent with **IFC PS4 and PS5**.

3.10 Project Implementation Schedule

The overall project implementation schedule for Lot 2 has been developed to optimize construction efficiency while minimizing environmental and social disruption. The 23-month construction program is structured to sequence activities logically, allowing for critical environmental controls to be applied during periods of peak impact. The high-level schedule, presented in **Table 3.3**, aligns the primary construction phases with key environmental management windows, ensuring that mitigation measures are targeted and effective.

Table 3.16: Project Implementation Schedule (April 2026 – February 2028)

Activity Phase	2025	2026	2026			2027				2028
	Q4	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**
ESIA and RAP Preparation	■	■								
Mobilisation & Site Setup			■							
Earthworks & Drainage				■	■					
Lagoon Bridge Works				■	■	■	■	■		
Pavement & Surfacing						■	■	■		
Toll Plaza & Ancillary									■	
Commissioning & Handover										◆

The schedule is designed with key environmental impact windows in mind, ensuring that the Environmental and Social Management Plan (ESMP) is actively implemented during the most sensitive periods:

- **Earthworks (Q3-Q4 2026):** This phase represents the peak period for dust generation and construction noise. Enhanced dust suppression protocols and noise monitoring, as per **IFC PS3 (Pollution Prevention)** , will be implemented to mitigate impacts on nearby communities.

- **Lagoon Bridge Works (Q3 2026 - Q3 2027):** This is the most critical phase for aquatic biodiversity and water quality. Continuous monitoring of turbidity and sediment control measures, aligned with **IFC PS6 (Biodiversity Conservation)** , will be mandatory throughout all in-water works to protect the lagoon ecosystem.
- **Pavement Works (Q1-Q3 2027):** The operation of asphalt and concrete batching plants during this period will be subject to strict air quality monitoring and community safety protocols, as required by **IFC PS4 (Community Health, Safety, and Security)**. Traffic management plans will also be fully implemented to manage construction-related traffic and maintain community access.

This structured timeline ensures that all environmental and social safeguards are not only planned but are operational and effective during the specific phases where they are most needed. The successful completion of the project, marked by the commissioning milestone, will depend on adherence to this integrated schedule and its embedded mitigation measures.

3.11 Conclusion

Lot 2 is a technically robust, environmentally conscious, and socially responsible infrastructure project that completes the 7th Axial Road corridor. Its design and phasing reflect international best practices, lender safeguards, and Nigerian regulatory requirements, ensuring deliverability, sustainability, and long-term public benefit. Traffic volumes are anchored to operational megaprojects, providing a stable demand base. The engineering design, with its detailed specifications for pavement, drainage, and structures, directly addresses the geotechnical and hydrological constraints of the area.

The project description presented in this chapter provides the technical, environmental, and social foundation for the impact assessment in Chapter 4 and ensures corridor-wide consistency with Lot 1, offering a defensible, evidence-based justification for project viability.

CHAPTER FOUR

DESCRIPTION OF THE BASELINE ENVIRONMENT

4.0 Introduction

This chapter presents the baseline environmental conditions for the Lot 2 corridor (CH 8+700 to CH 24+932) of the 7th Axial Road Project, based on field investigations undertaken in November and December 2025, and supported by relevant secondary data and established reference standards. The biophysical baseline focused on parameters such as vegetation, wildlife, geology, soils, surface and groundwater, hydrobiology, air quality, and ambient noise levels. Socioeconomic and community health data were gathered through field surveys and supplemented by statistics from the National Bureau of Statistics (NBS). Stakeholder involvement through meetings, interviews, and questionnaires contributed to a comprehensive understanding of local priorities, concerns, and expectations.

As required by IFC PS1, the baseline establishes the environmental and social conditions against which project-induced changes will be assessed and monitored.

4.1 Study Approach

The baseline study adopted a systematic and integrated approach to characterise the existing environmental and socioeconomic conditions of the project area. This approach was designed to support the ESIA by allowing the acquisition of reliable data against which project impacts would be assessed. It comprises the following:

- Field surveys (ecological, hydrological, socioeconomic).
- GIS and remote sensing for land-use and habitat mapping.
- Stakeholder consultations across 15 affected communities.
- Cross-referencing with Lot 1 and Section 2 ESIA data to ensure regional consistency.

The study approach aligns with IFC PS1 data adequacy requirements and ensures corridor wide harmonisation of baseline conditions.

4.1.1 Area of Influence (AoI) and Spatial Framework

The spatial framework for the study is defined by the project's AoI, operationally defined as the geographic extent within which physical, biological, and social receptors may be affected by construction and operational activities. It includes:

- Settlements: Administrative boundaries of the 15 affected communities, including Iraye-Oke, Iraye-Odo, Imokun, Odo-Egiri, Eregbe, Odogbonle, Ayedare, Eredo, Yewa, Aye, Mausa, Maya-Idiroko, Olosho, Edudu, and Noforija.
- Air Quality and Noise: Proximity of human habitations to emission and activity sources, and the presence of sensitive environmental features.

- Soil and Biodiversity: 500m on either side of the centreline
- Aquatic and Hydrobiology: 1km upstream and downstream of the three major lagoon/stream crossings, specifically CH 15, 16, and 17

The AoI also includes induced development zones, worker community interaction zones, and ecosystem service areas, consistent with IFC PS1, PS4, PS5, and PS6.

Figure 4.1 presents the geospatial extent of the Lot 2 AoI and the distribution of sampling locations.

Figure 0.1: Geospatial Map of Lot 1 & Lot 2 Route Alignment, Settlements, and Sampling Locations

4.1.1.1 Relevance of the AoI to Subsequent ESIA Chapters

The AoI defined in this chapter provides the spatial and analytical foundation for the entire ESIA process. The baseline conditions established here are the critical reference point against which all project-induced changes are measured. Specifically, the AoI and its characterised environments directly inform:

- Identifies sensitive receptors (e.g., Eredo), exposure pathways, and pre-existing stress levels against which incremental impacts are assessed.
- Informs climate-resilient engineering (e.g., drainage for 100-year flood events), route optimisation to avoid critical habitats, and the integration of pollution control features based on baseline hotspots.
- Provides the benchmarks for monitoring indicators, sets trigger levels for corrective action, and shapes the specific mitigation, monitoring, and institutional measures for each environmental and social component.
- Defines the shared geographical and ecological zone within which the project's impacts interact with those of other developments (e.g., Dangote Refinery, Lekki Port).
- Delineates the affected communities and households, documents pre-project livelihoods and socioeconomic conditions, and establishes the basis for compensation and restoration planning.
- Maps all affected parties and their concerns, forming the basis for ongoing consultation and the GRM.

The AoI also informs cumulative impact assessment and ecosystem services evaluation, as required by IFC PS1 and PS6.

4.2 Baseline Data Acquisition and Integration Framework

4.2.1 Summary of Data Acquisition Sources

Table 4.1 summarises the primary and secondary data sources used in this study. Primary data were collected through field studies, including environmental sampling, *in situ* measurements, geographic information system (GIS) modelling, and socioeconomic surveys, while secondary data were obtained from a review of the previously approved Lot 1 ESIA report, scientific literature, and reputable government institutions. Secondary data were validated for relevance, reliability, and temporal accuracy before integration, consistent with IFC PS1.

Table 0.1: Summary of the Data Used for the ESIA

Aspect	Spatial Scale	Season	Data Source	Regulatory Benchmark
Air Quality (CO_2, HCHO, NOx, $PM_{2.5}$, PM_{10}, and VOCs)	Project and local	Dry	In-situ Measurements	NESREA, FMEnv. WHO air quality guidelines (AQG)
Noise levels (db[A])	Project and local	Dry	In-situ Measurements	NESREA, FMEnv. WHO noise guidelines
Local Meteorology (Temperature, Relative Humidity, Wind Speed and Meteorology)	Project & Local	Dry	In situ measurements	NS
Groundwater (Physiochemistry and Microbiology)	Local	Dry	In situ, sampling and laboratory measurements	NESREA, FMEnv standards, WHO drinking water guidelines
Surface hydrology	Local & Regional	Dry	Hydrological modelling, GIS mapping, and field surveys	Hydrological guideline
Soil (Physiochemistry and Microbiology)	Project	Dry	Sampling and laboratory analysis	FAO soil guidelines
Geology Sublayer characteristics)	Regional	Dry	Literature review	NS
Sediment (Physiochemistry and microbiology	Local	Dry	Sampling and laboratory analysis	NS
Hydrobiology (Species diversity & abundance)	Local	Dry	Samplings and laboratory identification	Hydrobiological guidelines
Biodiversity (Species Diversity)	Local	Dry	Ecological surveys, GIS habitat mapping	IUCN Red List; CITES Convention
Bioindicators (Fish & Crustaceans)	Local	Dry	Sampling of artisanal catches and laboratory analysis	FAO/WHO Food Safety Standards
Socioeconomics (livelihoods,	Local and Regional	Dry	Household survey and stakeholder consultation	IFC PS5 (Resettlement), PS8 (Cultural Heritage)

demographics, cultural heritage)				
Cultural Heritage	Project	Dry	Inventory	Nigerian National Commission for Museums & Monuments; IFC PS8

NS: Not specified.

Notes

- **Spatial Scales:** Project (direct footprint), Local (adjacent communities/wetlands), Regional (ecosystem catchments).
- **Seasonality:** Refers to the season during which field sampling activities were conducted
- **Regulatory Benchmarks:** Standards against which baseline findings are evaluated, and include NESREA and FMEnv standards for air quality, noise, surface water and groundwater qualities, WHO AQG, IFC performance standards, and Equator Principles IV.
- **Data Sources:** Where and how the data was acquired.

4.2.2 Laboratory Analysis

As part of the environmental baseline characterisation, laboratory analyses were undertaken on selected biophysical samples to assess existing environmental quality, potential contaminant pathways, and ecological sensitivity within the Project AoI. The analyses focused on receptors relevant to human health, aquatic ecology, and food safety, with sample selection designed to provide representative coverage of surface water, groundwater, sediments, soils, and hydrobiology. Specifically, bio-indicator analysis of fish and crustaceans was conducted to establish a food-safety baseline for the 15 identified communities reliant on the Lekki Lagoon ecosystem.

Laboratory analyses followed standard chain of custody procedures and QA/QC protocols to ensure data integrity, consistent with IFC PS1 requirements. All laboratory analyses were conducted by ISO/IEC 17025-accredited laboratories, ensuring compliance with internationally recognised quality management and testing standards.

Full laboratory results are presented in Appendix 4, while Table 4.2 summarises the scope of analyses conducted.

Table 0.2: Summary of Biophysical Media Biotic Samples Analysed

Description of Analysis	Notes
Fish organ analysis	Bioaccumulation of heavy metals/hydrocarbons
Crab meat analysis	Food safety risks
Plankton & benthos analysis	Biodiversity indices, pollutant sensitivity
Groundwater	Physiochemistry and microbiology
Surface water	Physiochemistry and microbiology
Sediment	Physiochemistry and microbiology
Soil	Physiochemistry and microbiology

4.2.3 Data Integration and Regional Corridor Cross-Referencing

To ensure the scientific robustness and regulatory alignment of the Lot 2 ESIA, this study adopts a corridor-wide assessment strategy. Given that Lot 2 of the 7th Axial Road (Lekki Port Access Road) and Section 2 of the Lagos-Calabar Coastal Highway traverse the same ecological and socioeconomic corridor, this report integrates validated data from the Section 2 and the Lot 1 ESIAs. Cross-referencing is essential because the referenced ESIA reports have already been approved by FMEnv, providing a validated regulatory foundation for shared baseline conditions.

This approach ensures consistency in cumulative impact assessment, biodiversity screening, hydrological modelling, and socioeconomic profiling across the corridor (IFC PS1).

Table 0.3: Cross-Reference Matrix and Data Integration with Section 2 ESIA

Thematic Area	Integrated Data from Section 2 / Lot 1 approved ESIAs	Geo-Referenced Coordinates & Locations	Application to Lot 2 Baseline and Analysis	Relevance to IFC PS
Hydrology & Water Quality	Water sampling at Mahin Creek, Lekki Lagoon, and adjacent wetlands. Includes flood modelling for 10-year and 25-year rainfall events.	Lekki Lagoon Catchment: Approx. 6°25′N to 6°45′N, 3°35′E to 4°10′E.	Validates flood risk zones along Lot 2 and supports aquifer vulnerability assessment and regional hydrological modelling. Informs protection of water-related ecosystem services (fisheries, water supply, flood regulation).	PS1, PS3, PS6

Geology & Geotechnical	Subsurface stratigraphy from 40 exploratory points (BH, CPT, TP). Identifies silty clay (6.0-16.5m depth) and coarse sand strata.	Partial corridor coverage: CH 0+000 to CH 17+000 (Lot 1 Alignment + Parts of Lot 2).	Establishes the baseline geological conditions and soil stability profile for the Lot 2 corridor. Provides the physical context for assessing land stability, erosion vulnerability, and groundwater drainage patterns.	PS1
Biodiversity	Species inventory recording Nile crocodile, Little Egret, and mangrove associates. Includes habitat mapping of shared wetland buffers.	Wetland Buffers: Spanning the lagoonal corridor through Epe and Iraye.	Reinforces the Lot 1 biodiversity baseline (Section 4.3.1.6). Directly informs the Biodiversity Action Plan (BAP) and offset strategy.	PS1, PS6
Socioeconomic & RAP	Detailed engagement in shared communities. Profiles for fishing, farming, and petty trade livelihoods.	Shared Settlements: Idasho, Iraye, Odo-Noforija, and Epe.	Validates the Lot 2 RAP census and LRP. Strengthens the Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH)Action Plan based on regional grievance records.	PS1, PS2, PS4, PS5
Cultural Heritage	Mapping of 23 culturally significant sites, including shrines and sacred groves.	Sacred Sites: Documented in the vicinity of Odo-Noforija and Iraye.	Confirms cultural heritage risk zones within the Lot 2 AoI. Supports the Chance Finds Procedure implementation.	PS1, PS8
Traffic & Transport	Baseline vehicle count at corridor nodes. Peak hour congestion modelling for	Monitoring Nodes: Data points at CH47+500, CH60+000, and CH75+000.	Reinforces Lot 2 traffic impact analysis. Supports road safety mitigation measures in Chapter 6.	PS1, PS4

	regional logistics.			
Air & Noise Quality	Documented exceedances of VOCs near industrial zones. Noise levels exceeding NESREA limits.	Industrial Hotspots: Proximity to the refinery yard and FTZ boundaries.	Validates Lot 1 air/noise baseline findings. This justifies the requirement for acoustic barriers and dust suppression.	PS1, PS3, PS$
Industrial Pressure	Cumulative impact data for the Dangote Refinery, Lekki Deep Seaport, and FTZ expansion.	Refinery Yard: 609495.00 E, 711302.00 N.	Supports the Cumulative Impact Screening (Chapter 5.5) and justifies regional mitigation strategies.	PS1
Engineering Design	Technical specifications for culverts and bridges at lagoon crossings. Climate-resilient drainage systems.	Lagoon Infrastructure: Crossing points at the Lekki-Ogun boundary.	Enables design harmonisation for Lot 1. Supports a consistent regional flood mitigation strategy.	PS1, PS3
Monitoring Framework	Standardised KPIs for hydrology, biodiversity, resettlement (RAP), and community safety.	Corridor-Wide: Applies across shared buffer zones in Ibeju-Lekki LGA.	Aligns Lot 1 ESMP indicators and independent audit schedules for regional consistency.	PS1

4.2.4 Sampling Design (Physical and Biological Media)

The sampling design employed a systematic approach to ensure representative coverage of all sensitive receptors identified within the AoI. Field studies were conducted between the 20th and 21st of November 2025 (Dry Season). Follow-up socioeconomic survey activities were also conducted on the 22nd and 5th of December 2025. Field surveys included in situ monitoring, sample collections and biodiversity studies. The dry season sampling will be complemented by wet season sampling during construction to ensure seasonal completeness, as required by FMEnv.

The spatial framework for the study is defined by the project's AoI, as defined in Section 4.1.1

4.2.4.1 Sampling Locations and Sample Number

Table 4.4 presents the central GPS coordinates for each chainage. At each chainage, samples for different parameters were collected within a 50-100 m radius of the listed coordinates to ensure sampling was representative of each parameter type. Sampling locations were selected to capture transitions between peri-urban, agricultural, wetland, and freshwater environments, consistent with IFC PS6 biodiversity requirements.

- **GPS Positioning:** All locations were geo-referenced using a Garmin Map62 GPS (Accuracy ± 3m) using the WGS84 coordinate system.
- **Spatial Logic:** Stations were selected based on project chainage (CH 15, 17, 20, 22, and 24) to capture transitions between residential, agricultural, and aquatic environments.

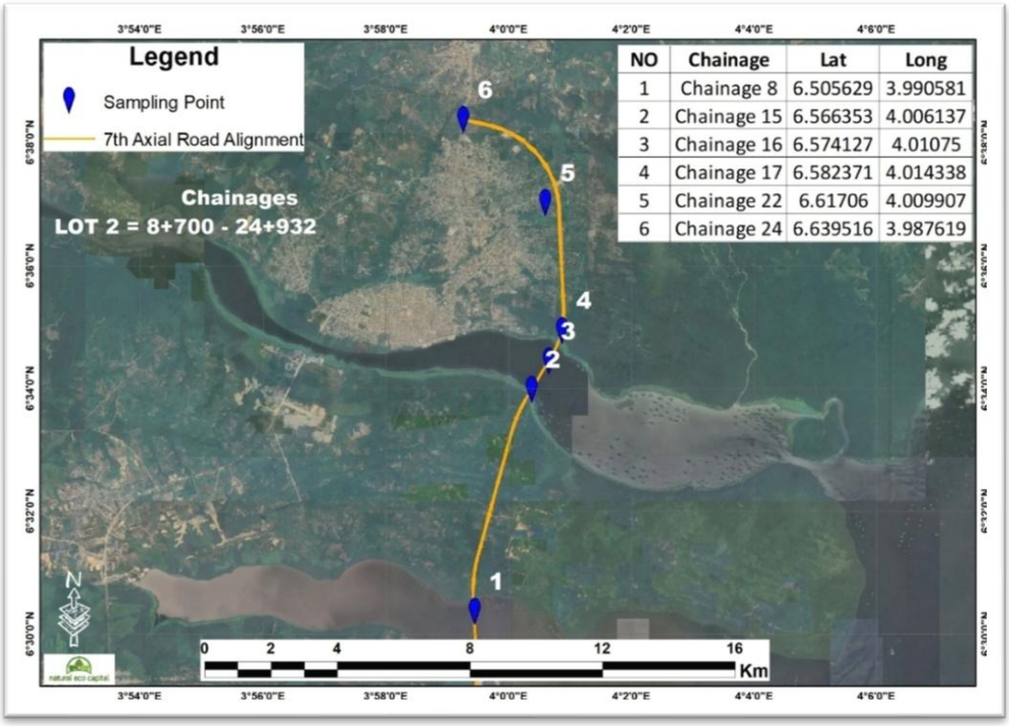

Figure 0.2: Map of the Sampling Stations along Lot 2

All sampling locations were geo-referenced using handheld Global Positioning System (GPS) devices (Garmin Map62) with a horizontal accuracy of ±3 meters under open-sky conditions. Coordinates were recorded in decimal degrees format using the WGS84 geographic coordinate system, consistent with standard geospatial data documentation practices.

Table 0.4: Sampling Location GPS Coordinates for Lot 2

S/N	Chainage	Latitude (N)	Longitude (E)	Parameter
1	Epe Town	6.590117	3.981367	Air /Noise
2	Chainage 17	6.582371	4.0143378	Air /Noise
3	Chainage 20	6.609438	4.013829	Air /Noise, Soil, BIO
4	Chainage 22	6.626870	4.010137	Air /Noise, Soil, BIO
5	Chainage 24	6.639458	3.987661	Air /Noise, Soil, BIO
6	Chainage 15	6.566353	4.006137	GW, SW, SED
7	Chainage 16	6.574127	4.010750	GW, SW, SED
8	Chainage 17	6.582371	4.014338	GW, SW, SED

GW: Groundwater; SW: Surface water; SED: Sediment; BIO: Biodiversity

Table 4.5 shows the number of samples collected for each parameter.

Table 0.5: Summary of Environmental and Social Samples Collected per Parameter

Parameter	Number of Samples
Air Quality	5 locations
Noise	5 locations
Groundwater	3 samples
Surface water	3 sample
Sediment	3 samples
Phytoplankton	3 samples
Benthic Macroinvertebrates	3 samples
Soil	6 samples (3 locations × 2 depths)
Vegetation	3 transects (50m × 20m each)
Wildlife	3 forest transects (1 km) + 5 riparian transects (100 m)
Socioeconomic questionnaires	103 (80 household questionnaires + 23 stakeholder questionnaires)

Note: Sample sizes were selected to provide representative coverage of key receptors within the AoI and are considered proportionate to the scale and risk profile of the Project, consistent with IFC PS1 requirements.

4.3 Physical Environment

4.3.1 Climate and Local Meteorology

The Lot 2 corridor lies within a tropical monsoon (Am) climate, characterised by a wet season from April to October and a dry season from November to March. Mean annual rainfall in the region ranges between 2,200 mm and 2,500 mm, with bimodal peaks occurring in June-July and September-October. Dominant winds are southerly to south-westerly, reflecting regional coastal circulation patterns, with wind speeds typically ranging from 2.5 m/s to 10.5 m/s and an average of approximately 5.6 m/s.

Real-time temperature and relative humidity (RH) were recorded across the five sampling stations during the November 2025 study using a Kestrel 5000 Series Weather Meter. Temperature values ranged from 28.6°C to 35.3, with the highest value recorded at Chainage 22 (Eredo) and the lowest at Chainage 24 (Figure 6). These readings are consistent with moderately high thermal conditions typical of tropical coastal environments and provide context for baseline air quality and pollutant dispersion along the corridor.

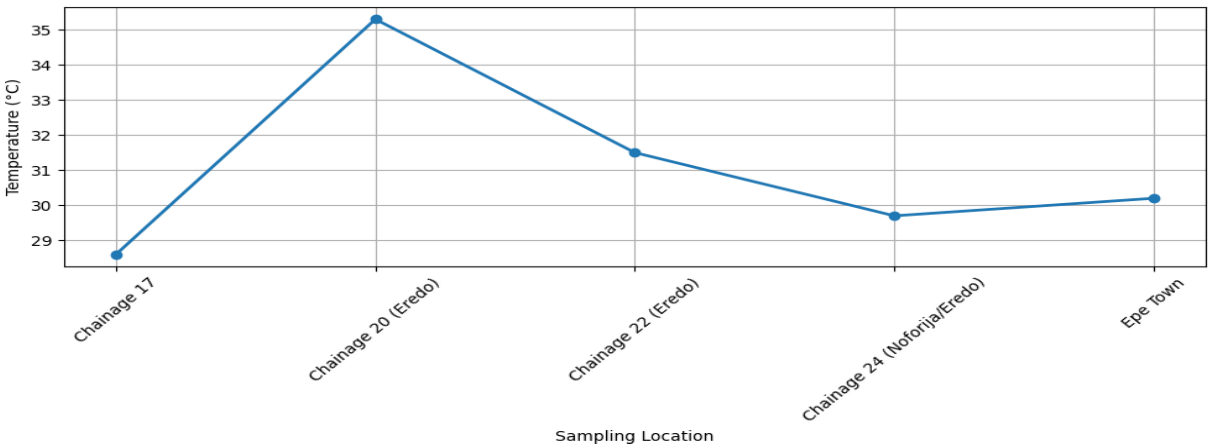

Figure 0.3: Temperature Distribution Across Lot Monitoring Stations

The relative humidity (RH) values measured during the study ranged from 67.5% to 90%, indicating a generally humid microclimate across the corridor (Figure 4.4). These values are representative of typical coastal-peri-urban conditions and are relevant to the behaviour of airborne particulates, evaporative processes, and human thermal comfort within the project area.

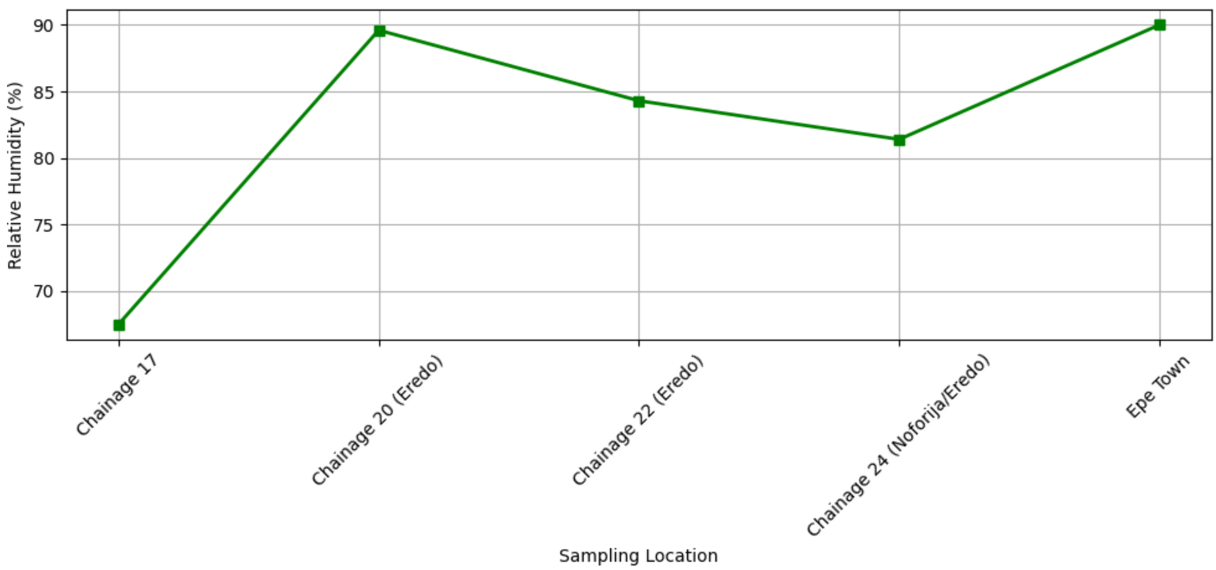

Figure 0.4: Relative Humidity Distribution Across Lot Monitoring Stations

4.3.1.1 Climate-Related Sensitivities

The Lot 2 corridor is characterised by low-lying terrain with limited natural gradients in certain sections. As a result, surface water accumulation may occur during periods of intense rainfall, particularly in poorly drained areas. According to the National Climate Change Policy (NCCP, 2021), rainfall intensity in Nigeria is projected to increase over the long term, which may influence surface water accumulation and flood risk within low-lying sections of the Lot 2 corridor.

Climate conditions directly influence dust generation and dispersion during construction, noise propagation, pollutant dilution and accumulation, and worker health and safety. Climate sensitivity also affects erosion risk, culvert sizing, and the performance of stormwater infrastructure (IFC PS3).

4.3.2 Land Use and Physical Features

The Lot 2 corridor traverses a diverse mosaic of natural, agricultural, and built environments. Natural land cover includes secondary forests, freshwater wetlands, and riparian vegetation associated with the Lekki and Lagos Lagoon catchments, particularly near aquatic crossings. The area is generally low-lying (0-15 m ASL) and is characterised by dense vegetation and hydrophilic plant communities that support local biodiversity. Agricultural lands occur intermittently, comprising active farmlands and fallow fields primarily used for subsistence and small-scale commercial cropping. The distribution of these lands reflects the rural and peri-urban character of the region, often interspersed with natural vegetation patches and settlements.

Built-up areas intensify around major settlements, such as Epe Town, while sections closer to wetlands retain more natural or semi-natural landscapes. These land use patterns influence community severance, biodiversity fragmentation, and potential induced development pressures, all of which are relevant under IFC PS1, PS4, PS5, and PS6.

4.3.2.1 Land Use within the AoI

Building on the corridor-scale land use, the AoI was mapped to support air quality and noise exposure assessment and to identify sensitive receptors for impact modelling. Key land use types include:

- Residential communities: Epe Town and Noforija/Eredo (Chainage 24), characterised by residential, commercial, and routine traffic activities.
- Peri-urban transition zones: Eredo axis (Chainage 20-22), where moderate human activity occurs at interfaces between residential areas, open land, and small-scale agriculture.
- Aquatic and wetland environments: Chainage 17 waterbody, with limited permanent habitation but potential exposure to emissions from nearby road traffic and surrounding activities.

This classification provides a clear basis for identifying sensitive receptors and designing appropriate mitigation measures for air quality and noise, in line with IFC PS3 and PS4.

4.3.3 Air Quality and Noise

4.3.3.1 Introduction and Relevance

Air quality and noise levels are key components of the physical environment baseline for Lot 2 due to their relevance to public health, occupational safety, ecosystem integrity, and regulatory compliance. Baseline exceedances in $PM_{2.5}$ and noise levels indicate pre-existing environmental stress, which must be considered when determining project significance thresholds (IFC PS1).

4.3.3.2 Baseline Monitoring Objectives

The baseline air quality and noise monitoring programme was designed to:

- Characterise existing ambient air quality and noise conditions within the project AoI.
- Identify existing exceedances and environmental stressors unrelated to the project.
- Support predictive modelling of construction and operation phase impacts.
- Inform mitigation, monitoring, and ESMP design.
- Establish defensible baseline values for compliance tracking and lender reporting.

Monitoring objectives also include identifying sensitive receptors such as schools, markets, and health facilities.

4.3.3.3 Monitoring Locations and Spatial Referencing

Five (5) sampling locations were selected along Lot 2 at Epe Town, Chainage 17 (Waterbody crossing), Chainage 20 (Eredo), Chainage 22 (Eredo), and Chainage 24 (Noforija/Eredo) (Figure 4.5), to capture representative baseline conditions across residential, peri-urban, and environmentally sensitive land-use types along the project corridor. These locations were selected based on:

- Proximity to emission and activity sources (e.g., Epe Town and Eredo axis)

- Residential vulnerability and human exposure (e.g., Epe Town and Noforija/Eredo at Chainage 24)
- Environmentally sensitive features (e.g., Chainage 17 Waterbody)
- Peri-urban transition areas (e.g., Chainage 20 and Chainage 22 along the Eredo axis)

All sampling locations were recorded using handheld GPS devices to ensure spatial accuracy, repeatability, and compatibility with GIS analysis, with the coordinates presented in Table 4.4 above.

Monitoring objectives also include identifying sensitive receptors such as schools, markets, and health facilities.

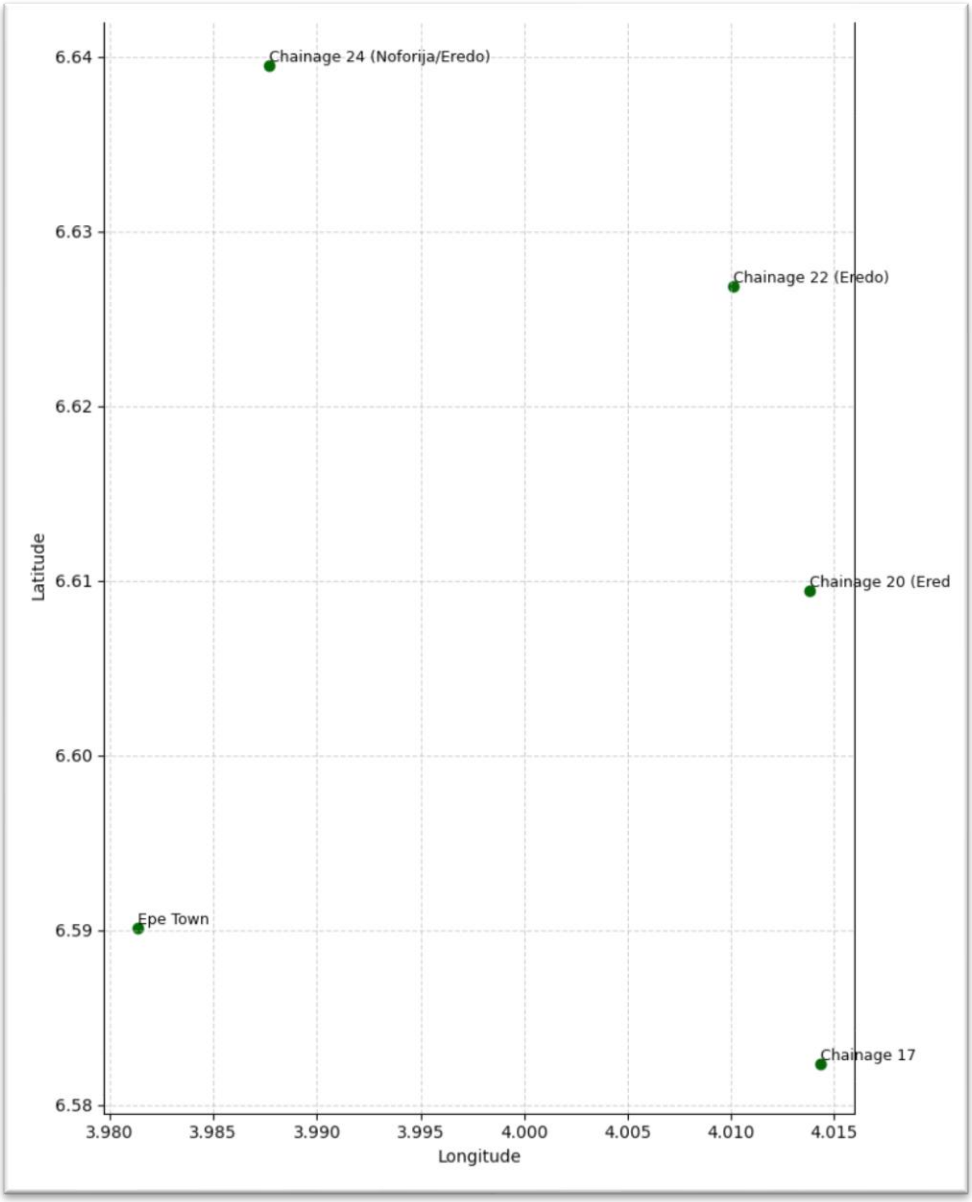

Figure 0.5: GIS Distribution of Lot 2 Monitoring Location

4.3.3.4 Air Quality Monitoring Methodology

The study employed in-situ measurements of air quality parameters using a handheld Aeroqual Series 500 Air Quality Monitor (Plate 4.1). At each of the five sampling locations, monitoring was conducted for a minimum duration of one (1) hour during peak daytime periods (0900-1700h). All measurements were taken under dry, stable meteorological conditions to ensure equipment reliability and the acquisition of stabilised environmental data.

Monitored parameters included:

- Particulate Matter: $PM_{2.5}$ and PM_{10}
- Gaseous Emissions: Nitrogen oxides (NOx) and Carbon dioxide (CO_2) and
- Volatile Compounds: Total VOCs and Formaldehyde (HCHO)

The selection of these parameters (Table 4.6) ensures coverage of both typical vehicle exhaust emissions and industrial signatures from the nearby refinery complex. While handheld monitors are acceptable for screening, lenders typically require at least one reference-grade sampler for calibration and validation. All results were benchmarked against NESREA, FMEnv, and WHO Air Quality Guidelines (AQG) (Table 4.7).

4.3.3.5 Noise Levels Monitoring Methodology

Ambient noise levels were monitored using an Extech 407730 Sound Level Meter with a basic accuracy of ±2dB. The device was configured for 'A-weighting' (dB(A)) and 'Slow' response mode to capture the equivalent continuous sound levels at each station. The meter was positioned at approximately 1.5 meters above ground level to represent typical human ear height, and measurements were recorded during representative periods of daily activity (0900-1700h) to capture baseline acoustic conditions. Nighttime noise monitoring should be included in future sampling rounds to fully comply with NESREA and WHO guidelines. The observed noise levels were evaluated against NESREA’s ambient noise standards for residential and industrial areas.

Table 0.6: Summary of Air Quality Monitoring Parameters and Relevance

Parameter	Unit	Relevance
$PM_{2.5}$	µg/m³	Fine respiratory hazard
PM_{10}	µg/m³	Coarse inhalable particles
CO_2	ppm	Combustion indicator
NO_x	ppm	Traffic-related gaseous pollutants
HCHO	ppm	Formaldehyde: Volatile organic compound
VOC	ppm	Total volatile organic compounds

Table 0.7: Applicable Air Quality and Noise Standards

Parameter	Standard Body	Limit Value
$PM_{2.5}$	WHO	15 µg/m³ (24-hr mean)
PM_{10}	WHO	45 µg/m³ (24-hr mean)
VOC	FMEnv	0.25 ppm
HCHO	FMEnv	0.10 ppm
NOx	FMEnv	0.04 ppm (Applies to NO_2)
Noise (Residential)	NESREA	50 dB(A) day/35 dB(A) night
Noise (Construction)	NESREA	75 dB(A) day/65 dB(A) night
Noise (Road Traffic)	WHO	53 dB(A) day/45 dB(A) night

Plate 0.1Monitoring Equipment used during studies

Quality Assurance/Quality Control (QA/QC) Protocols for Air and Noise Monitoring

- All field instruments were factory-calibrated and validated before deployment.
- Sensors were allowed a 10-minute equilibration period prior to sampling.
- Multiple readings were taken at each site and averaged.
- Background contamination was avoided through site positioning away from transient point sources (e.g., idling vehicles).
- Instruments were handled by trained personnel with field validation cross-checks.

4.3.3.5 Baseline Monitoring Results (Air Quality and Noise)

Baseline monitoring revealed that some air quality and noise parameters exceeded NESREA standards and WHO air quality guidelines (2021) at specific locations (Table 4.8), while other parameters were within acceptable limits. These exceedances indicate pre-existing environmental stress in the corridor and highlight the need for targeted mitigation measures during construction, as well as continuous monitoring during operation to protect human health and sensitive ecological receptors.

Table 0.8: Lot 2 Air Quality and Noise Results (20 and 21 Nov 2025, Dry Season)

Location	VOC (ppm)	NOx (ppm)	CO_2 (ppm)	HCHO (ppm)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	Daytime Noise dB(A)
Chainage 17	0.1	1.0	436	0.02	28.6	47.3	57.1
Chainage 20 (Eredo)	0.098	1.0	427	0.02	26.7	29.3	52.85
Chainage 22 (Eredo)	0.111	1.0	759	0.01	37.8	44.8	60.05
Chainage 24 (Noforija/Eredo)	0.022	1.0	681	0.01	39.3	42.3	62.05
Epe Town	0.071	1.0	451	0.01	22.5	39.3	74.5
Equipment Detection Limit	**0.01**	**0.005**	**10**	**0.01**	**0.001**	**0.001**	**30**
Min	**0.01**	**0.005**	**427**	**0.01**	**0.001**	**0.001**	**30**
Max	**0.111**	**1**	**759**	**0.02**	**39.3**	**47.3**	**74.5**
FMEnv/NESREA	**0.25**	**0.04**	**NS**	**0.1**	**NS**	**150**	**50 /60 (Residential / Industrial)**
WHO Guidelines	**NS**		**NS**		**15**	**45**	**53 (Road traffic)**

4.3.3.5.1 Air Quality Monitoring Results

Particulate Matter 2.5 ($PM_{2.5}$)

Particulate matter aerodynamic diameter ≤2.5 µm ($PM_{2.5}$) concentrations across the five Lot 2 sampling points showed varied exceedances relative to the World Health Organisation (WHO) 24-hour guideline of 15 µg/m³ (Figure 4.6) All locations recorded values above the WHO $PM_{2.5}$

guideline value, indicating a baseline $PM_{2.5}$ concern along the corridor likely influenced by regional industrial activity, unpaved surfaces, and traffic emissions.

Chainage 24 (Noforija/Eredo) and Chainage 22 (Eredo) recorded the highest $PM_{2.5}$ levels at 39.3 µg/m³ and 37.8 µg/m³, respectively. These elevated readings suggest intensified dust or combustion-based emissions likely associated with vehicular activity, construction spillover, or nearby unpaved surfaces. Chainage 17 and Chainage 20 reported moderately high levels at 28.6 µg/m³ and 26.7 µg/m³. respectively, however, these were still nearly double the WHO guideline. Epe Town, generally considered a semi-urban zone, showed a $PM_{2.5}$ level of 22.5 µg/m³, highlighting a persistent background concentration likely influenced by local human activities or transboundary dust transport.

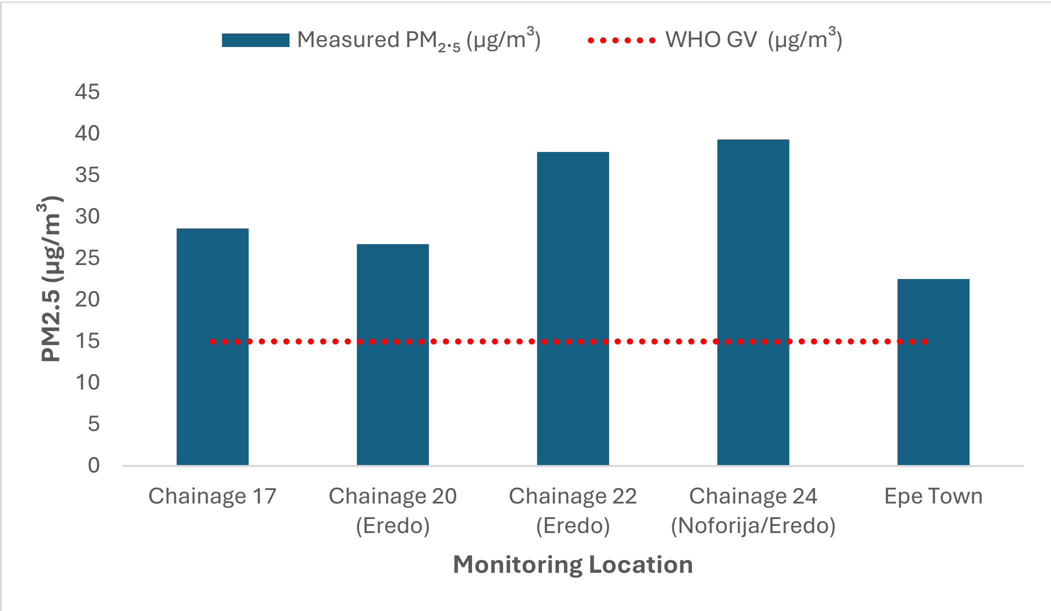

Figure 0.6: Monitored Levels of Lot 2 $PM_{2.5}$ vs WHO Guideline Value

The consistent exceedance across all Lot 2 sites underscores the need for targeted dust management strategies and continuous monitoring, particularly during the construction phase, to avoid exacerbating existing pollutant burdens and associated respiratory health risks for residents and workers in the project corridor.

Suspended Particulate Matter (PM_{10})

The results of PM_{00} concentrations along the Lot 2 project corridor indicate a marginal exceedance of the WHO 24-hour guideline value of 45 µg/m³ at Chainage 17, where a concentration of 47.3 µg/m³ was recorded (Figure 4.7). Despite this exceedance of the WHO guideline, the measured value remains well below the NESREA 24-hour ambient air quality limit of 150 µg/m³, indicating compliance with national regulatory standards. All other locations reported values within the WHO AQV for PM_{10}, with the lowest concentration observed at Chainage 20 (29.3 µg/m³), suggesting relatively lower dust or coarse particle presence at that point.

The elevated value at Chainage 17 is consistent with vehicular re-suspension, unpaved road dust, and local anthropogenic activities. The variation in PM_{10} levels across the other locations suggests a moderate spatial gradient in particulate dispersion, potentially influenced by land use, surface characteristics, and proximity to activity zones.

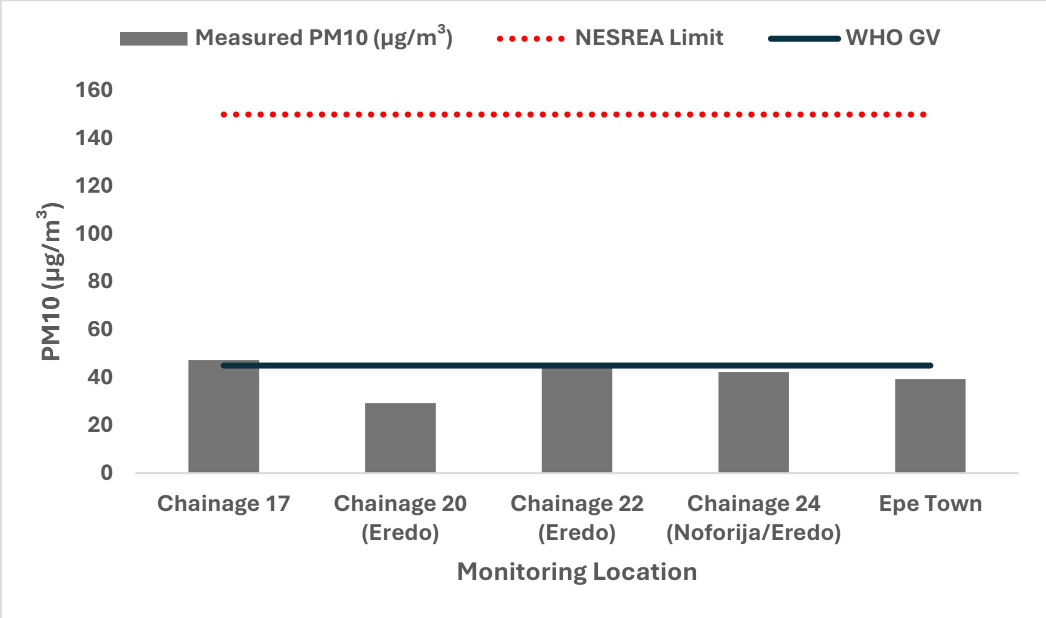

Figure 0.7: Monitored Levels of Lot 2 PM_{10} vs WHO Guideline Value

VOC (Volatile Organic Compounds)

VOC levels across the five sampling locations in Lot 2 showed generally low concentrations, with values ranging from 0.022 ppm to 0.111 ppm (Figure 4.8). The highest concentration of 0.111 ppm was recorded at Chainage 22 (Eredo), while the lowest observed level (0.022 ppm) was observed at Chainage 24 (Noforija/Eredo).

Despite all recorded values falling below the FMEnv ambient VOC limit of 0.6 ppm, the elevated reading at Chainage 22 suggests the presence of potential emission sources nearby, possibly from light vehicular activities, minor commercial use of solvents, or unregulated combustion sources. Comparatively, Chainage 17, Chainage 20, and Epe Town recorded moderate VOC levels (0.071 - 0.1 ppm), indicating low to moderate hydrocarbon presence. These concentrations, although within acceptable limits, are notable in areas with human activity and proximity to local transport corridors.

Key Observations:

- **Regulatory Compliance:** All locations comply with FMEnv thresholds, indicating a non-critical VOC pollution status at baseline.
- **Spatial Trends:** Chainage 22 stands out as a monitoring priority due to its relatively higher value.

- **Health & Environmental Implications:** While compliant, prolonged exposure to even low-level VOCs, particularly in enclosed or poorly ventilated areas, may pose cumulative health effects.

Although compliant, VOC monitoring should continue during construction due to potential emissions from asphalt plants, solvents, and fuel storage.

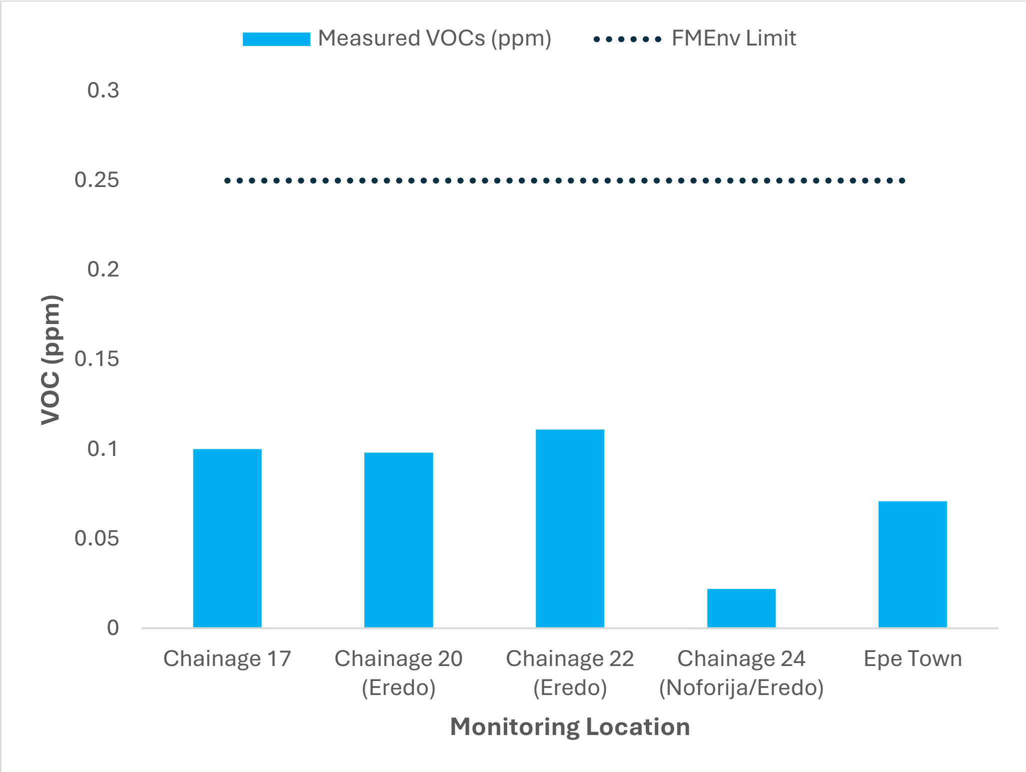

Figure 0.8: VOCs Concentrations Across Lo2 Locations vs FMEnv Standard

Formaldehyde (HCHO)

Formaldehyde (HCHO) concentrations remained below FMEnv thresholds across all sampling locations, ranging from 0.01 ppm to 0.02 ppm (Figure 4.9). These values are well below the FMEnv permissible limit of 0.1 ppm for ambient air, indicating minimal presence of this pollutant in the corridor during the monitoring period.

The highest concentration (0.02 ppm) was observed at Chainage 17 and Chainage 20 (Eredo), while other locations, such as Chainage 22, Chainage 24, and Epe Town, recorded lower concentrations of 0.01 ppm. These readings suggest that formaldehyde emissions in the project area are not of significant concern at baseline and are likely influenced by typical urban activities such as vehicular traffic or low-scale combustion rather than industrial-scale emissions.

HCHO levels should be monitored during construction due to potential emissions from construction materials and equipment.

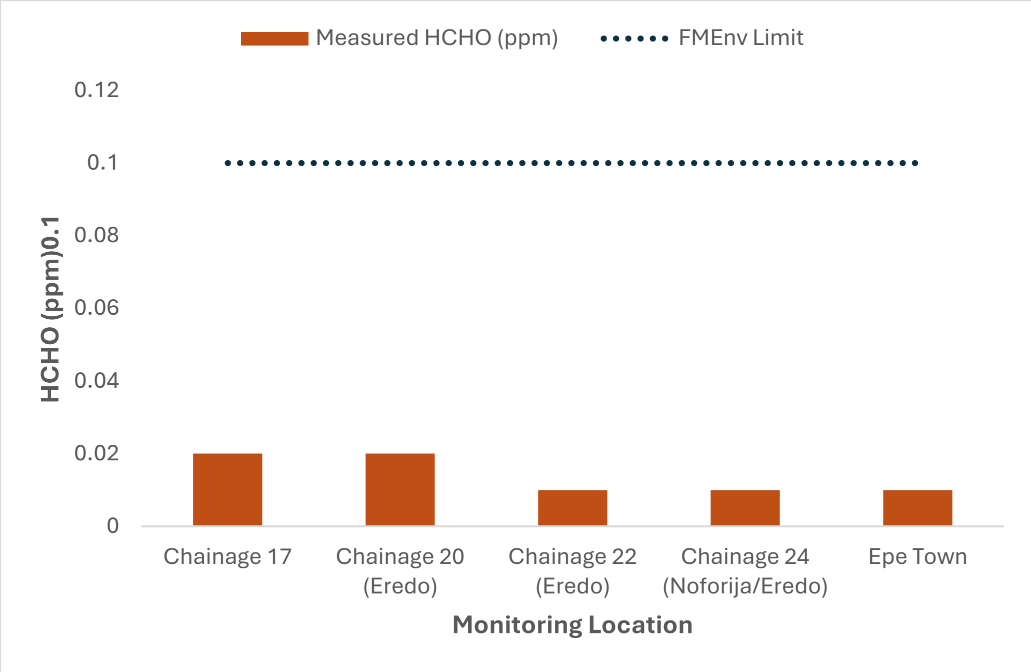

Figure 0.9: Formaldehyde Concentrations Across Lo2 Locations vs FMEnv Standard

Given that formaldehyde is a known irritant and classified as a probable human carcinogen, its presence, even in trace amounts, is still of public health concern. Continued monitoring is advisable during and after construction phases, especially in the vicinity of emission sources (e.g., construction equipment, open burning zones, fuel storage areas), to ensure that levels remain compliant and do not rise due to project-related activities.

In summary, the baseline data indicate favourable air quality with respect to formaldehyde along the Lot 2 corridor, providing a strong benchmark for future impact assessments.

Carbon Dioxide (CO_2)

Baseline carbon dioxide (CO_2) concentrations along the Lot 2 corridor ranged from 427 ppm at Chainage 20 (Eredo) to a maximum of 759 ppm at Chainage 22 (Eredo) (Figure 4.10). Lower values were recorded at Chainage 17 (436 ppm), Chainage 20 (427 ppm), and Epe Town (451 ppm), with higher concentrations at Chainage 22 (759 ppm) and Chainage 24 (681 ppm). The spatial variation in CO_2 concentrations along the corridor likely reflects localised influences such as increased vehicular idling, reduced dispersion, proximity to settlements, or nearby combustion sources during the monitoring period.

No ambient regulatory or health-based standards are specified by FMEnv, NESREA, or the WHO for outdoor CO2 concentrations. However, the observed levels are within ranges commonly reported for traffic-influenced peri-urban environments and do not indicate abnormal accumulation under baseline conditions.

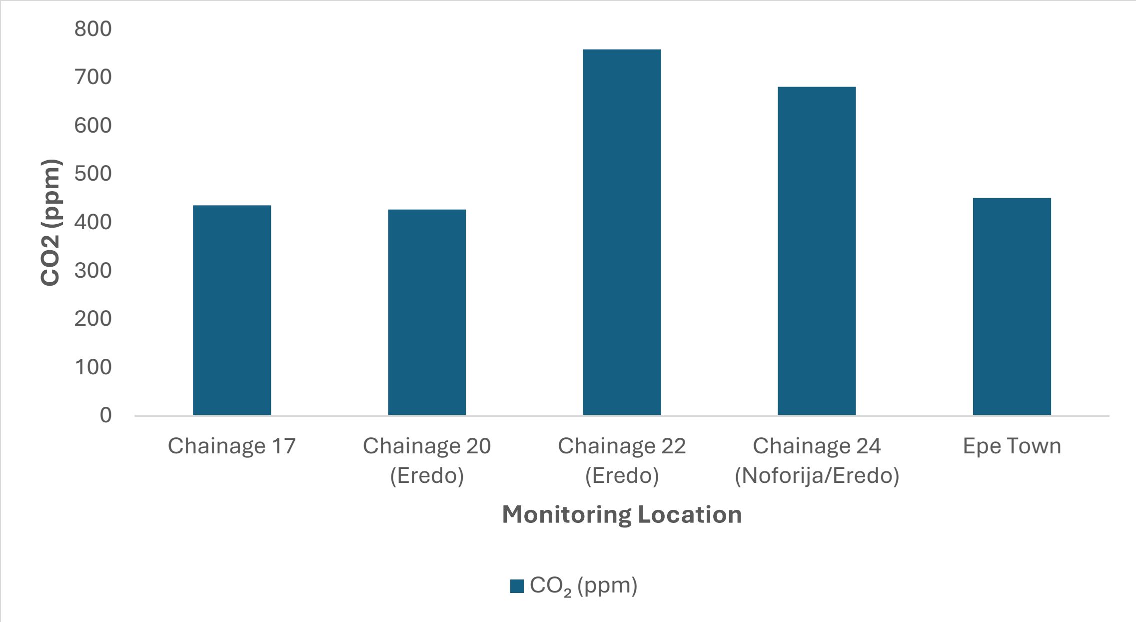

Figure 0.10: Carbon Dioxide Concentrations Along Lot 2 Monitoring Locations

Nitrogen Oxides (NOx)

NO_x levels were uniformly recorded at 1.0 ppm across all five sampling locations. The FMEnv 0.04 ppm standard refers to NO_2 rather than total NO_x. The fixed value suggests a potential instrument or data recording constraint and may warrant further validation.

4.3.3.5.2 Noise Levels Monitoring Results

Baseline noise monitoring along the Lot 2 corridor indicates a consistently elevated acoustic environment relative to the NESREA daytime residential standard of 50 dB(A) and the WHO (2024) daytime guideline of 53 dB(A) for road traffic noise. Noise levels ranged from 52.85 dB(A) at Chainage 20 (Eredo) to 74.5 dB(A) at Epe Town (Figure 4.11). Locations exceeding the WHO daytime guideline include Epe Town (74.5 dB(A)) and Chainage 24 (62.05 dB(A)), indicating pre-existing acoustic stress in these densely populated areas. Intermediate noise levels were recorded at Chainage 17 (57.1 dB(A)) and Chainage 22 (60.05 dB(A)), remaining below WHO but above NESREA standards.

Noise intensity generally corresponds to traffic density and proximity to settlements along the corridor. These elevated baseline levels underscore the need for enhanced construction-phase noise controls and community engagement measures to protect sensitive receptors, consistent with IFC PS4.

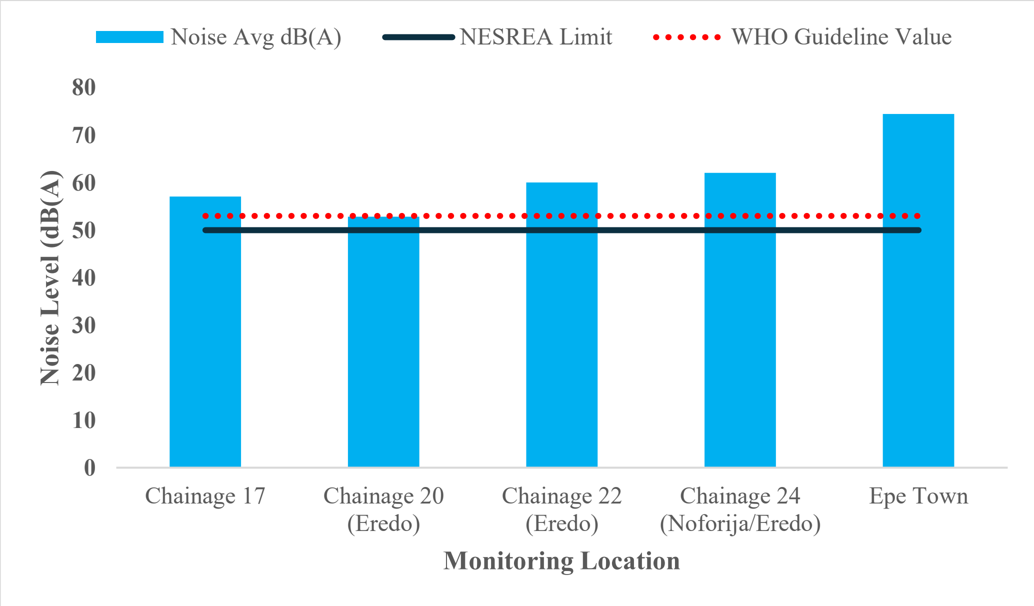

Figure 0.11: Measured Ambient Lot 2 Noise Levels vs NESREA and WHO Standards

4.3.3.5.3 Summary of Air Quality and Noise Baseline Conditions

Baseline air quality monitoring results show that measured concentrations of the selected pollutants exceed, meet, or fall below applicable national and international guideline values, depending on parameter and location.

$PM_{2.5}$ concentrations were above the WHO (2021) 24-hour guideline value of 15 µg/m³ at all monitoring locations, with recorded values ranging from 22.5 to 39.3 µg/m³. These measurements indicate the presence of elevated fine particulate matter along the corridor during the monitoring period. Observed conditions are consistent with existing sources typical of peri-urban road corridors, including unpaved surfaces, vehicular movement, agricultural activity, and domestic combustion. By contrast, PM_{10} concentrations were largely within the WHO 24-hour guideline value of 45 µg/m³, with a single exceedance recorded at Chainage 17 (47.3 µg/m³). This exceedance was spatially limited, occurring in proximity to a waterbody crossing, while other locations recorded values within guideline levels.

Measured concentrations of gaseous pollutants, including VOC and HCHO, were below FMEnv guideline limits at all monitoring locations. This indicates low ambient concentrations of these parameters during the monitoring period. CO2 concentrations ranged from 427 to 759 ppm and were consistent with expected background levels for traffic-influenced peri-urban road corridors.

NOx concentrations were recorded at 1.0 ppm at all monitoring locations, exceeding the FMEnv guideline value of 0.04 ppm for NO2. The absence of spatial variation across locations with differing land-use characteristics suggests that these measurements should be interpreted with caution as baseline indicators.

Baseline daytime noise levels along the Lot 2 alignment exceeded the NESREA residential daytime guideline of 50 dB(A) at all monitoring locations. When assessed against the WHO

(2021) daytime guideline for road traffic noise of 53 dB(A), exceedances were recorded at all locations except Chainage 20. Recorded values ranged from 52.85 dB(A) at Chainage 20 to 74.5 dB(A) at Epe Town, with higher noise levels observed in areas characterised by increased settlement density, commercial activity, and traffic movement. Epe Town recorded the highest levels during the monitoring period.

4.3.3.5.4 Baseline Data Limitations and Considerations

The interpretation of the baseline air quality and noise dataset reflects temporal and technical constraints associated with the monitoring programme. Data collection was undertaken during the wet-dry season transition in November, representing environmental conditions during a period of moderate dust generation. Baseline conditions during peak dry-season months (December to February), when particulate levels may be higher, are not represented in this dataset. Wet season sampling is scheduled to take place in April 2026 to ensure seasonal completeness, consistent with FMEnv requirements and IFC PS1 data adequacy expectations. Results will be submitted as a supplementary baseline report prior to construction commencement.

The uniform NO_x concentrations measured across all monitoring locations, despite observable differences in surrounding land use, traffic intensity and human activities, suggest potential limitations related to sensor resolution, calibration, or differentiation of nitrogen oxide species. The NO_x values are therefore interpreted as indicative baseline measurements rather than precise representations of ambient concentrations.

Noise monitoring was undertaken during daytime periods only. Baseline night-time acoustic conditions, which may differ from daytime levels in residential areas, are not captured during the monitoring period.

In addition, no background or reference monitoring location outside the immediate Lot 2 corridor was included in the baseline design. As a result, the dataset does not distinguish between Lot 2-corridor-specific conditions and broader regional air quality influences associated with the wider Lekki-Epe transport and development corridor.

4.3.4 Geology, Geotechnical and Soil Conditions

4.3.4.1 Data Sources and Investigation Scope

The geological and geotechnical baseline for the 7th Axial Road corridor is based on a comprehensive site investigation undertaken for Lot 1 between 7 and 30 December 2023. The investigation covered the alignment from CH0+000 to CH17+000 and comprised 40 exploratory points, including boreholes (BH), cone penetration tests (CPT), and test pits (TP). Borehole depths ranged from 5.0 m to 88.2 m, with the deepest investigations undertaken in lagoon crossing sections.

In accordance with the ESIA methodology, which allows for corridor-wide data integration where geological continuity exists (Table 4.3, Section 4.2.3), the findings from Lot 1 are used to characterise subsurface conditions and groundwater behaviour along the contiguous Lot 2 alignment, particularly in shared lagoonal and coastal terrain.

4.3.4.2 Regional Geological Setting

The project corridor lies within the Coastal Plain Sands of the Dahomey Basin. The subsurface geology is dominated by unconsolidated to semi-consolidated sedimentary materials deposited under fluvial, deltaic, and marine conditions. These materials consist primarily of sands, silts, clays, and organic-rich lagoonal deposits, which collectively govern bearing capacity, settlement behaviour, and groundwater dynamics.

Surface soils along much of the corridor are predominantly sandy, reflecting the coastal plain and barrier island depositional environment. Beneath these surface soils, regional stratigraphy includes sequences of dense sands and softer clayey layers, which are particularly relevant for foundation design and embankment stability.

The corridor traverses four distinct terrain types: reclaimed industrial platform, lagoonal plain, lagoon crossing, and upland transition zones. Each terrain exhibits different soil profiles and groundwater regimes, with direct implications for foundation depth, embankment stability, drainage design, and construction methodology.

4.3.4.3 Lagoonal and Coastal Geomorphological Context

A defining feature of the project environment is the Lagos Lagoon system, a shallow coastal lagoon that separates parts of the mainland from barrier islands and coastal landforms. The lagoon represents a dynamic fluvial-marine interface shaped by tidal action, river inflows, and long-term sedimentation along the Gulf of Guinea coastline.

Lagoonal environments are typically characterised by fine-grained, compressible sediments, shallow groundwater levels, and variable bearing capacity. These conditions have direct implications for road alignment selection, embankment design, foundation solutions, and drainage performance in lagoon-proximal and lagoon-crossing sections.

Coastal and lagoonal processes, including erosion, sediment reworking, and periodic inundation, have produced prominent geomorphological features such as tidal flats, barrier islands, beaches, and sand ridges. These features provide an important contextual framework for interpreting subsurface conditions and engineering constraints.

4.3.4.4 Geological Hazards Relevant to the Project

The geological and geomorphological setting gives rise to hazards of relevance to linear transport infrastructure, particularly in coastal and lagoonal zones. These hazards include:

- Coastal and pluvial flooding, especially in low-elevation areas.
- Differential settlement and land subsidence associated with soft, compressible soils and high groundwater tables.

In lagoon-adjacent areas, flood risk may be exacerbated by intense rainfall and limited natural drainage gradients. These conditions necessitate robust drainage design, embankment construction methods, and foundation solutions capable of accommodating settlement without compromising structural integrity or road safety.

4.3.4.5 Geological Conditions of the Lagoon Section

Lot 2 (CH 8+700 to CH 24+932) is a continuous extension of Lot 1 and traverses the same coastal and lagoonal terrain. In line with the ESIA methodology, the geological and geotechnical baseline for Lot 2 is informed by Lot 1 investigations, ensuring a consistent understanding of subsurface conditions and groundwater behaviour.

In sections associated with lagoonal and low-lying coastal environments, the subsurface profile is generally characterised by:

- Upper layer: Silty clay, thickness ranging from approximately 6.0 m to 16.5 m.
- Underlying layer: Coarse sand, approximately 3.0 m thick.
- Surface soils: Predominantly sandy, reflecting coastal plain and barrier island deposition (Figure 4.12).

These conditions provide a sound basis for engineering design, impact assessment, and selection of appropriate mitigation measures for the Lot 2 alignment.

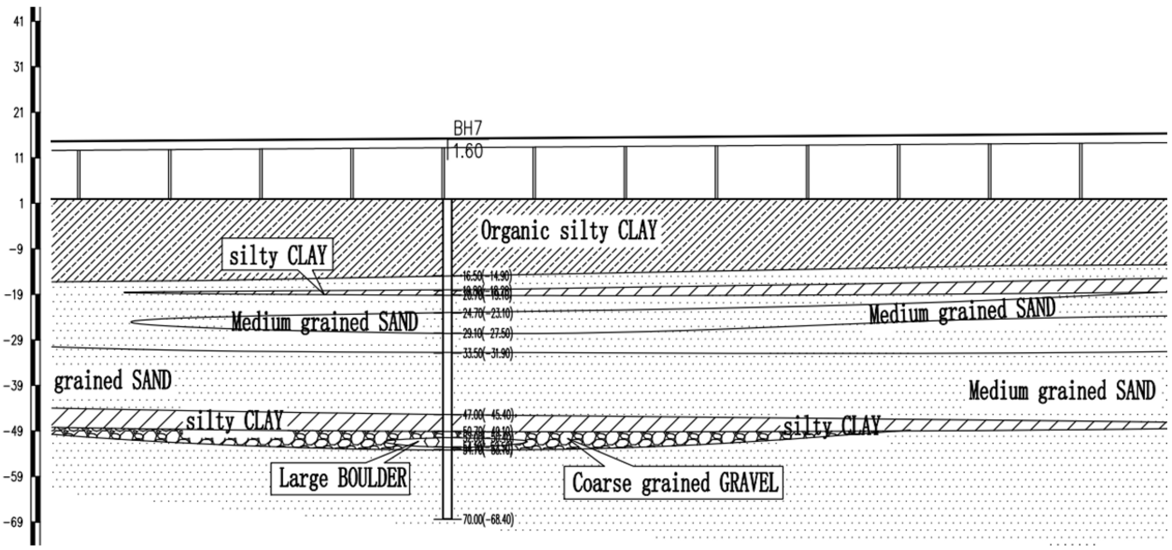

Figure 0.12: Typical Geological Profile of the Project Location

4.3.4.6 Subsurface Stratigraphy and Soil Properties

Across much of the alignment, surface soils are predominantly sandy. Lagoon-adjacent and lagoon-crossing sections are characterised by thick deposits of soft to very soft silty clay and organic clay (Lot 1 ESIA).

Key observations include:

- Low-density organic clays: Boreholes near lagoon crossings (BH-7, BH-9, BH-10) reveal dark grey, very soft organic silty clay at 4-18 m depth. Bulk densities are extremely low (1.28-1.39 g/cm³) and moisture contents exceptionally high (up to 182%), indicating low bearing capacity and high compressibility.

- Dense foundation strata: Beneath soft clay layers, medium dense to very dense sands (yellowish-brown to grayish-white) have bulk densities of 1.70-1.83 g/cm³ and moisture contents generally <20%, suitable for deep foundations.
- Lagoon crossing profile: Upper silty clay 6-16.5 m thick underlain by ~3 m coarse sand (Figure 4.12).

4.3.4.7 Groundwater Conditions

Groundwater levels along the alignment range from 1.60 m to 3.20 m below ground. Terrain-specific observations:

- Industrial Zone: 1.60-2.30 m
- Lagoonal Plain: 2.50-3.00 m
- Lagoon Crossing: 2.80-3.20 m
- Upland Transition: 1.80-2.50 m

These conditions influence excavation stability, culvert invert elevations, dewatering, and construction sequencing.

4.3.4.8 Spatial Variability Along the Alignment

Soft soil zones were identified at CH0+000-CH1+000 and CH17+000, characterised by compressible silty clays confirmed through CPT. Lagoonal and marine clay deposits between CH2+500 and CH6+200 exhibit low bearing capacity, requiring deep foundation solutions.

Table 4.9 shows the borehole number, chainage, final depth, and groundwater level along the road corridor. These locations demonstrate elevated groundwater, deep soft clay layers, and increased scour potential.

Table 0.9: Representative Investigation Points

Worksite Name	Hole No.	Chainage	Final Depth (m)	Groundwater Level (m)	Remarks
Start Point Interchange	BH1	CH0+000	40.00	2.30	Dense sand over clay
Soft Soil Subgrade	CPT-1	CH0+000	20.00	1.60	Soft clay confirmed
Lagoon Bridge	BH16	CH16+280	88.20	3.20	Deep foundation zone
Lagoon Bridge	BH17	CH16+590	82.80	2.80	High scour potential
Soft Soil Subgrade	CPT-7	CH17+000	20.00	,	Soft fill (Barrack zone)

4.3.4.9 Engineering Implications

The geotechnical conditions have direct implications for design and construction:

- Foundation Design: Lagoon crossings require deep pile foundations (>80 m) to reach competent sand beneath thick soft clay layers. Bridge abutments and structures must incorporate scour protection.
- Embankment Stability: Soft soil zones require geotextile reinforcement, staged construction, surcharge preloading, or engineered soil replacement (≈294,000 m³).
- Drainage and Groundwater Management: Shallow groundwater affects culvert invert levels, excavation stability, and dewatering requirements.
- Subgrade Improvement: Compressible soils necessitate reinforced subgrade layers to prevent settlement and long-term pavement deformation.

4.3.5 Soil Physiochemistry and Microbiological Analysis

In addition to the engineering-focused stratigraphic investigations, soil samples were collected to characterise the physiochemical and microbiological properties of surface and subsoil along the Lot 2 corridor. The objective of the assessment was to establish baseline soil conditions and to determine the presence or absence of chemical or biological contamination that could pose environmental or public health risks in relation to the proposed development.

4.3.5.1 Soil Sampling Methodology

Soil sampling was conducted at CH 20, 22, and 24 sampling locations along the Lot 2 corridor, as shown in Table 4.4 (Section 4.2.4.1). Samples were retrieved using a soil auger to prevent cross-contamination. At each sampling location, samples were collected at two distinct depth intervals of 0-15 cm (topsoil) and 15-30 cm (subsoil) for a total of 6 samples (Table 4.5, Section 4.2.4.1). Upon retrieval, core samples were sectioned according to depth, homogenised in a clean plastic bowl, and transferred into pre-labelled Ziplock bags. Approximately 500g of soil per depth interval was collected for laboratory analysis. Samples were stored in a cool, dry environment and transported to the FMEnv-accredited laboratory for analysis of heavy metals, nutrient profile, and textural class.

QA/QC Protocols

The auger was cleaned with distilled water and dried between sampling locations to prevent carry-over contamination. Chain of custody forms were maintained throughout sample handling and transport from the field to the laboratory.

4.3.5.2 Soil Baseline Results

Soil characteristics reflect coastal-influenced sandy loams and clayey subsoils typical of the Lekki-Epe corridor, with moderate organic content and low cation exchange capacity.

The soil exhibited moderately well-drained soils with slightly acidic pH (5.2-5.8), typical of tropical and sub-tropical environments. Soil moisture and colour varied between locations, with CH 22 showing higher moisture (27%) and greyish soils, suggesting localised reduced drainage or seasonal waterlogging, while CH 20 and CH 24 exhibited well-drained dark and light brown soils.

Organic matter content ranged from 5.4% to 10.7%, supporting active nutrient cycling, with mineral-dominated soils reflected in ash content (62.3-89.3%). Nutrient analysis confirmed moderate to high levels of ammoniacal nitrogen, nitrates, and phosphates, with essential cations present at background concentrations. Heavy metals and hydrocarbon residues were largely below detection limits, with iron naturally elevated at CH 24 due to local geology.

Microbiological assessments showed low coliform counts and no pathogenic organisms, indicating minimal microbial risk. Slightly higher microbial activity at CH 22 aligns with its elevated moisture and organic matter.

Soil erosion risk is moderate to high in areas with exposed sandy profiles, requiring erosion control measures

4.3.6 Hydrology

The Lot 2 corridor of the 7th Axial Road traverses a low-lying coastal plain (0-15 m ASL) characterised by high annual rainfall (~2,500 mm), lagoonal systems, wetlands, and tidal influences. The hydrological assessment was undertaken to establish the baseline hydrological and water quality conditions, including surface water characteristics, groundwater levels, and flow regimes along the corridor, and to predict future hydrological responses under projected rainfall scenarios, providing a basis for climate-resilient mitigation and drainage design strategies.

4.3.6.1 Study Sources

The hydrological baseline for Lot 2 of the 7th Axial Road corridor (CH 8+700-CH 24+932) is informed by the comprehensive hydraulic and water quality data collected for LCCH (Section 2 ESIA), including Mahin Creek, Lekki Lagoon, and wetland sampling, as discussed in the 3 Data Integration and Regional Corridor Cross-Referencing section (Section 4.2.3). Regional flood modelling, covering 10-year and 25-year rainfall events, and surface water quality assessments provide a robust framework for evaluating flood risk, drainage requirements, and aquifer vulnerability along the contiguous corridor. Spatial mapping indicates hydrological receptors between 6°25′N and 6°45′N and 3°35′E-4°10′E, overlapping with lagoon, creek, and wetland systems that influence Lot 2.

4.3.6.2 Rainfall Intensity and Frequency Analysis

Historical rainfall data spanning 1965-2022 were analysed using the Gumbel distribution to develop Intensity-Duration-Frequency (IDF) curves for design purposes. These curves provide rainfall depths for return periods ranging from 2-year to 100-year storm events (Table.4.10).

Table 0.10: Regional Design Rainfall Depths (mm) for Different Return Periods

Meteorological Station	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Lagos Marine (6°27′N, 3°45′E)	121	170	203	244	275	305
Lagos Roof (6°28′N, 3°46′E)	120	169	201	242	272	302
Ikeja (6°36′N, 3°20′E)	98	138	165	198	223	248

4.3.6.3 Hydraulic Design Standards

Lot 2 drainage design adopts climate-resilient standards consistent with the Federal Ministry of Works Highway Manual (2013) and international best practice:

- Culverts and Inlets: Designed for a 50-year return period storm event.
- Embankments: Checked against a 100-year return period to prevent overtopping.
- Runoff Estimation:
  - Rational Method for catchments <12 km^2
  - SCS Unit Hydrograph Method for larger basins

All design criteria reflect the low-lying coastal plain setting, ensuring alignment with validated Lot 1 hydrological assessments.

4.3.6.4 Regional Flow Patterns and Flood Risk

Hydrological modelling indicates predominantly south-westerly runoff along the corridor. Flat topography and low elevation slow natural drainage, resulting in localised flood-prone zones:

- **Swamp Formation:** Marshes and stagnation zones are present in southern sections (6°30′N, 3°50′E).
- **Lagoon Crossing Influence:** The Lagos Lagoon and associated tidal action maintain a dynamic fluvial-marine interface. Shallow groundwater and fine-grained lagoonal sediments contribute to low bearing capacity and ponding risk.
- **Settlement Effects:** Communities such as Idasho and Iraye locally impede runoff, increasing flood susceptibility.
- **Construction Impacts:** Road embankment compaction may further reduce infiltration and drainage capacity.

Table 0.11: Spatial Coordinates of Key Hydrological Features

Feature	Coordinates (WGS84)
Mahin Creek Sampling Point	6°28′N, 3°42′E
Lekki Lagoon Bridge Crossing	6°30′N, 3°50′E
Wetland Buffer (Odo-Noforija)	6°34′N, 3°57′E
Northern Ponding Zone	6°32′N, 3°52′E

4.3.6.5 Groundwater Interaction and Aquifer Considerations

Surface water and groundwater regimes are closely linked in lagoonal and low-lying sections of Lot 2. Elevated water tables (2.8-3.2 m below ground) near lagoon crossings indicate potential saline intrusion and shallow aquifer vulnerability. These conditions inform both culvert and embankment design, as well as measures to maintain natural flow connectivity and prevent induced flooding.

4.3.6.6 Implications for Lot 2 Design

Based on integrated regional and Lot 1 data, the following design requirements apply to Lot 2:

- **Outlet Velocities:** ≤ 4.5 m/s for 25-year events; ≤ 6.0 m/s for 50-year events.
- **Erosion Protection:** Riprap required at culvert outlets where high velocities occur.
- **Lagoon Crossings:** Full bridge structures are recommended rather than embankment fill, preserving hydrological connectivity and reducing upstream flooding.
- **Drainage and Groundwater Management:** Shallow groundwater necessitates careful culvert invert selection, dewatering planning, and embankment compaction control.

This approach ensures that the hydrological regime of Lot 2 is managed in alignment with validated Section 2, while maintaining the integrity of lagoon, creek, and wetland systems along the corridor.

4.3.7 Surface Water and Groundwater Quality

Water sampling was conducted at locations (CH 15, 16, and 17) to establish the baseline physiochemical and microbiological characteristics of the Lot 2 aquatic environment.

Surface water samples were collected from the three major lagoon/stream crossings, while groundwater samples were collected from existing boreholes and hand-dug wells located within 200m of chainages. Samples were properly labelled for easy identification, as shown in Table 6.

Table 0.12: Labelling Protocol for Lot 2 Surface Water and Groundwater Samples

Sampling location	Sample Identification Tag	Sample Type
CH 15	SW-L2-R1	Surface water
CH 16	SW-L2-R2	Surface water
CH 17	SW-L2-R3	Surface water
CH 15	GW-L2-R1	Groundwater
CH 16	GW-L2-R2	Groundwater
CH 17	GW-L2-R3	Groundwater

To ensure data integrity, pH, Electrical Conductivity (EC), and Dissolved Oxygen (DO) were measured in situ at the point of collection using a calibrated multi-parameter water quality metre.

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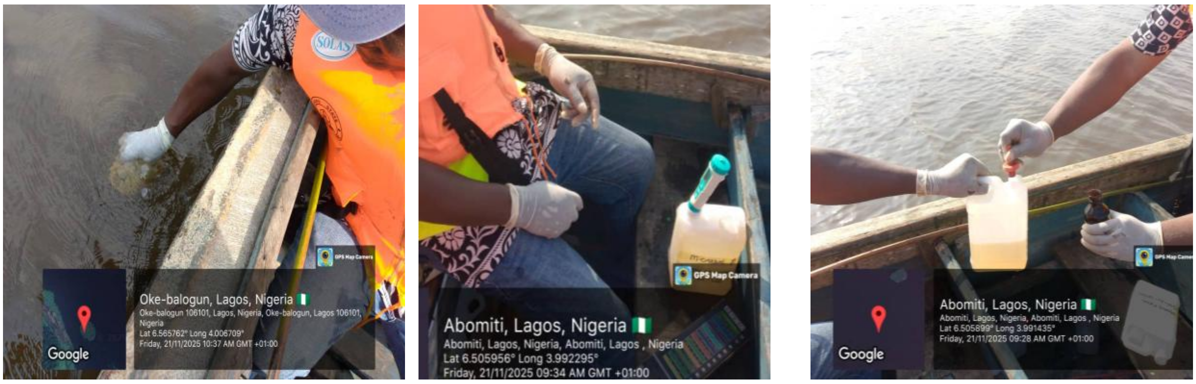


Plate 2: Surface Water Sampling

4.3.7.1 QA/QC Protocols for Water Sampling

Samples were handled according to the following preservation protocols:

- **Physiochemical Analysis:** Collected in pre-cleaned polyethylene containers and stored in chilled insulated containers at 4℃.
- **Heavy Metals:** Collected in nitric acid-rinsed bottles and acidified with nitric acid (HNO_3) to a pH < 2 to prevent metal precipitation.
- **Microbiological Analysis:** Collected in pre-sterilised bottles to prevent external contamination and transported within 6 hours of collection for laboratory incubation and analysis.
- **Chain of Custody:** Chain of custody forms were maintained throughout sample handling and transport from the field to the laboratory.

4.3.7.2 Baseline Result of Surface Water and Groundwater Quality

4.3.7.2.1 Surface Water Quality

Surface water quality results show spatial variation in turbidity, dissolved oxygen, microbial load, and nutrient concentrations, reflecting differences in hydrology, land use, and upstream anthropogenic activities. All parameters were benchmarked against FMEnv and WHO standards for surface water quality.

- General Condition: Reddish-brown to brownish turbid waters.
- Key Parameters: Dissolved Oxygen 6.8-7.69 mg/L. pH near neutral to slightly alkaline (7.1-7.3). Ammoniacal Nitrogen 1.6-3.7 mg/L.
- Metals & Contaminants: Heavy metals below detection. Total Iron elevated (up to 1.2 mg/L).
- Microbiology: Coliforms present (0-5 CFU/ml), E. coli not detected.

Slightly elevated turbidity and microbial counts at Chainage 17 suggest upstream domestic wastewater influence, requiring strict sediment control measures during construction. No heavy metal exceedances were recorded, indicating limited industrial contamination in the sampled freshwater systems.

4.3.7.2.1 Groundwater Quality

Groundwater quality generally falls within FMEnv and WHO permissible limits, although localised exceedances in iron and coliform counts were observed.

- Critical Finding: Chainage 17 (GW-L2-R3): Shows extreme acidity (pH 2.1), very high Electrical Conductivity (2020 μmhos/cm), Total Dissolved Solids (1515 mg/L), Chloride (222.7 mg/L), and Total Acidity (291.3 mg$CaCO_3$/L).
- Other Samples: Chainage 15 (GW-L2-R1) and Chainage 16 (GW-L2-R2) show acceptable parameters with pH 7.4.
- Metals & Contaminants: Heavy metals below detection in all samples.

Groundwater quality generally falls within FMEnv and WHO permissible limits for potable water, although localised exceedances in iron, manganese, and coliform bacteria were observed. Extreme low pH of pH 2.1at CH 17 and high total dissolved solids, chloride, and conductivity indicate localised groundwater contamination or naturally acidic conditions.

Exceedances indicate vulnerability to shallow contamination and highlight the need for strict control of construction wastewater, fuel storage, and sanitation facilities (IFC PS3).

Groundwater abstraction for construction will require monitoring to avoid over-extraction and interference with community water sources.

4.3.7.3 Seasonal Context

The November 2025 sampling was conducted during the early dry season to capture conservative estimates of water quality, reflecting conditions of relatively low flow in surface water bodies and declining groundwater levels. This provides a representative baseline for hydrological and water quality conditions along the Lot 2 corridor.

4.3.8 Sediment Quality

4.3.8.1 Sampling Methodology

Three sediment samples were collected at the three aquatic crossings CH 15 (SED-L2-R1), CH 16 (SED-L2-R2), and CH 17 (SED-L2-R3) using a 25 kg Heckman sediment grab. The grab sampler was firmly attached to a rope and carefully lowered vertically from the sampling boat to the sediment surface. Upon contact with the substrate, the grab was activated to close and collect bottom sediment along with associated benthic organisms. The sampler was then slowly retrieved to the surface to prevent loss or disturbance of the collected material.

After retrieval, the grab was examined to ensure proper closure and adequate sample collection. The sediment sample was gently transferred from the grab and separated into portions for sediment physiochemical analysis and macrobenthic identification and quantification. Samples for sediment physiochemical analysis were carefully placed into appropriately labelled containers and transported to the laboratory in insulated containers under cool conditions. Sampling was conducted in duplicate at each chainage to ensure the study area was representative. In the laboratory, analysis for heavy metals and nutrient profiles was conducted on air-dried and homogenised sediment samples, following standard analytical procedures.

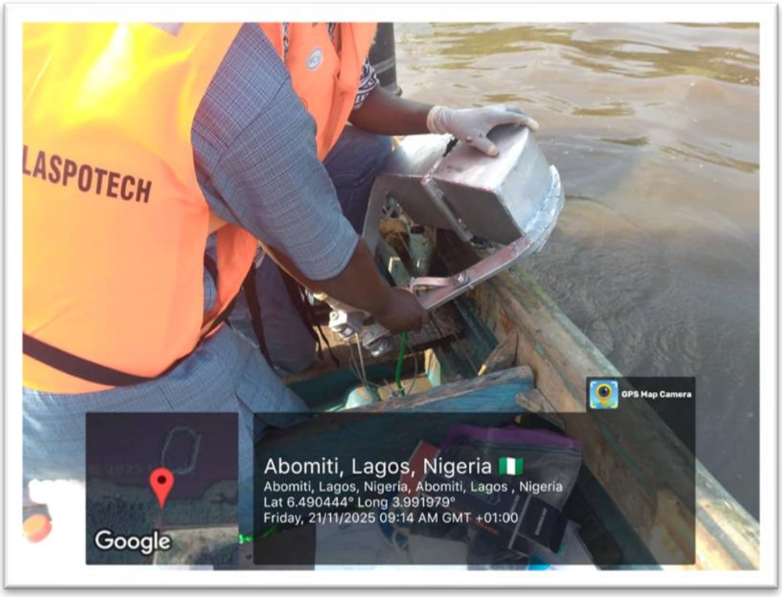


Plate 0.3: Sediment Sampling with the Heckman grab

4.3.8.2 Baseline Result of Sediment Quality

General Observations

Sediment samples collected along the Lot 2 corridor were generally greyish, semi-solid, and exhibited high moisture content, ranging from 71.4 % to 90.6 %.

Physiochemical Parameters:

- pH: 5.6-6.4 (slightly acidic to near-neutral)
- Ammoniacal nitrogen: Elevated, 357.8-1,811.7 mg/kg
- Total phosphates: 3.5-22.7 mg/kg

Metals

- Total iron: Extremely high in sample SED-L2-R2 (21,166.9 mg/kg as Fe_2O_3)
- Zinc: Notably high in SED-L2-R1 (75.0 mg/kg)
- Chromium: 3.6-8.1 mg/kg
- Copper: 4.1-14.2 mg/kg
- Lead: 3.2-10.1 mg/kg

Sediment along the Lot 2 corridor is predominantly greyish and semi-solid, with high moisture content. Measured pH values range from slightly acidic to near-neutral (5.6-6.4). Elevated ammoniacal nitrogen and moderate phosphate concentrations indicate organic matter accumulation typical of lagoonal depositional environments. Total iron is notably high at SED-L2-R2, while zinc, copper, chromium, and lead are within ranges expected for coastal plain sediments with minimal industrial influence. These findings confirm that the sediment functions both as a nutrient repository and a potential receptor for contaminants, consistent with the corridor's hydrodynamic characteristics. No national sediment quality standards currently exist in Nigeria; therefore, results are interpreted relative to background conditions.

4.3.9 Laboratory Analysis and Quality Assurance/Quality Control

All water, sediment, and soil samples were analysed at FMEnv-accredited laboratories (Environmental Laboratory Services Ltd, Lagos) using internationally recognised analytical methods. Water quality parameters were analysed following Standard Methods for the Examination of Water and Wastewater (APHA, 23rd Edition, 2017). Heavy metals were determined using Atomic Absorption Spectroscopy (AAS) with detection limits of 0.001-0.01 mg/L depending on the element. Organic parameters (BOD, COD, nutrients) were analysed using spectrophotometric methods with appropriate quality control standards.

Quality assurance and quality control (QA/QC) protocols included:

- Equipment calibration using certified reference standards before field deployment and daily verification during multi-day surveys
- Laboratory analysis of certified reference materials (CRMs) and reagent blanks with each analytical batch
- Maintenance of chain of custody documentation from field collection through laboratory analysis and data reporting
- Validation of results against method detection limits (MDLs) and regulatory standards, with flagging of results below MDL or exceeding calibration range
- Data validation procedures, including outlier identification (values >3 standard deviations from the mean), replicate precision checks (relative per cent difference <20%), and blank contamination assessment

4.4 Biological Environment

This section describes the baseline biological environment within the AoI of the Lagos 7th Axial Road, with emphasis on Lot 2, which contains the most ecologically sensitive habitats. The assessment follows a risk-based ecological screening approach consistent with international ESIA good practice and IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.

The ecological baseline builds on findings from Section 2 ESIA and Lot 1 and integrates field surveys, habitat mapping, fisheries data, and species records to characterise:

- Habitat types and condition;
- Floral and faunal composition;
- Presence of species of conservation concern;
- Ecosystem services and natural capital values; and
- Sensitivity and criticality of habitats potentially affected by the project.

4.4.1 General Ecological Study Approach

The ecological assessment focused on characterising species assemblages and habitat types at CH 20, 22, and 24 along the Lot 2 corridor. The study included an inventory of floral and faunal diversity, an evaluation of habitat types (mangrove forest, riparian zones, and disturbed areas), and the identification of threatened or endemic species. These locations were selected to represent the most ecologically sensitive terrestrial habitats within the project's AoI.

4.4.1.1 Spatial Extent of the Study Area

The spatial extent of the biodiversity study area comprises Lot 2 of the 7th Axial Road alignment within Epe Local Government Area (LGA), Lagos State. The study area was delineated based on the proposed road alignment and its anticipated ecological zone of influence for baseline characterisation purposes, and was divided into three spatial zones: Core Zone, Buffer Zone, and Zone of Influence (ZoI).

A. Core Zone

This zone includes the immediate project footprint along the 7th Axial Road alignment, encompassing road carriageways, shoulders, drainage structures, borrow areas, and construction camps. Biodiversity within this zone is most susceptible to direct impacts such as vegetation clearing, habitat loss, and physical disturbance. Survey coverage within the Core Zone focused on road sections at Chainages 20, 22, and 24, traversing Eredo and Noforija communities within Epe LGA. Locations were referenced using project chainages to ensure spatial accuracy and traceability of baseline ecological observations.

B. Buffer Zone

The Buffer Zone extends approximately 500 m on either side of the road alignment along the Lot 2 alignment sections surveyed at CH 20, 22, and 24. The zone represents a lateral spatial extension of these same alignment segments and captures areas likely to experience indirect impacts such as noise, dust, vibration, altered drainage conditions, and increased human activity.

C. Zone of Influence (ZoI)

The Zone of Influence (ZoI) includes adjacent communities, wetlands, creeks, lagoons, and associated ecosystems that may be affected by changes in access, land use patterns, drainage pathways, and socioecological interactions resulting from the road development. Survey coverage within the ZoI corresponds to the same Lot 2 alignment sections surveyed at CH 20, 22, and 24, and extends laterally to immediately adjacent communities (Eredo and Noforija), wetlands, and hydrological features. Locations are referenced using the corresponding chainages to ensure spatial accuracy and traceability of ecological observations.

4.4.1.2 Time and Season of Survey

Field surveys were conducted on the 20th and 21st of November 2025, which is ecologically relevant in coastal Lagos due to increased species activity and accessibility of survey locations.

This period enabled:

- Improved access to selected sampling sites;
- Observation of resident species and opportunistic records of seasonally present fauna;
- Documentation of vegetation structure prior to peak rainy-season growth.

4.4.1.3 Study Limitations and Assumptions

Limitations

While the assessment followed recognised baseline survey practices; several limitations were identified:

- Seasonal constraints may have limited the detection of migratory, nocturnal, or cryptic species;
- Physical access limitations in swampy, flooded, or privately owned areas constrained survey coverage at some locations;
- Reliance on secondary data sources for historical biodiversity trends assumes the accuracy and continued relevance of published information.

Limited field equipment, including the absence of camera traps, binoculars, and GPS-enabled cameras, and time constraints during field deployment, reduced opportunities for extended observation and species identification, particularly for mobile or low-detectability fauna. To mitigate this, the study incorporated local ecological knowledge (LEK) and secondary literature to compensate for the temporal constraints.

Assumptions

The following assumptions underpin the biodiversity baseline study:

- Species recorded during the survey period are considered indicative of typical baseline conditions for the surveyed season.
- Identified habitat types are assumed to remain broadly consistent in the absence of major external environmental changes unrelated to the project

These limitations and assumptions were carried forward into impact evaluation to support a precautionary and adaptive management approach, consistent with IFC Performance Standard 6 requirements.

4.4.2 Habitat Types

The Lot 2 corridor encompasses a mosaic of interconnected habitat types, reflecting varying degrees of anthropogenic modification and natural features. Baseline surveys indicate the following composition within the project Area of Influence (AoI):

1. **Modified Terrestrial Habitats (60%)**

Modified terrestrial areas constitute the majority of the corridor and include croplands, fallow agricultural plots, and secondary regrowth vegetation. These areas are largely shaped by subsistence and smallholder farming, with typical crops including cassava, maize, and vegetables. They support a range of generalist flora and fauna, including small mammals, birds, and reptiles adapted to edge environments. These areas also provide corridors for species movement between more natural habitats.

2. **Wetland and Riparian Habitats (25%)**

Wetland and riparian zones comprise freshwater marshes, streams, and their associated buffer vegetation. These habitats are hydrologically connected to the Lekki Lagoon system, providing critical functions such as flood attenuation, water filtration, and sediment trapping. They also support wetland-dependent flora and fauna, including small mammals, reptiles, herpetofauna, and bird species such as herons, egrets, and kingfishers. Baseline surveys indicate that wetlands cover approximately 41.8% of land within certain sections of the AoI, forming essential ecological corridors that maintain connectivity across fragmented landscapes.

3. **Built and Settled Areas (≈15%)**

Built-up areas are concentrated along the existing corridor and include roadside residential dwellings, small commercial centres, and other infrastructure developments. These areas have limited habitat value for native wildlife but contribute to human-wildlife interface considerations, especially in riparian-adjacent zones. The presence of settlements influences local biodiversity patterns, often restricting the movement of sensitive species and altering habitat structure.

Ecological Connectivity

Despite the anthropogenic modification, the habitat types along the Lot 2 corridor remain interconnected. Riparian buffers and wetland fringes link otherwise fragmented natural habitats, forming linear corridors that facilitate wildlife movement, maintain hydrological continuity, and support ecosystem services. These interconnections underpin cumulative ecological considerations, particularly when viewed in relation to Lot 1 and other regional developments along the Lekki-Epe corridor.

4.4.3 Floral Assessment

4.4.3.1 Survey Methodology

Vegetation studies were conducted on the 20th and 21st of November 2025, during daylight hours (0800-1700h), to characterise floral composition within the ecological habitats at CH 20, 22, and 24 of Lot 2.

Field Equipment and Materials

The following equipment and materials were employed during the field survey:

- Measuring tape (50-meter) for pLot demarcation
- Garmin Map62 GPS device for pLot geo-referencing
- Digital camera for photographic documentation of vegetation and habitat conditions
- Field datasheets for recording species occurrence and abundance
- Flora of West Africa (taxonomic reference guide)

- Mobile plant identification applications for field verification

Sampling Design and PLot Establishment

The study employed a stratified sampling approach across the three chainage locations to document the vegetation composition and structure in the project area. At each chainage, a rectangular vegetation survey pLot (quadrat) measuring 50 m × 20 m (1,000 m^2) was established perpendicular to the road alignment in the direction of adjacent forest/riparian habitat to capture the most intact vegetation zone (Plate 4.4). Each pLot was geo-referenced using a handheld Garmin Map62 GPS device, and pLot boundaries were established using measuring tape. The 50m × 20m pLot dimensions were selected to provide adequate sampling area for capturing the diversity and structural characteristics of forest vegetation while remaining logistically feasible for comprehensive enumeration.

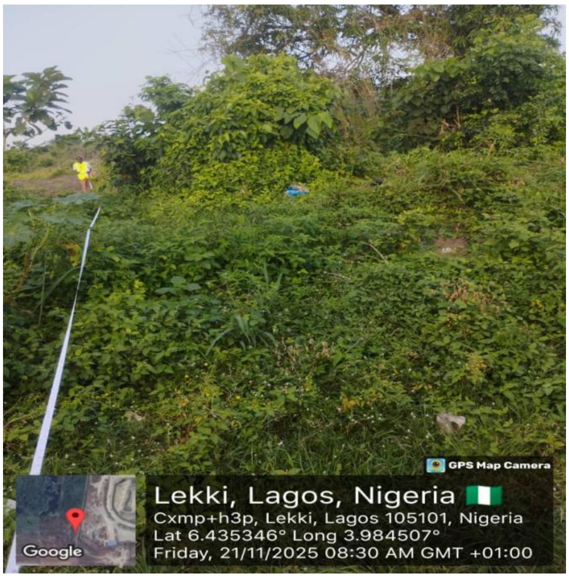


Plate 0.4: Establishment of the 50 m by 20 m quadrat on the sample sites in Epe, Lagos

Floral Inventory and Identification

Plant species identification was conducted in the field using a combination of morphological characteristics (leaf structure, bark texture, growth form) and taxonomic reference materials. Primary identification was based on the Flora of West Africa, supplemented with mobile plant identification applications as needed. Photographic records were obtained for species that could not be immediately identified in the field for subsequent identification in the laboratory. All identified species were recorded in the field datasheet.

Relative Species Abundance (RSA)

The relative species abundance (RSA) of each plant species was calculated to characterise the vegetation composition and dominance patterns within each sampling pLot and across the entire surveyed area. The RSA expresses the proportional representation of each species as a percentage of the total plant community. It was calculated at both the individual chainage level and the aggregate level.

At the single chainage level, the RSA was calculated using the following formula:

$$\text{Chainage RSA} = \frac{\text{Total number of individuals of a species}}{\text{Total number of individuals of all species in a quadrat}} \times 100$$

At the aggregate level, the data across all three sampled chainages were pooled to provide a broader corridor assessment:

$$\text{Aggregate RSA} = \frac{\text{Total number of individuals of a species}}{\text{Total number of individuals of all species in the three quadrats}} \times 100$$

4.4.3.2 Vegetation Inventory

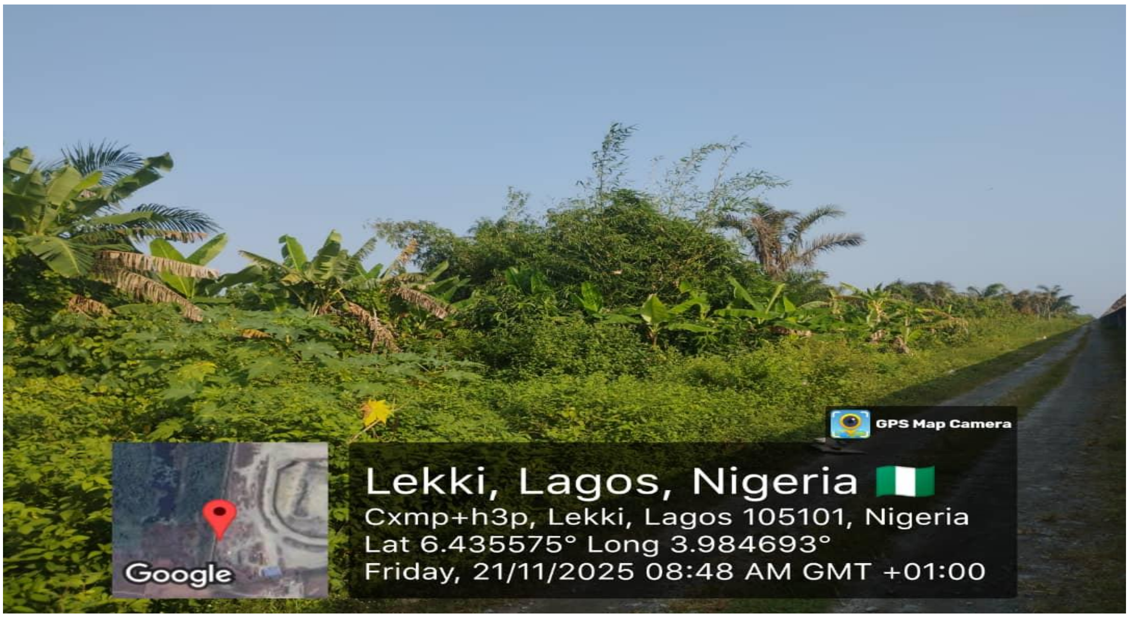
A total of 24 plant species belonging to 15 families were recorded across the three sampled chainages (Table 4.13). The vegetation community is dominated by shrubs, herbs, sedges, and grasses, indicating a predominantly secondary vegetation assemblage associated with disturbed wetland and transitional habitats (Plate 4.5). fn terms of family representation, the most species-rich families were Fabaceae and Poaceae, each represented by four species. Fabaceae species recorded include Senna obtusifolia, *Crotalaria retusa, Mimosa pudica*, and *Calopogonium mucunoides*, while Poaceae species include Pennisetum polystachion, Cynodon dactylon, Phragmites australis, and *Leersia hexandra*. Euphorbiaceae and Cyperaceae were each represented by two species, including *Alchornea cordifolia* and *Ricinus communis* (Euphorbiaceae), and Cyperus ligularis and Mariscus alternifolius (Cyperaceae).

Table 0.13: Family and Growth Form of the Flora

S/N	Name of Species	Family	Growth Form
1	*Gomphrena celosiodes*	Amaranthaceae	Herb
2	*Peltandra virginica*	Araceae	Herb
3	*Raphia taedigera*	Arecaceae	Woody herb
4	*Chromolaena odorata*	Asteraceae	Shrub
5	*Cleome viscose*	Cleomaceae	Herb
6	*Cyperus ligularis*	Cyperaceae	Sedge
7	*Mariscus alternifolius*	Cyperaceae	Sedge
8	*Dryopteris fili-max*	Dryopteridaceae	Herb
9	*Alchornia cordiflora*	Euphorbiaceae	Shrub
10	*Ricinus communis*	Euphorbiaceae	Shrub
11	*Senna obtusifolia*	Fabaceae	Shrub
12	*Crotalaria retusa*	Fabaceae	Herb
13	*Mimosa pudica*	Fabaceae	Herb
14	*Calopogonium mucunoides*	Fabaceae	Herb

15	*Hyptis suaveolens*	Lamiaceae	Herb
16	*Spigelia anthelmia*	Loganiaceae	Herb
17	*Sida acuta*	Malvaceae	Shrub
18	*Musa paradisiacal*	Musaceae	Herb
19	*Pennisetum polystachion*	Poaceae	Grass
20	*Cynodon dactylon*	Poaceae	Grass
21	*Phragmites australis*	Poaceae	Grass
22	*Leersia hexandra*	Poaceae	Grass
23	*Eichhornia crassipes*	Pontederiaceae	Herb
24	*Lantana camara*	Verbenaceae	Shrub

Analysis of growth form distribution shows that herbs constitute the dominant life form (45.8% of recorded species), followed by shrubs (25.0%), grasses (16.7%), sedges (8.34%), and wood herbs (4.2%). This life-form structure is characteristic of secondary successional vegetation and hydrologically influenced lowland habitats subject to anthropogenic disturbance, including land clearing and modification of natural drainage patterns.



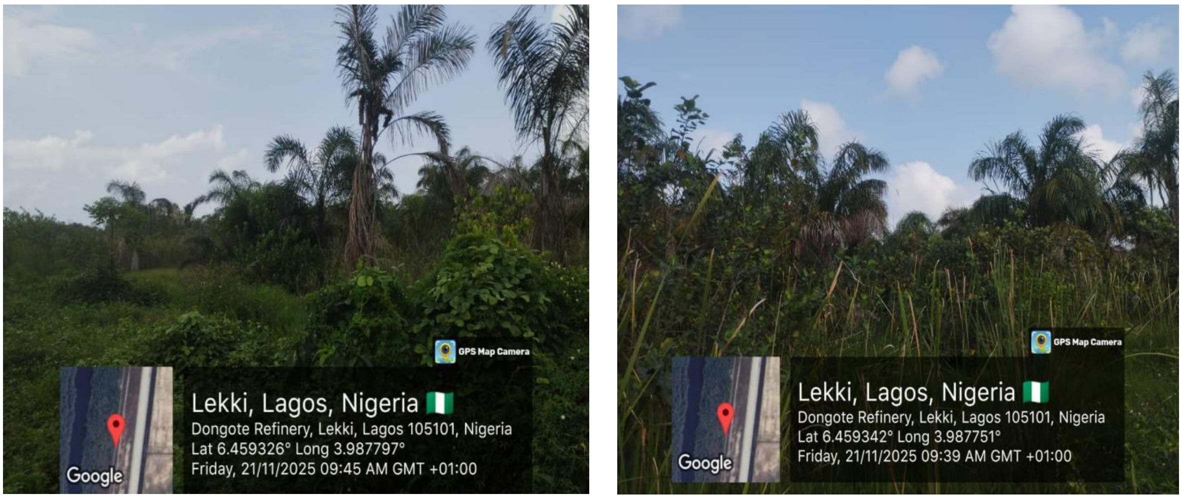


Plate 0.5: Overview of Vegetation Along Lot 2 Corridor

4.4.3.2.1 Vegetation Composition by Chainage

Chainage 20

Table 4.14 presents the floral composition at Chainage 20, with a total of 12 species recorded at this chainage. The vegetation is strongly dominated by *Alchornea cordifolia* (35%), *Raphia taedigera* (30%), and *Cyperus ligularis* (15%). Collectively, these three species account for approximately 80% of total vegetation cover, indicating low species evenness and marked dominance by a limited number of disturbance-tolerant taxa. Other species occurred only as scattered individuals (<5% cover), suggesting restricted niche differentiation and competitive exclusion by dominant species.

Table 0.14: Composition of Flora (Plant Species) On Epe Chainage 20 (Lot 2)

S/N	Name of Species	Percentage Composition (%)
1	*Alchornia cordiflora*	35.00***
2	*Raphia taedigera*	30.00***
3	*Cyperus ligularis*	15.00***
4	*Mariscus alternifolius*	1.80**
5	*Musa paradisiaca*	3.50**
6	*Ricinus communis*	5.00**
7	*Cleome viscosa*	1.50**
8	*Sida acuta*	2.20**
9	*Cynodon dactylon*	1.80**
10	*Senna obtusifolia*	1.20**
11	*Lantana camara*	2.00**
12	*Mimosa pudica*	1.00**

Key: ***: Dominant Species; **: Scattered Species; *: Invasive Species - (Not recorded)

Chainage 22

A similar species dominance structure was observed at Chainage 22 (Table 4.15), with pattern is observed, with *Raphia taedigera* (35%), *Alchornea cordifolia* (30%), and *Cyperus ligularis* (10%) representing the principal structural species. However, species richness increases slightly to 13 recorded species, indicating marginally greater habitat heterogeneity relative to Chainage 20. The presence of wetland grasses, such as Phragmites australis and *Leersia hexandra*, alongside aquatic-associated species including *Peltandra virginica*, confirms a stronger hydrological influence at this location. *Dryopteris filix-mas* 5% coverage indicates moist, shaded microhabitats within the vegetation matrix. Overall, the vegetation structure at Chainage 22 reflects a transitional wetland-terrestrial interface.

Table 0.15: Composition of Plant Species on Chainage 22 (Lot 2)

S/N	Name of Species	Percentage Composition (%)
1	*Alchornia cordiflora*	30.00***
2	*Raphia taedigera*	35.00***
3	*Cyperus ligularis*	10.00***
4	*Mariscus alternifolius*	2.30**
5	*Musa paradisiaca*	4.50**
6	*Phragmites australis*	1.60**
7	*Pennisetum purpureum*	3.50**
8	*Calopogonium mucunoides*	3.50**
9	*Peltandra virginica*	1.70**
10	*Leersia hexandra*	1.40**
11	*Spigelia anthelmia*	1.00**
12	*Lantana camara*	0.50**
13	*Dryopteris fili-mas*	5.00**

Key: ***: Dominant Species; **: Scattered Species; *: Invasive Species - (Not recorded)

Chainage 24

At Chainage 24 (Table 4.16), species richness decreases to 10 with dominance shifts toward *Cyperus ligularis* (40%), followed by *Raphia taedigera* (25%) and *Alchornea cordifolia* (20%). This change in dominance pattern suggests increasing wetland conditions and soil moisture along the corridor alignment. Ferns such as *Dryopteris filix-mas* and herbs including *Cleome viscosa* and *Hyptis suaveolens* occur as scattered species within the understorey. No invasive species were recorded at this chainage during the survey period.

Table 0.16: Composition of Plant Species on Chainage 22 (Lot 2)

S/N	Name of Species	Percentage Composition (%)
1	*Alchornia cordiflora*	20.00***
2	*Raphia taedigera*	25.00***
3	*Cyperus ligularis*	40.00***
4	*Mariscus alternifolius*	3.80**
5	*Dryopteris fili-max*	5.00**
6	*Gomphrena celosiodes*	1.00**
7	*Cleome viscosa*	2.00**
8	*Hyptis suaveolens*	1.00**
9	*Cynodon dactylon*	1.00**
10	*Senna obtusifolia*	1.20**

Key: ***: Dominant Species; **: Scattered Species; *: Invasive Species - (Not recorded)

Spatial Floral Pattern

Moving from Chainage 20 to 24, there is a progressive increase in wetland influence, reflected in the increasing dominance of the sedge Cyperus ligularis and the presence of aquatic-associated species. This gradient corresponds to increasing soil moisture and proximity to permanent water bodies.

4.4.3.2.2 Invasive and Opportunistic Species

Chromolaena odorata (Siam weed)

Table 4.13 above indicates the presence of *C. odorata* at low abundance (1.25%) within the broader study area. However, the species was not recorded within the quantitative vegetation plots presented in Tables 4.14-4.116. This suggests that its occurrence was limited to peripheral or disturbed micro-sites outside the main sampling quadrats. *C. odorata* is widely recognised as an aggressive coloniser of disturbed tropical environments. Although recorded at low abundance and not dominant within the surveyed chainages, its presence indicates localised disturbance and warrants periodic monitoring to prevent future spread.

Regionally Recorded Invasive Species

Eichhornia crassipes (water hyacinth) and *Nypa fruticans* (nipa palm) were documented within the Lot 1 corridor and the wider Lagos Lagoon system but were not recorded within the surveyed Lot 2 chainages (20, 22, and 24) during this ecological assessment. *E. crassipes* is commonly associated with nutrient-enriched surface waters and may form dense floating mats that obstruct waterways and reduce dissolved oxygen, while N. fruticans is a non-native palm species known to colonise brackish shorelines and displace native mangrove associates along lagoon margins.

Although these species were not observed within the direct Lot 2 footprint, their documented presence within the contiguous lagoon system indicates potential regional ecological pressures that may influence future habitat dynamics. Continued monitoring is therefore recommended as part of corridor-wide biodiversity management.

4.4.3.2.3 Mangrove Status

True mangrove species (*Rhizophora spp., Avicennia spp., Laguncularia racemosa*) were not recorded within the surveyed chainages, but mangrove-associated and freshwater swamp species were observed, including *Raphia taedigera, Cyperus ligularis, and Phragmites australis*.

This confirms that true mangrove forests are absent within the direct project footprint surveyed for Lot 2. While mangrove ecosystems occur regionally within the Lagos Lagoon system, the specific locations assessed support secondary swamp and wetland vegetation rather than structurally developed mangrove stands.

4.4.3.2.4 Summary of Floral Diversity

The occurrence of disturbance-adapted species, together with the presence of cultivated plants such as Musa paradisiaca, indicates ongoing anthropogenic influence within the project area. Where recorded at low abundance, invasive or opportunistic species further reflect altered ecological conditions rather than intact primary habitat.

4.4.3.2.5 Ecological Interpretation

The recorded flora indicates a secondary swamp-terrestrial mosaic characterised by wetland-tolerant sedges, grasses, shrubs, and scattered cultivated species. The vegetation structure and composition reflect modified wetland conditions within a disturbed coastal plain environment.

The dominance of a limited number of species at each chainage, particularly *Alchornea cordifolia*, *Raphia taedigera*, and *Cyperus ligularis*, indicates relatively low species evenness and simplified community structure. Such patterns are typical of early- to mid-successional vegetation developing under recurrent disturbance and hydrological modification.

The progressive increase in the relative dominance of wetland-associated taxa from Chainage 20 to Chainage 24 reflects a spatial moisture gradient and increasing proximity to permanent or seasonally inundated areas.

4.4.4 Faunal Assessment

Faunal surveys were also conducted on the 20th and 21st of November 2025, and covered multiple habitat types, including forest, riparian zones, grassland, farmland, roadside corridors, and disturbed or urban settlements. Wildlife surveys focused on amphibians and reptiles using line transects, VES, and opportunistic observations.

4.4.4.1 Survey Methodology

Wildlife

The study employed line transect surveys and visual encounter surveys (VES) as the primary study method, supplemented by semi-structured interviews with local residents to incorporate traditional ecological knowledge.

In forest habitats, a single transect per chainage, each extending 1 km inward from the forest edge (total: 3 forest transects) were established to record species occurrence within interior environments. Along streams, rivers, and wetlands, five separate transect walks of 100 m each were conducted. Similarly, in grassland and farmland areas, 100 m line transects were established to ensure consistency across non-forest habitats.

VES were conducted along all transects, involving active searches of microhabitats such as leaf litter, logs, tree trunks, and vegetation. All encountered individuals were identified, counted, and photographed where possible. Opportunistic searches were also conducted outside formal transects to record incidental encounters.

In roadside corridors and urban settlements, an opportunistic survey approach was used to document species occurring in modified environments. This was complemented by interviews with local residents to incorporate local ecological knowledge, particularly for cryptic or nocturnal species that may not be active during daylight surveys.

Species Identification and Verification

Surveys were conducted by experienced field personnel supported by local field guides with knowledge of local wildlife and habitat characteristics. Species identification was based on morphological characteristics, including body size, colouration patterns, scalation, and diagnostic features. Photographic records were obtained where feasible to support species identification verification and to provide documentation for quality assurance review.

Desktop Review and Secondary Data Integration

Secondary sources, including the IUCN Red List and the Global Biodiversity Information Facility GBIF) database, were used to provide conservation context for recorded species.

4.4.4.2 Survey Results

Faunal observations include 12 small mammals (e.g., maxillo-facial squirrel, grasscutter, bushbuck), 9 reptiles (e.g., *Crocodylus niloticus*, Varanus sp., *Agama agama*), amphibians (e.g., *Ptychadena mascareniensis*), and 46 avifauna typical of peri-urban and agricultural landscapes, e.g. African grey parrot (*Psittacus Erithacus*). Minor fish populations are found in streams (See Section 4.5.7).

No critically endangered species were recorded; however, wetlands near Chainages 15-17 provide habitat for waterbirds and amphibians, requiring avoidance and minimisation measures.

Plates 4.6 and 4.7 show photos of juvenile male and female Nile crocodile Juveniles and a male monitor lizard captured during the study.

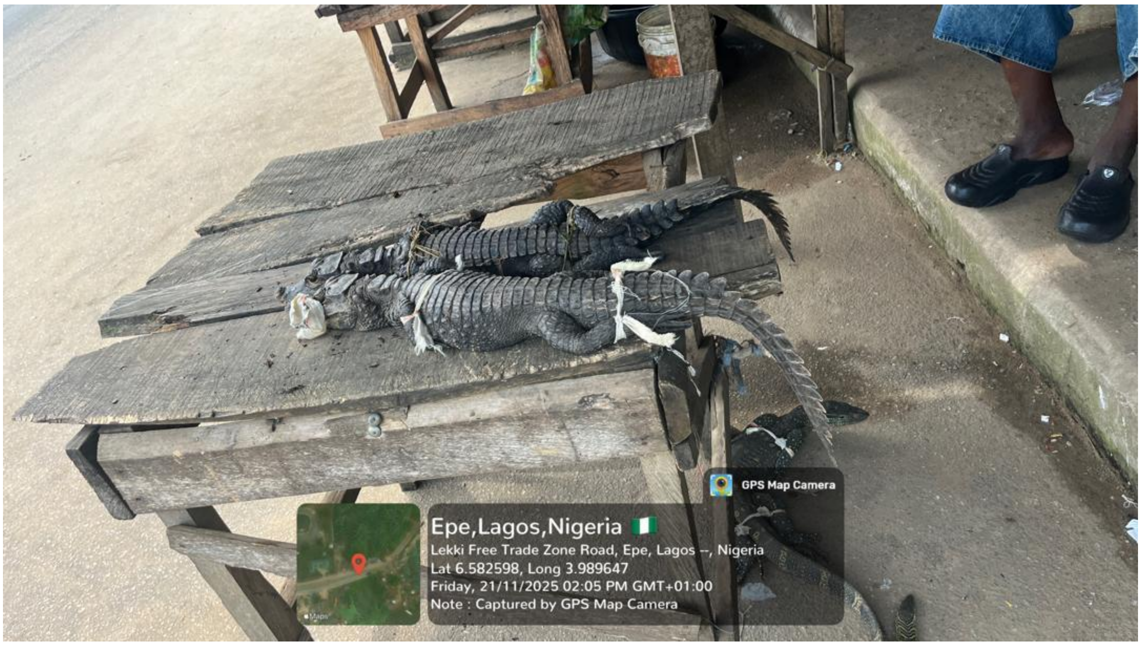


Plate 0.6: Nile Crocodile (Male and Female Juveniles)

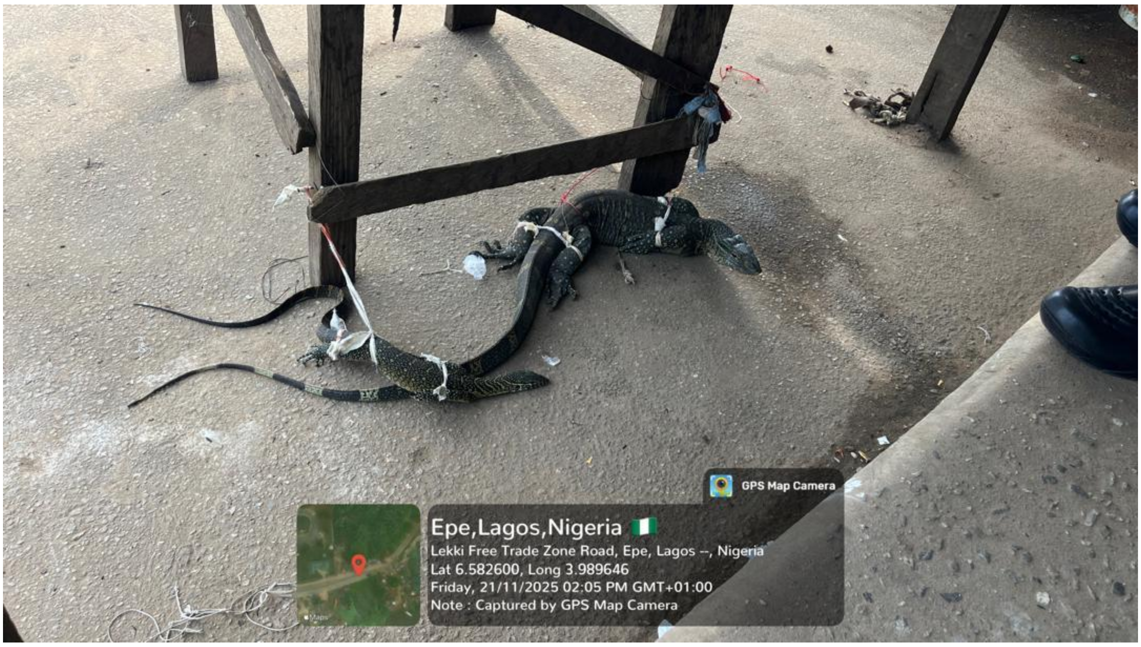


Plate 0.7: Monitor Lizards (Male Juveniles

Habitat Associations

Wildlife observed within the project area were primarily associated with riparian zones characterised by vegetative cover, calmer water bodies located away from high-traffic areas, and relatively undisturbed microhabitats that provide adequate refuge. These habitat features offer suitable conditions for foraging, breeding, and shelter.

Key Observations

Species presence and relative abundance were observed to decline in areas experiencing intense human activity. Local communities reported harvesting reptiles for subsistence consumption and limited local trade. Habitat modification, vegetation removal, and associated thermal stress, together with changes in water quality, likely constrain breeding opportunities and reduce refuge availability. Consistent with established ecological understanding, herpetofauna serve as indicators of environmental health due to their sensitivity to habitat disturbance, pollution, and temperature fluctuations (Vitt & Caldwell, 2014).

Threatened Species Status

No Critically Endangered (CR) or Endangered (EN) herpetofauna species were recorded during the field surveys. All observed species are widespread across West Africa, tolerant of disturbed and modified habitats, and not restricted-range or endemic to Lagos State.

4.4.4.2.1 Ecological Interpretation

Macro-invertebrates are widely used as bioindicators of aquatic ecosystem health due to their sensitivity to pollution, dissolved oxygen levels, and habitat quality (Rosenberg & Resh, 1993; Barbour *et al.*, 1999). However, the assemblages recorded during this survey are dominated by widespread, disturbance-tolerant species. The observed patterns are consistent with moderate ecological stress in areas adjacent to industrial activity, with comparatively improved assemblages further from disturbance sources. No unique, endemic, or critically threatened macrobenthic species were found. All recorded species are widespread across West African freshwater and brackish systems.

4.4.5 Critical Habitat Assessment (Habitat Screening)

IFC Performance Standard 6 (PS6) requires projects affecting natural habitats to determine whether the project area qualifies as Critical Habitat, areas of high biodiversity value based on the presence of threatened species, endemism, ecosystem integrity, or key ecological processes. Critical Habitat designation mandates specific management obligations, including biodiversity net gain requirements and the strict application of the mitigation hierarchy.

This assessment evaluates whether the Lot 2 project corridor (CH 8+700 to CH 24+932, including a 1 km buffer zone) meets the criteria for Critical Habitat under IFC PS6 and identifies areas of high, moderate, and low ecological sensitivity, providing guidance for targeted management and mitigation measures.

4.4.5.1 Assessment Methodology and Data Sources

The assessment draws upon multiple sources of primary and secondary data to evaluate biodiversity conditions within the Lot 2 project corridor

Primary Field Surveys: Flora composition surveys were conducted between 20th and 21st November 2025 (dry season) across Lot 2 chainages 20, 22, and 24. Three 50 m × 20 m (0.1 ha) pLots were established per chainage, sampling a total area of 0.3 ha. Macroinvertebrate studies were conducted using sediment samples collected from CH 15, 16, and 17, while herpetofauna were assessed along riparian zones of the same chainages (100 m transect per chainage) using visual encounter surveys. Surveys were supplemented with local ecological knowledge (LEK) through interviews with residents. Survey coverage was limited to the chainages noted; other sections of the corridor were not directly sampled, which may limit representativeness.

Desktop Reviews: Desktop analyses included the IUCN Red List of Threatened Species (https://www.iucnredlist.org/) and the Global Biodiversity Information Facility (GBIF; https://www.gbif.org/) databases to evaluate species threat status and geographic range.

Supplementary Observations: Qualitative observations of habitat condition, disturbance, and land use were recorded, with reference to detailed baseline biodiversity surveys (Section 4.4.3 Flora, Section 4.4.4 Fauna). Parameters assessed included vegetation structure, wetland connectivity, signs of anthropogenic disturbance, and the presence of aquatic and riparian microhabitats.

Survey Limitations

- Surveys were conducted during daytime only and limited to the dry season (November 2025), which may have affected the detectability of seasonal, nocturnal, or migratory species.
- Taxonomic coverage was restricted to herpetofauna and macroinvertebrates, with no systematic surveys of mammals, birds, or fish.
- No trapping, automated recording, or acoustic bat surveys were conducted.
- Macroinvertebrate and herpetofauna observations were restricted to CH 15-17 aquatic systems, limiting corridor-wide representativeness.

4.4.5.2 Baseline Ecological Summary

Flora: Across Lot 2 chainages, 24 plant species from 15 families were recorded (Table 8, Section 4.3). Vegetation is dominated by shrubs, herbs, sedges, and grasses characteristic of secondary regrowth and disturbed wetlands. The most abundant species include *Alchornia cordiflora* (≈30%), *Raphia taedigera* (≈30%), and Cyperus ligularis (≈20%), collectively representing 80% of vegetation cover. All species are classified as Least Concern or not assessed according to the IUCN Red List database

Invasive Species: *Chromolaena odorata* (siam weed) occurs at approximately 1.25% of total cover, restricted to peripheral disturbed microsites. Other regionally recorded invasive species, including Eichhornia crassipes and *Nypa fruticans*, were not observed during surveys

Mangrove Status: True mangrove species (*Rhizophora racemosa, Avicennia germinans*, and *Laguncularia racemosa*) were absent. Vegetation comprised freshwater swamp species, confirming that structurally developed mangrove forests do not occur within the Lot 2 footprint. Although mangrove ecosystems occur regionally and are considered threatened in Nigeria, no brackish mangrove forest exists within the project footprint. The surveyed chainages support freshwater swamp and secondary wetland vegetation, not true mangrove habitat.

Macro-invertebrates: Recorded taxa within the sampled areas include *Pomacea maculata* (island apple snail), while *Achatina achatina* (giant land snail) was observed incidentally during site reconnaissance rather than within structured sampling pLots. All recorded and observed species are classified as Least Concern or have not been assessed.

Herpetofauna: Observed primarily in riparian zones and undisturbed microhabitats, species are widespread across West Africa, disturbance-tolerant, and include no endemic or threatened taxa.

4.4.5.3 Biodiversity Hotspots and Sensitive Areas

High Sensitivity Areas:

CH 22 (Wetland Transition Zone): This zone exhibits the highest species richness (13 species) and contains transitional wetland-terrestrial habitats supporting diverse microhabitats, including ferns (Dryopteris fili-max) and wetland grasses (Phragmites australis, Leersia hexandra). Aquatic-associated species (Peltandra virginica) and moist shaded microhabitats add to ecological value. Vegetation clearance or hydrological disruption could significantly affect habitat quality.

Riparian Corridors Along Water Bodies: These corridors provide habitat for herpetofauna, maintain macro-invertebrate diversity, and support connectivity across the landscape. Vegetation moderates water temperature and supplies organic matter. Disruption could fragment populations and degrade aquatic habitats.

Water Bodies CH 15, 15 and 17 (Fish Market Area): Active fishing grounds support local livelihoods. Aquatic habitat quality is crucial; construction runoff, sedimentation, or noise could reduce fish catches and disrupt livelihoods.

Moderate Sensitivity Areas: Chainages 20 and 24: These areas support wetland-associated flora such as Raphia taedigera, Cyperus ligularis, and Alchornia cordiflora. While species richness is moderate (10-12 species), vegetation clearance could still reduce ecological function.

Low Sensitivity Areas (Heavily Disturbed Zones Near Dangote Refinery, Lot 1): Macro-invertebrate diversity is low, dominated by disturbance-tolerant species. Incremental impacts from road construction are expected to be minor. Focus is on pollution control rather than habitat protection.

Spatial Pattern of Sensitivity: Ecological sensitivity increases with distance from industrial activities and decreases with the intensity of farming and lumbering disturbance. The highest values occur in wetland-terrestrial transition zones (CH 22) and riparian corridors; the lowest values occur in heavily industrialised and farmed areas.

4.4.5.4 IFC PS6 Critical Habitat Screening

- **Criterion 1: CR/EN Species - Not Applicable**

No Critically Endangered or Endangered species were recorded.

- **Criterion 2: Endemic/Restricted-Range Species - Not Applicable**

All species have ranges >500,000 km²; no restricted-range or endemic species were documented.

- **Criterion 3: Migratory/Congregatory Species - Not Applicable**

No globally significant concentrations of migratory birds or fish, or bat roosts, were observed.

- **Criterion 4: Threatened/Unique Ecosystems - Not Applicable**

No true mangrove forests or unique ecosystem types are present. Vegetation is secondary wetland and modified by historical human activity.

- **Criterion 5: Key Evolutionary Processes - Not Applicable**

No evolutionary hotspots or distinct lineages were identified.

Summary: All five criteria were evaluated as Not Applicable, confirming that the Lot 2 corridor does not qualify as Critical Habitat (Table 4.17: IFC PS6 Screening Results).

Table 0.17: Summary of IFC PS6 Critical Habitat Screening

Criterion	Assessment	Key Evidence
Criterion 1: CR/EN Species	Not Applicable	IUCN screening: 0 CR/EN species
Criterion 2: Endemic/Restricted-Range	Not Applicable	GBIF analysis: all species >500,000 km² range
Criterion 3: Migratory/Congregatory	Not Applicable	No globally significant concentrations documented
Criterion 4: Threatened Ecosystems	Not Applicable	No true mangroves; secondary vegetation only
Criterion 5: Evolutionary Processes	Not Applicable	No key evolutionary processes identified

z4.4.5.5 Critical Habitat Determination

The Lot 2 project corridor is classified as Modified Habitat. Although the corridor supports localised biodiversity, including 24 plant species, 12 mammals, 9 reptiles, and 46 bird species, small tropical lagoon fishes, and ecosystem services for fisheries and subsistence farming, these values are not irreplaceable, globally significant, or unique. Extensive historical anthropogenic modification (farming, lumbering, and industrial development) has resulted in disturbance-adapted species assemblages.

4.4.5.6 Management Implications

Requirements for Modified Habitat under IFC PS6 include:

- Apply the mitigation hierarchy, prioritising avoidance and minimisation.
- Restore and enhance biodiversity where feasible; net gain encouraged but not mandatory.
- Manage invasive species, controlling existing populations and preventing the introduction of new ones.
- Establish monitoring programs and implement adaptive management where necessary.

The Modified Habitat classification balances biodiversity conservation with development objectives. The Lot 2 corridor does not support Critical Habitat but provides important local ecological values and ecosystem services, which will be maintained through mitigation, restoration, and monitoring as detailed in the ESMP (Chapter 6).

4.4.6 Ecosystem Services

Under IFC PS6, ecosystem services that are relied upon by affected communities are considered priority ecosystem services. Within Lot 2, these include:

- Provisioning: Agricultural production and non-timber forest products
- Regulating: Flood attenuation and groundwater recharge
- Cultural: Recreational fishing and community gathering spaces

The dependency of local communities on agricultural land and wetland systems confirms that these ecosystem services form part of the project's biodiversity risk framework. These baseline conditions will inform the impact assessment presented in Chapter 5.

4.4.7 Hydrobiology (Phytoplankton, Macrobenthos, and Fish) Sampling

The hydrobiological study focused on documenting the composition of aquatic biological communities at selected aquatic crossings (CH 15, 16, and 17) along Lot 2. The assessment included phytoplankton, benthic macroinvertebrates, and fish fauna.

4.4.7.1 Phytoplankton

Phytoplankton samples were collected from three strategic aquatic crossings and designated as follows: SW-L2-01 (CH 15), SW-L2-02 (CH 16), and SW-L2-C (CH 17). The samples were collected using a combination of surface water grab sampling and a standard plankton net (mesh size 20-55 µm) for qualitative and quantitative assessment, following standard limnological and coastal monitoring procedures (Plate 4.3). Horizontal tows of 5-minute duration were conducted in shallow areas (<2m depth), while vertical hauls from bottom to surface were performed in deeper zones (>2m depth). Concentrated samples were transferred into labelled sample bottles, preserved with Lugol's iodine, and transported directly to the laboratory for analysis.

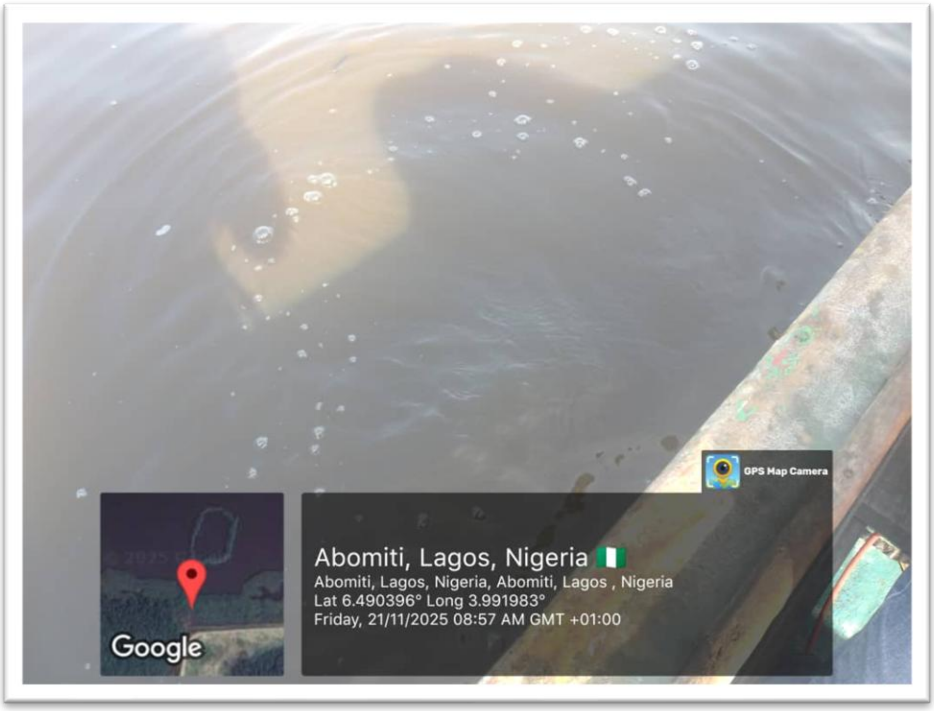


Plate 0.8: Phytoplankton Sampling

Quantitative phytoplankton enumeration was performed using the sedimentation method described by Utermöhl (1958). Subsamples were allowed to settle in counting chambers for a minimum of 24 hours before microscopic examination.

Phytoplankton identification and counting were carried out using an inverted light microscope at magnifications of ×100 to ×400. Organisms were identified to the lowest practicable taxonomic level (usually genus or species) using standard taxonomic keys and regional floras. Cell counts were converted to cells per millilitre (cells/mL) to allow comparison across stations and seasons.

4.4.7.1.2 Results of Phytoplankton

The results of the baseline phytoplankton community in the sampled Lot 2 water bodies are shown in Table 4.18. A total of eight (8) species belonging to three (3) families are identified, with *Gonatozygon monotaenium* showing the highest abundance among the identified species.

Table 0.18: Phytoplankton Analysis of the Study Site

Phytoplankton Class	SW-L2-01	SW-L2-02	SW-L2-C
Bacillariophyceae (cells per mL)			
Achnanthidium exiguum	16	16	32
Aulacoseira sp.	16	160	-
Navicula sp.	-	16	16
Chlorophyceae (cells per mL)			
Cladophora sp.	16	320	-

Closterium lineatum	-	16	-
Gonatozygon aculeatum	16	480	16
Gonatozygon monotaenium	32	800	16
Cyanophyceae (trichomes per mL)			
Aphanizomenon sp.	16	16	16

The presence of *Gonatozygon*, *Cladophora*, *Aphanizomenon*, and *Achnanthidium* provides specific indicators about the water body's environmental conditions, particularly regarding nutrient levels (eutrophication), water flow, and potential for harmful toxins. *Gonatozygon* is a genus of green algae often found in moderately nutrient-rich, slightly acidic lakes and ponds. Its presence can be an indicator of acidic pH within an aquatic ecosystem. *Cladophora* is known to grow exceptionally well in nutrient-rich waters, especially those with high levels of phosphorus, and its excessive growth (blooms) indicates potential pollution from sources like agricultural runoff or failing septic systems. Decaying mats of *Cladophora* can harbour human bacterial pathogens like *E. coli* and *Salmonella*, posing health risks at beaches and recreational areas. *Aphanizomenon* is known to form dense and potentially toxic blooms, often in nutrient-rich lakes and ponds, especially under warm, calm weather conditions. Species of *Aphanizomenon* can produce potent cyanotoxins, including nerve toxins (anatoxin-a, saxitoxin) and liver toxins (cylindrospermopsin), which pose serious risks to aquatic life, livestock, and human health. It has the ability to fix atmospheric nitrogen, allowing it to thrive and dominate in waters where inorganic nitrogen is a limiting nutrient for other algae. *Achnanthidium* is a cosmopolitan genus of diatoms commonly found attached to substrates in flowing waters (periphytic assemblages). Its presence is associated with moving, well-oxygenated water, often in rapids or the wave zones of lakes, as they can take advantage of the rapid replenishment of nutrients in such environments.

In summary, the coexistence of these genera is suggestive of a complex ecosystem with potentially variable conditions, likely experiencing nutrient enrichment (eutrophication), specific hydrological conditions (attached *Cladophora* and *Achnanthidium* in moving water), and the potential for harmful cyanobacterial blooms if conditions favour *Aphanizomenon* proliferation. This combination often points to a water body with higher than usual levels of phosphorus, and under some degree of environmental stress, potentially from agricultural run-off.

4.4.7.2 Benthic Macroinvertebrates

The sediment portions designated for macrobenthic identification (see section 4.3.8.1) on sediment sampling methodology) were rinsed through a 0.5 mm mesh sieve using ambient water to separate benthic organisms from sediment particles. The retained organisms were carefully sorted in the field and preserved in appropriate fixatives for further laboratory analysis. Organisms from both replicate grabs at each chainage were processed identically.

The baseline findings indicate moderate species diversity, with dominance of pollution-tolerant taxa, such as Chironomidae, Tubificidae, and Nematoda. Sensitive taxa, such as Ephemeroptera and Trichoptera, were present in low numbers, indicating partial ecological integrity.

Construction activities near water crossings will require strict sediment control measures to avoid degrading aquatic habitats (IFC PS6).

4.4.7.3 Fish Fauna

A. Sampling Procedure

The assessment of fish fauna relied on the sampling and observation of catches from artisanal fisherfolk operating within the study area. A total of 125 specimens were collected from fishers utilising a variety of gear, including cast nets, seine nets, gill nets, traps, and hook-and-line sets. Specimens were immediately preserved in plastic coolers with ice and transported to the laboratory for analysis. Species identification was performed using standard taxonomic keys by Olaosebikan and Raji (1998) and FAO (1992). Biometric data, including standard length (±0.01cm) of each fish was taken from the tip of the snout (mouth closed) to the caudal peduncle, while body weight (±0.01g) was measured using a top-loading Metler balance (Kumolu-Johnson and Ndimele, 2010).

B. Growth and Population Parameters

To understand the life history and sustainability of the fish stocks, growth parameters were estimated from length-frequency data using the ELEFAN I (Electronic Length Frequency Analysis) tool within the FiSAT II software package (Gayanilo *et al.*, 1996).

The relationship between length and age was modelled using the Von Bertalanffy Growth Function (VBGF):

$$\mathrm{L_t} = \mathrm{L_\infty}\left(1 - \mathrm{e}^{-\mathrm{K(t-t0)}}\right) \rightarrow \boldsymbol{Equation\ (Eq)1}$$

Where:

- $L_t = Length\ of\ the\ fish\ at\ time\ t$
- $\mathrm{L_\infty} =$ The asymptotic length of the fish in cm
- $K = The\ growth\ coefficient\ (Rate\ at\ which\ the\ Lt\ approaches\ L\infty)$
- $t_0 = Theoretical\ age\ at\ length\ zero$

The Growth Performance Index ($\boldsymbol{\Phi'}$) was calculated using the L_∞ and K values according to the equation by Pauly & Munro (1984), as follows:

$$\Phi' = \log_{10} K + 2\log_{10} L_\infty \rightarrow \boldsymbol{Eq\ 2}$$

The age of the fish at zero length was obtained using Pauly's (1979) equation:

$$\log_{10}(-t_{0)} = -0.392 - 0.275\log_{10} L_\infty - 1.038\log_{10} K \rightarrow \boldsymbol{Eq\ 3}$$

While the potential longevity, $tmax$, was estimated using Pauly's (1980) formula:

$$t_{max} = \frac{3}{K} \rightarrow \boldsymbol{Eq\ 4}$$

C. Mortality and Exploitation Rates

The total mortality coefficient, Z was estimated from Beverton and Holt's Z-equation (Sparre and Venema, 1998):

$$Z = K * \frac{L_\infty - \bar{L}}{\bar{L} - L'} \rightarrow \boldsymbol{Eq\ 5}$$

Where:

- $\bar{L} = Mean\ length\ of\ fish,$
- $L' =$ $length\ for\ which\ all\ fish\ of\ that\ length\ and\ longer\ are\ under\ full\ exploitation.$ It is the lower limit of the class interval of lengths from which point full exploitation is presumed.

Natural mortality rate M was estimated using the empirical equation of Pauly (1980):

$$Log_{10}M = 0.654 \log_{10} K - 0.28 \log_{10} L_\infty + \log_{10} T * 0.4634 - 0.0066 \rightarrow \boldsymbol{Eq\ 6}$$

K and $L\infty$ are the parameters of the von Bertalanffy growth model, and T is the mean annual temperature of the study site.

4.4.7.3.1 Results Analysis of the Population Dynamics of *Synodontis ocellifer*

A. K Scan result is shown in Figure 4.13.

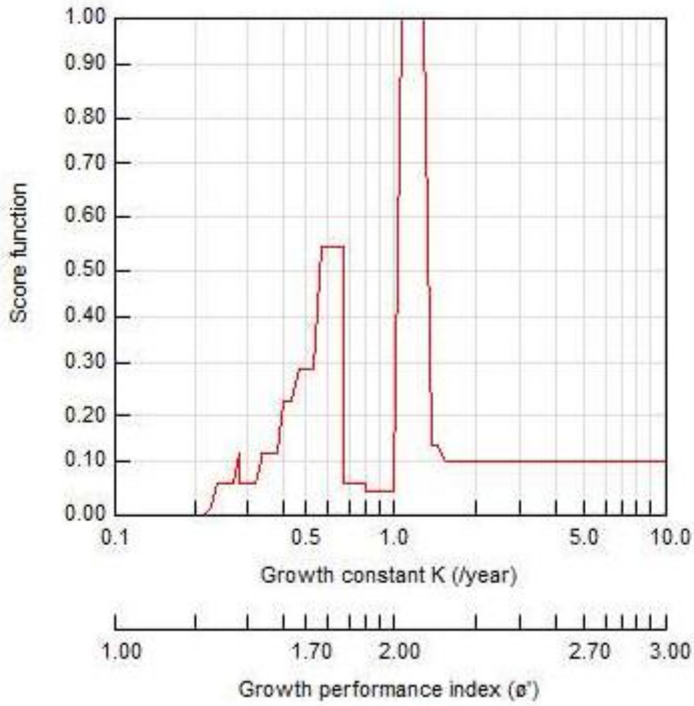


Figure 0.13: Length-Converted Catch Curve of Synodontis ocellifer

B. The Length at infinity (L∞) = 11.03 cm with growth coefficient (K) = 1.1 yr^{-1} (Figure 4.14)

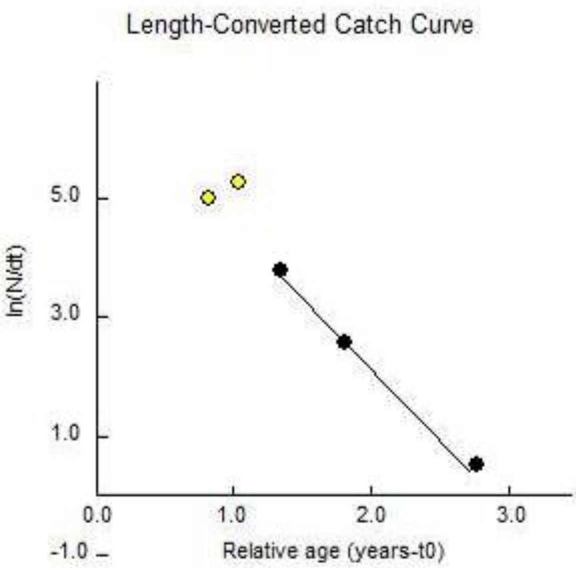


Figure 0.14: Length-Converted Catch Curve of Synodontis ocellifer.

C. Total mortality (Z) = 2.28 yr^{-1}; Natural mortality (M) = 2.43 yr^{-1}; Fishing mortality (F) = 1.15 yr^{-}1; Exploitation Rate = 0.50 (Figure 4.15)

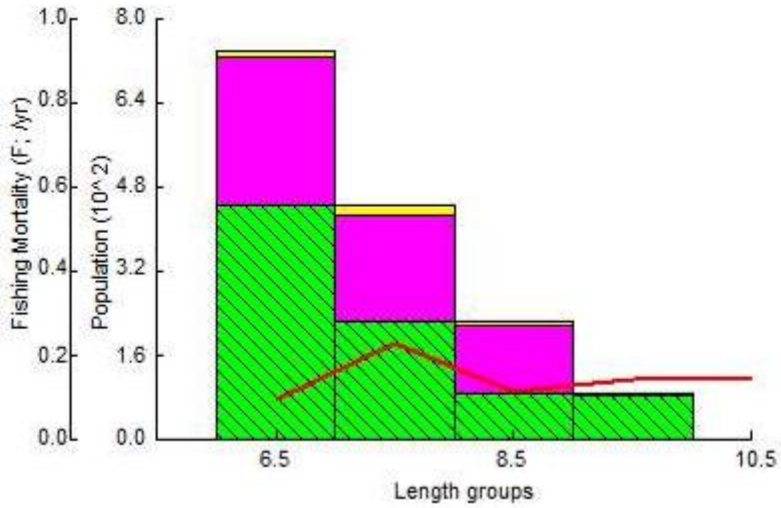


Figure 0.15: Length Structured Virtual Population Analysis of *S. ocellifer*

D. Growth Parameters (ELEFAN)

1. Interpretation

- The small L∞ indicates a small-bodied, short-lived species, typical of tropical coastal or estuarine fishes (Figure 1).
- A high K value (1.1) suggests rapid growth and early maturation, meaning the species can replenish relatively quickly if mortality pressures are not excessive.
- Such species are generally productive but highly sensitive to increased mortality, especially from fishing or habitat disturbance.

2. Relevance

- Fast growth alone does not imply resilience if mortality exceeds sustainable thresholds.
- The stock's life history suggests moderate recovery potential, but only under controlled exploitation.

3. Mortality Estimates

- The estimated natural mortality is very high, consistent with (Figure 4.14):
    - Small body size
    - Tropical temperature regime
    - Short lifespan
- High M is expected for such species, but it leaves little ecological buffer for additional anthropogenic mortality.

3. Length-Structured VPA

- E = 0.50 is widely used as a biological reference point, indicating that fishing mortality equals natural mortality.
- This level is commonly interpreted as fully exploited, not underexploited.
- For small, fast-growing species, E ≥ 0.5 is often considered biologically risky, especially under environmental stress.

4. Stock Status Synthesis

Table 4.19 shows the combined indicators for assessing stock status.

Table 0.19: Indicators for Stock Status Synthesis

Indicator	Assessment
Growth	Fast-growing, short-lived
Natural mortality	Very high
Fishing pressure	Moderate to high
Exploitation level	At the upper sustainable limit
Resilience	Moderate
Risk under added stress	High

D. Conclusion Statement

The fish stock assessed using length-based methods exhibits rapid growth and high natural mortality, characteristic of small tropical species. Exploitation rates indicate that the stock is currently fully exploited (E ≈ 0.5) (Figure 4.15), suggesting limited capacity to absorb additional mortality. Consequently, any project-related increase in fishing pressure, habitat disturbance, or recruitment impairment may result in significant negative impacts on stock sustainability unless effective mitigation and management measures are implemented.

4.4.7.3.2 Analysis of the Population Dynamics of *Nematalosa japonica*

A. K Scan (Figure 4.16)

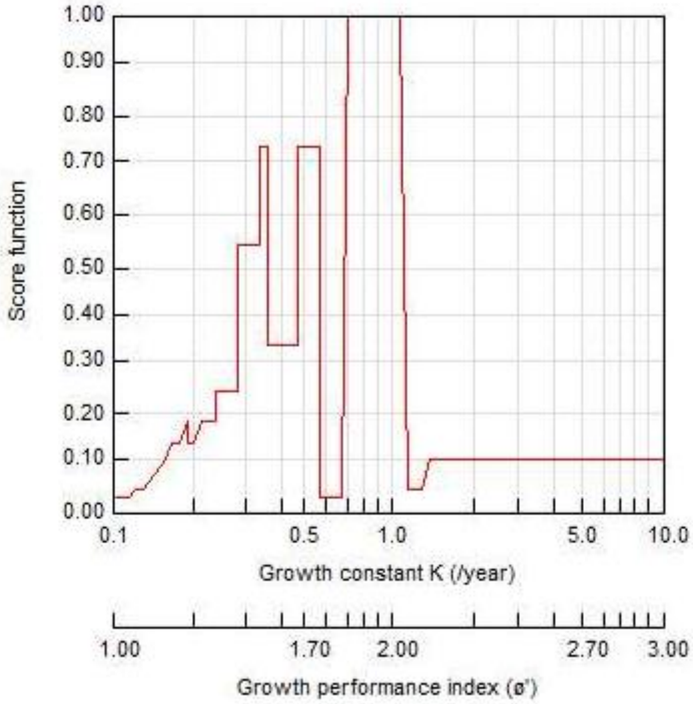


Figure 0.16: K Scan of *Nematalosa japonica*

B. L∞ = 10.5 cm; K = 0.7 yr^{-1}

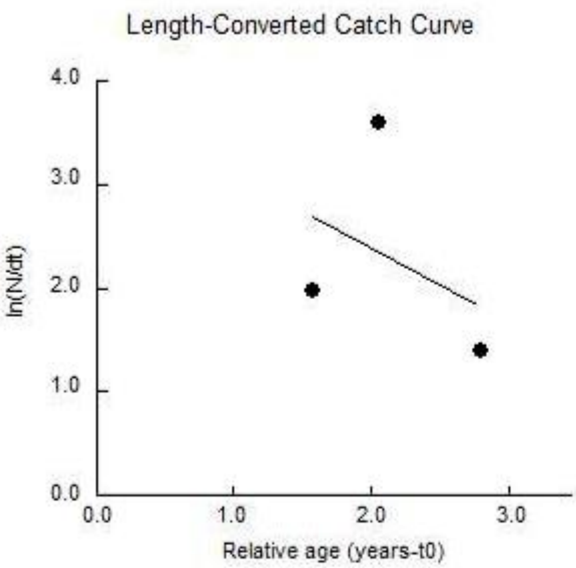


Figure 0.17: Length-Converted Catch Curve of *N. japonica*

C. Z = 0.69 yr^{-1}; M = 1.83 yr^{-1}; F = -1.14 yr^{-1}; E = -1.65 (Figure 4.18)

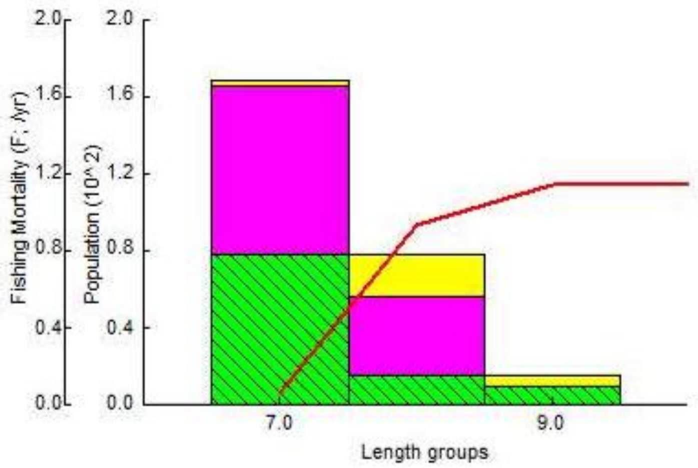


Figure 0.18: Length Structured Virtual Population Analysis of *N. japonica*

D. Growth Parameters

The von Bertalanffy Growth Function (VBGF) parameters estimated for *Nematalosa japonica* indicate an asymptotic length ($L\infty$) of 10.5 cm and a growth coefficient (K) of 0.7 yr^{-1} (Figure 4.16). These values suggest that *N. japonica* is a small-sized, fast-growing species, reaching its maximum size relatively quickly. A high K value is characteristic of short-lived pelagic fishes and indicates rapid turnover of individuals within the population.

Such growth traits are typical of clupeiform fishes and imply that the species can respond quickly to favourable environmental conditions, but may also be sensitive to sustained environmental stressors, as population replacement depends on continuous recruitment success.

E. Mortality and Exploitation

The length-converted catch curve analysis produced the following estimates (Figure 4.17):

The estimated natural mortality (M) exceeds total mortality (Z), resulting in a negative fishing mortality (F) and a negative exploitation rate (E). From a biological and fisheries perspective, negative values of F and E are not realistic and indicate that fishing pressure on the stock is negligible or absent.

This outcome suggests that:

- The sampled population is largely unaffected by fishing activities, or
- The catch data are insufficient to accurately capture fishing impacts, particularly for small, low-value, or non-target species.

High natural mortality is consistent with the species' small body size and fast growth, implying that population dynamics are primarily controlled by environmental and ecological factors rather than anthropogenic exploitation.

F. Stock Structure and Survivorship

The length-structured Virtual Population Analysis (VPA) shows a progressive decline in abundance with increasing length classes, reflecting normal survivorship patterns for short-lived pelagic fishes (Figure 4.18). The dominance of smaller size classes indicates continuous recruitment and a population structure typical of species with high natural mortality.

The absence of strong fishing mortality signals across length classes further supports the conclusion that *N. japonica* is not subjected to significant harvesting pressure within the study area. Mortality appears to be primarily driven by natural causes such as predation and environmental variability.

G. Implications for Environmental Impact Assessment

The population parameters collectively indicate that *N. japonica* is a resilient, fast-growing species with high natural turnover and minimal fishing exploitation. As such:

- The species is unlikely to be significantly impacted by current fishing activities.
- Potential environmental impacts (e.g., habitat modification, water quality changes, or coastal development) could influence the population mainly by affecting recruitment success and early life stages, rather than adult survivorship.
- From an EIA perspective, *N. japonica* can be considered a low-risk species in terms of overexploitation, but may serve as a useful indicator of environmental health due to its sensitivity to habitat and productivity changes.

4.4.7.3.3 Analysis of the Population Dynamics of *Chrysichthys nigrodigitatus*

A. K Scan (Figure 4.19)

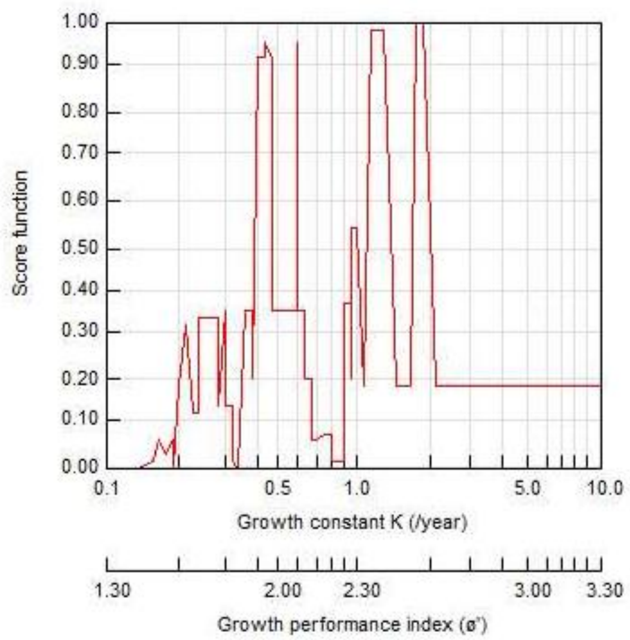


Figure 0.19: K Scan of *C. nigrodigitatus*

B. L∞ = 14.7 cm; K= 1.8 yr^{-1} (Figure 20)

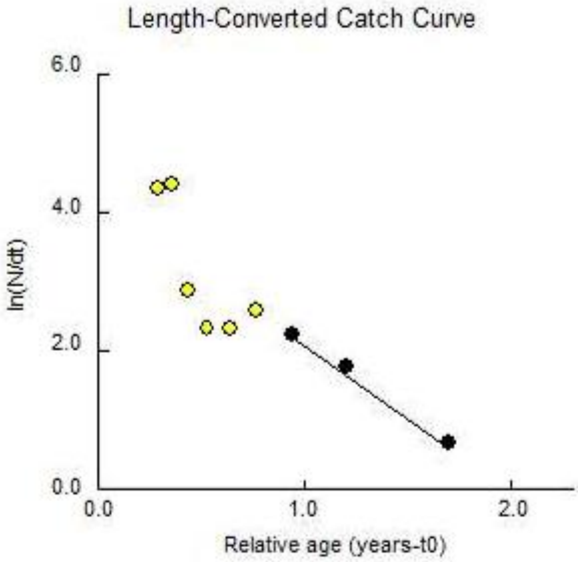


Figure 0.20: Length-Converted Catch Curve of *C. nigrodigitatus*

C. Z = 2.1 yr^{-1}; M = 3.09 yr^{-1}; F = -0.99 yr^{-1}; E = -0.471 (Figure 4.21)

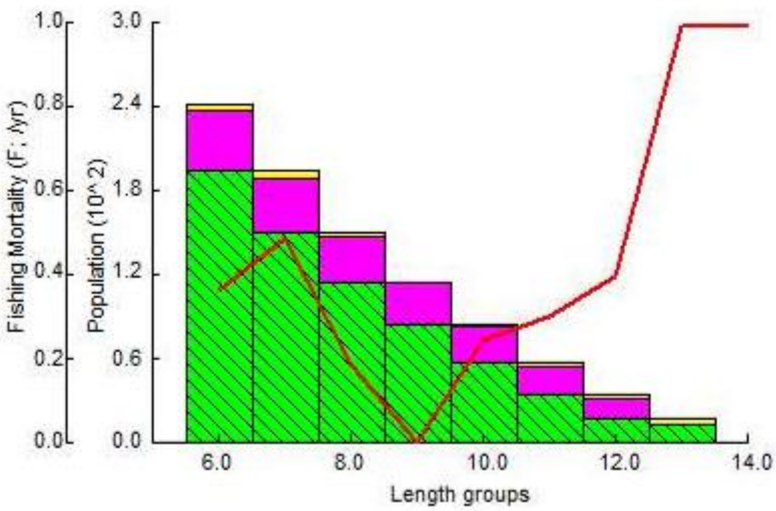


Figure 0.21: Length Structured Virtual Population Analysis of *C. nigrodigitatus*

D. Result Discussion

The von Bertalanffy growth parameters estimated for *C. nigrodigitatus* indicate an asymptotic length (L∞) of 14.7 cm and a growth coefficient (K) of 1.8 yr^{-1} (Figure 4.19). The relatively low L∞ suggests that the population is dominated by small-sized individuals, which may reflect either species-specific growth characteristics or environmental constraints such as limited food availability, habitat degradation, or high mortality rates.

The high K value indicates rapid growth and early attainment of maximum size, a trait commonly associated with short-lived, fast-growing fish species. In an environmental impact context, such growth dynamics imply that the species may be moderately resilient to disturbance; however, this resilience is contingent upon stable recruitment and suitable habitat conditions. Any alteration to nursery habitats or water quality could significantly disrupt early life stages, thereby affecting population sustainability.

Length-Converted Catch Curve Analysis

The length-converted catch curve produced the mortality estimates stated above (Figure 4.20):

The estimate of natural mortality exceeding total mortality ($M > Z$) results in negative fishing mortality and exploitation rate, which are biologically unrealistic. This outcome strongly suggests that fishing pressure on the stock is negligible or absent and that the observed population structure is primarily shaped by natural causes such as predation, environmental stressors, disease, or sampling bias.

In the context of an EIA, this finding is significant as it indicates that anthropogenic fishing activities are not currently a major driver of population decline. However, the high natural mortality may reflect environmental instability, poor habitat quality, or episodic stress events. Any proposed development that increases turbidity, pollution, or habitat fragmentation could exacerbate natural mortality and lead to rapid population decline.

Length-Structured Virtual Population Analysis (VPA)

The length-structured VPA illustrates the distribution of stock abundance and fishing mortality across different size classes (Figure 4.21). The results show a progressive decline in abundance with increasing length, indicating high mortality at early life stages and limited survival into larger size classes. This pattern is consistent with a population characterised by fast growth and high natural mortality.

Fishing mortality across length classes appears minimal or absent, corroborating the negative F values derived from the catch curve analysis. Consequently, population dynamics are likely regulated by environmental conditions rather than exploitation pressure. From an impact assessment perspective, this highlights the importance of maintaining environmental integrity, particularly in shallow or nearshore habitats that serve as feeding and nursery grounds.

Implications for Environmental Impact Assessment

Overall, the population of *C. nigrodigitatus* in the study area appears to be:

- Fast-growing and short-lived
- Minimally exploited by fisheries
- Highly influenced by natural and environmental mortality factors.

Any proposed project within the aquatic environment should therefore prioritise:

- Protection of nursery and feeding habitats

- Control of sedimentation, effluents, and chemical discharges
- Maintenance of water quality parameters (e.g., dissolved oxygen, temperature, and turbidity)

Failure to mitigate these impacts could disproportionately affect recruitment and survival, given the species' reliance on rapid growth and continuous replenishment of the stock.

4.4.7.3.4 Metal Accumulation Results

Heavy Metals

Heavy metal concentrations in fish and crabs indicate generally low levels consistent with background environmental conditions. Essential metals, including copper (Cu), iron (Fe), and manganese (Mn), zinc (Zn), were present at concentrations typical of natural aquatic systems, while potentially toxic metals, such as arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), and nickel (Ni) occurred at low concentrations, particularly in edible muscle tissues. Gill tissues consistently recorded higher concentrations than muscle tissues, reflecting direct interaction with the water column and suspended particulates. Measured concentrations were within applicable international food safety guideline values. Localised elevations of chromium in Nematalosa japonica gills and lead in Synodontis ocellifer gills were observed; these values remain below recognised safety thresholds and are consistent with environmental exposure pathways.

Organic Compounds (Pesticides and Petroleum Hydrocarbons)

Organochlorine and organophosphorus pesticides were either not detected or occurred at very low concentrations (Appendix 4). Trace residues of selected legacy organochlorines and commonly used organophosphates were detected sporadically, primarily in gill tissues and benthic organisms, consistent with waterborne exposure rather than trophic magnification within edible tissues. Measured concentrations were below applicable international maximum residue limits for food safety.

In contrast, total petroleum hydrocarbons (TPH) were more consistently detected across species. Aliphatic hydrocarbons constituted the dominant fraction, consistent with diffuse or chronic hydrocarbon inputs typical of lagoonal systems influenced by anthropogenic activity. Elevated TPH concentrations in certain fish muscle tissues and in crabs indicate both dietary uptake and environmental exposure pathways. Overall, organic contaminant levels reflect existing background inputs within the aquatic system, with petroleum hydrocarbons representing the most consistently detected contaminant group under baseline conditions.

4.5 Socioeconomic Environment

This socioeconomic study provides a comprehensive description of the prevailing social, economic, and health conditions within the Project Area of Influence (AoI) prior to project implementation. The assessment establishes the baseline conditions against which potential project-related impacts are evaluated in subsequent sections of this ESIA. The study was undertaken in accordance with the EIA Procedural Guidelines and aligned with international best practice, including relevant IFC Performance Standards on social risk and impact assessment.

4.5.1 Objectives of the Study

The specific objectives of the socioeconomic baseline assessment were to:

- Identify all neighbouring communities within the project's AoI;
- Document the prevailing socioeconomic and health characteristics of households and communities;
- Gather empirical information on infrastructure, social services, and economic activities;
- Characterise patterns of land use, livelihoods, and access to natural resources relevant to the project corridor;
- Integrate socioeconomic and health considerations into project planning and decision-making.

The baseline information obtained from this study provides the evidentiary basis for evaluating potential positive and negative impacts and for informing the design of mitigation, enhancement, and stakeholder engagement measures.

4.5.2 Approach and Methodology

Socioeconomic studies were carried out following the processes described below.

a) Pre-Engagement with Community Leaders

Introductory visits were conducted to inform community leaders about the project, clarify expectations, and obtain stakeholder support for fieldwork activities.

b) Desk Review

This involved reviewing relevant secondary information, including:

- Previous EIA/ESIA report (LCCH Section 2 and Lot 7th Axial Road)
- Community maps and administrative frameworks
- Socioeconomic and demographic data
- Literature on local livelihoods and settlement characteristics

c) Development of Data Collection Framework

A detailed framework was developed to guide field data collection. Tools included:

- Observation checklist
- In-depth interview guide
- Focus group discussion (FGD) guide
- Semi-structured interview (SSI) checklist
- Community ranking tools
- Validated household questionnaire
- Photographic documentation sheets

d) Data Collection Methods

Formal Methods:

- Administration of structured household questionnaires
- Random or systematic sampling procedures
- Use of descriptive statistics to analyse quantitative data (percentages, charts, graphs)

Informal Methods (Participatory Rural Appraisal [PR]):

- Direct observation of community conditions, facilities, livelihoods, and behaviours
- Semi-structured interviews with key informants (youth leaders, women leaders, community development association (CDA) executives, teachers, traditional rulers, etc.)
- Group interviews and FGDs with various stakeholder categories (men, women, youth, vulnerable groups)
- Transect walks, seasonal calendars, community mapping (optional depending on project)

Sampling Method

A multistage sampling technique was adopted for the socioeconomic and stakeholder survey to ensure adequate representation of communities and households likely to be affected by the proposed 7th Axial Road Project Lot 2. In the first stage, the project area of influence (AoI) was delineated based on the proposed road alignment and ancillary facilities. Communities located within this corridor, including Iraye-Odo, Imokun, Odo-Egiri. Eregbe, Odogbonle, Ayedare, Eredo areas, were purposively selected due to their proximity to the project and likelihood of direct and indirect impacts.

In the second stage, purposive sampling was used to identify key stakeholders and households with potential exposure to land acquisition, displacement, livelihood disruption, or environmental impacts. This approach was considered appropriate given the linear nature of the road project and the need to reach respondents with direct project relevance. Finally, at the household level, respondents were selected using convenience sampling, taking into account availability, willingness to participate, and knowledge of local socioeconomic conditions. This combined sampling approach ensured that the survey captured both quantitative household-level data and qualitative insights from stakeholders such as community leaders, farmers, traders, and vulnerable groups.

Sample Size Determination

The sample size for the household survey was determined using Yamane's (1967) sample size formula, which is widely applied in socioeconomic and environmental studies where the population size is known or can be reasonably estimated. The formula is expressed as:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = required sample size

N = estimated population size of the study area

e = level of precision (sampling error), set at 5% (0.05)

Based on the estimated population figures obtained from community leaders and secondary sources, the formula was applied to determine the minimum required sample size of 120. However, due to time constraints, accessibility challenges, and the predominantly qualitative nature of stakeholder engagement, a total of 103 respondents were successfully surveyed. While modest, this sample size was considered adequate for identifying key socioeconomic trends, livelihood patterns, and community perceptions relevant to the ESIA process, consistent with similar infrastructure-based ESIA studies. The use of complementary data collection methods, including Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs), further strengthened the robustness and credibility of the findings.

Inclusion Criteria

Respondents included in the socioeconomic survey were adults aged 18 years and above who had resided in the project-affected communities for a minimum of one year prior to the survey. Only households and individuals whose land, housing, livelihoods, or daily activities were likely to be directly or indirectly affected by the proposed road construction were considered eligible. Stakeholders such as farmers, traders, artisans, community leaders, women, and youth were deliberately included to ensure the representation of diverse socioeconomic groups within the study area. In addition, individuals who demonstrated knowledge of community land use, settlement patterns, and livelihood activities were prioritised, as their inputs were essential for meaningful ESIA analysis and impact prediction.

Exclusion Criteria

Individuals who were below 18 years of age, temporary visitors, or residents who had lived in the community for less than one year were excluded from the survey. Households located outside the defined project area of influence, with no foreseeable interaction or exposure to the proposed road alignment, were also excluded. Furthermore, respondents who were unwilling to provide informed consent or whose responses were incomplete were not included in the final data analysis.

e) Quality of Life Indicators

Assessing the quality of life (QoL) within the project's Area of Influence (AoI) provides insights into the existing socioeconomic conditions of communities that may experience direct or indirect impacts from the construction and operation of the Lagos 7th Axial Road (Lekki Port Access Road) Lot 2. Quality of life indicators help identify existing vulnerabilities, measure development deficits, and provide a baseline for predicting, evaluating, and managing social impacts. The key indicators assessed include income and expenditure, education levels, housing conditions, employment and occupation, access to utilities and social services, and health status.

4.5.3 Area of Influence Socioeconomic Characteristic

4.5.3.1 Administrative Jurisdictions (LGA/LCDA/Wards)

The proposed road alignment for Lot 2 is located in Eredo LCDA. The affected settlements are distributed across multiple wards within these jurisdictions, each with distinct administrative, traditional, and community governance structures. These administrative units play a critical role in land administration, community mobilisation, stakeholder engagement, and conflict resolution. Coordination with LGA and LCDA authorities, traditional institutions, and community development associations is therefore essential for effective project implementation, particularly in relation to land acquisition, resettlement planning, traffic management, and grievance redress.

4.5.3.2 Demographic Profile

The Lot 2 Area AoI has an estimated population of approximately 15,000 individuals. The age distribution is heavily skewed towards youth, with around 55% of residents under the age of 25, indicating a young population profile that may influence labour availability, education demand, and social services. Household sizes average 5-7 persons, consistent with regional norms. The gender composition is slightly female-biased, with 52% of the population female and 48% male. Household sizes typically range between four and six persons, reflecting extended or nuclear family structures common in the region.

4.5.3.3 Livelihoods and Economic Activities

Livelihood vulnerability is moderate, with high dependence on natural resources and informal economic activities (IFC PS5). The local population engages in a range of livelihood activities, with agriculture serving as the primary source of income for approximately 45% of households. Petty trading supports around 25% of households, while fishing and transportation services each contribute roughly 10% to household livelihoods. Women are disproportionately represented in petty trading and other informal labour, highlighting the need for gender-sensitive mitigation measures. Overall, this livelihood profile demonstrates reliance on both land- and water-based activities, as well as informal commerce, for household sustenance.

Income levels are generally low, with an estimated 60% of households earning less than ₦50,000 per month. This economic profile underscores the sensitivity of local populations to disruptions, particularly from construction activities that may affect land access, market connectivity, or water resources.

Vulnerable groups within the AoI include women-headed households, constituting approximately 18% of households, elderly residents (about 8%), and unemployed youth, representing roughly 30% of the working-age population. These groups are considered particularly susceptible to economic shocks and social displacement, and their needs will inform livelihood restoration and community engagement measures.

4.5.3.4 Land Tenure and Use

Land within the Lot 2 Area of Influence (AoI) is held under a mix of tenure arrangements. Approximately 60% of land is under customary tenure, managed according to traditional community rules and family ownership structures. Statutory land rights account for around 25%, reflecting formally surveyed and government-registered plots, while the remaining 15% of land is informally occupied or held without formal documentation.

Land use is dominated by crop farming, which supports the livelihoods of smallholder and subsistence farmers. Residential settlements are dispersed along the corridor, often adjacent to farmed plots and local trading nodes. Commercial activities, including petty trading and roadside commerce, occupy key access points along the corridor. Undeveloped or fallow plots remain scattered throughout the area, offering potential for future development or infrastructure expansion.

4.5.3.5 Infrastructure and Services

Access to potable water is predominantly through boreholes, serving approximately 65% of households. Shallow wells provide water for around 20% of residents, while the remaining 15% obtain water from vendors. This mixed water supply system highlights both the reliance on communal sources and potential vulnerabilities in water quality and reliability.

With regard to sanitation facilities, about 40% of households use pit latrines, while formal sewerage infrastructure covers less than 10% of the population. The limited sewerage network, combined with widespread pit latrine use, presents challenges for hygiene management and environmental health.

Healthcare services in the AoI are provided through three primary health centres, which cater to local communities. More complex medical cases are referred to Epe General Hospital, the nearest secondary-level facility. Although primary care is reasonably accessible, gaps remain in specialised services, emergency response, and maternal and child health coverage.

Educational infrastructure comprises five primary schools and two secondary schools within the corridor. Access to tertiary education remains limited, with most students required to travel outside the AoI for higher-level education opportunities. The current facilities indicate reasonable coverage at the basic level but highlight a need for enhanced resources and capacity to meet the growing population's demands.

4.5.3.6 Community Health and Safety

Community health within the Lot 2 Area of Influence (AoI) is reflects environmental conditions, access to services, and infrastructure. The primary health risks identified include malaria, respiratory infections, and waterborne diseases, reflecting local climatic conditions, household water sources, and sanitation practices. Baseline respiratory risks may be elevated due to existing $PM_{2.5}$ exceedances.

Road safety is an additional concern along the existing corridor. Records indicate 12 traffic accidents in 2025, with contributing factors including speeding, limited traffic signage, and inadequate pedestrian facilities. These conditions highlight the need for targeted interventions in road design, traffic management, and community awareness to reduce accident risks and improve overall public health outcomes.

4.5.3.7 Cultural Heritage and Community Concerns

IFC Performance Standard 8 (Cultural Heritage) requires the identification f cultural heritage assets within the project's AoI, including tangible and intangible cultural heritage as well as unique natural features. Tangible cultural heritage includes movable or immovable objects, sites, or structures of archaeological, historical, or religious significance, while intangible heritage includes traditional practices and oral traditions.

Tangible Cultural Heritage

Preliminary surveys, field assessments and community consultations along the Lot 2 corridor identified a limited number of tangible cultural heritage features. Cultural heritage mapping identified sites near Odo Noforija and Iraye, requiring implementation of a Chance Finds Procedure (IFC PS8). These include two shrines and one historic burial ground, all located outside the currently defined right-of-way (RoW). However, no gazetted or formally recognised heritage sites were observed within the project footprint. Nevertheless, the proximity of these features to the corridor warrants careful consideration during detailed design and construction planning to avoid inadvertent impacts.

Intangible Cultural Heritage

Communities along the corridor maintain a rich array of oral traditions and seasonal festivals, which form an important part of social and cultural identity. These practices may be sensitive to changes in access, local land use, or construction activities that alter the immediate environment.

Chance Finds Protocol

In accordance with IFC PS 8, a Chance Finds Procedure will be implemented during construction. This protocol will ensure that any previously unidentified archaeological or culturally significant materials encountered during project activities are reported, assessed, and managed in consultation with relevant local authorities and traditional leaders.

4.5.4 Questionnaire Survey Findings of Project Affected Communities

Data on socioeconomic characteristics of projected affected communities (PACs) was generated through household surveys, stakeholder consultations, focus group discussions, and key informant interviews, providing a foundation for understanding population structure, vulnerability, and potential project-induced changes. The data is particularly important for anticipating the scale and distribution of social impacts, including land acquisition, livelihood disruption, service demand, and resettlement implications.

4.5.4.1 Demographic Profile of Project Affected Communities

4.5.4.1.1 Sex Distribution

The gender distribution of the sampled communities is nearly even, which strengthens the representativeness of the sample with 44% and 56% for males and females, respectively (Figure 4.22). This balance suggests that both men and women are active participants in community life and were adequately represented during the survey. The slightly higher female representation is consistent with field observations in peri-urban households, where women tend to be more available for public consultation, particularly during the work week.

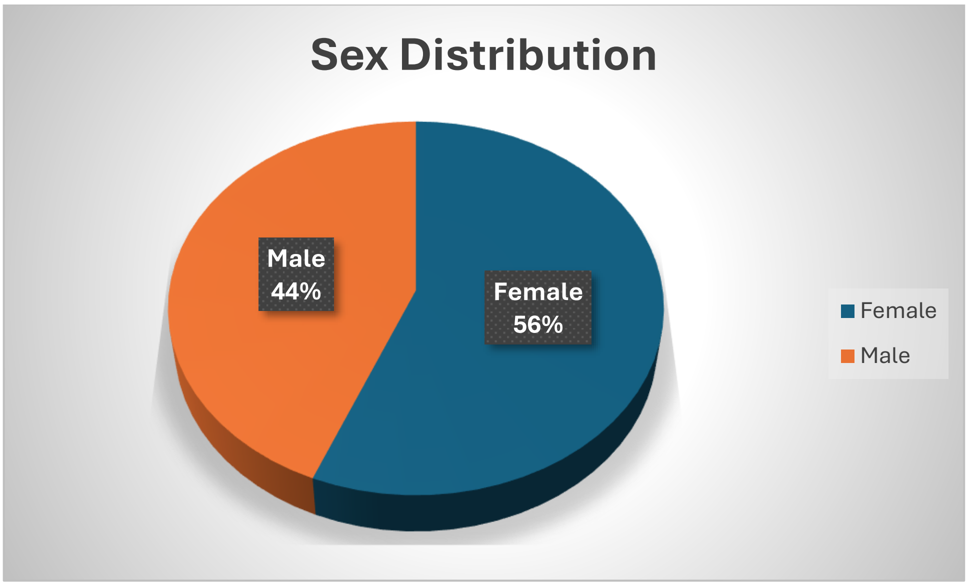


Figure 0.22: Respondents' Gender Distribution

Communities with populations below 2,000 persons dominate the dataset, accounting for 86.0% of the sampled population categories. Within these smaller communities, males constitute 51.4% and females 48.6%, indicating a slight male dominance. This pattern is typical of rural and peri-urban settlements, where men are more visible in community representation and in livelihood activities such as farming, fishing, and artisanal work.

In the 2,001-10,000 and >250,000 population categories, representation is entirely female (100%). Although these categories are represented by a very small number of observations, this pattern may reflect higher female availability for household-level surveys in larger or more urbanised settlements, where men are more likely to be engaged in off-site employment during survey periods.

Communities within the 10,001-50,000 and 50,001-250,000 population ranges show a perfect gender balance (50% male, 50% female). These settlement sizes are characteristic of peri-urban communities experiencing moderate growth, in-migration, and diversified livelihood structures. The balanced gender representation suggests relatively stable household structures and supports the reliability of the demographic data for impact assessment purposes.

Overall, the gender distribution across population categories indicates that women form a slightly higher proportion of the population within the Lot 2 AoI, underscoring the importance of gender-sensitive impact mitigation measures. Given women's strong involvement in household welfare, informal trade, and caregiving roles, project-related impacts, particularly those linked to land acquisition, livelihood disruption, health, and safety, may have differentiated effects along gender lines. These findings reinforce the need for inclusive consultation, targeted livelihood support, and gender-responsive mitigation measures within the ESIA, RAP, and ESMP frameworks.

Table 4.20 shows the gender distribution among the respondents by their communities.

Table 0.20: Gender distribution by community population size

Population Size Category	Male (No.)	Female (No.)	Total (No.)	Male (%)	Female (%)
< 2,000	19	18	37	51.4	48.6
2,001 - 10,000	0	1	1	0.0	100.0
10,001 - 50,000	1	1	2	50.0	50.0
50,001 - 250,000	1	1	2	50.0	50.0
> 250,000	0	1	1	0.0	100.0
Total	21	22	43	48.8	51.2

4.5.4.1.2 Marital Status

The predominance of married respondents (81.3%) indicates strong family-based household structures (Table 4.21). Widowed and divorced respondents (7.5% combined) may represent vulnerable groups, particularly in the context of displacement or livelihood loss.

Table 0.21: Marital Status

Marital Status	Frequency	Percentage (%)
Married	65	81.3
Single	9	11.3
Widowed	4	5.0
Divorced	2	2.5
Total	80	100.0

4.5.4.1.3 Number of Children Per Household

More than 85% of households have children, with nearly 39% having four or more children and 46.3% having less than 3 children (Table 4.22). This indicates moderate to high dependency ratios, increasing sensitivity to income disruption and displacement impacts.

Table 0.22: Number of children per household

Category	Frequency	Percentage (%)
None	12	15.0
< 3	37	46.3
4 - 6	25	31.3
7 - 10	6	7.5
Total	80	100.0

4.5.4.1.4 Household Size

Households of 4-6 persons dominate (47.5%), followed by <3, reflecting extended family living arrangements typical of peri-urban and rural Yoruba communities (Figure 4.23). Larger households may face greater challenges during resettlement or housing disruption.

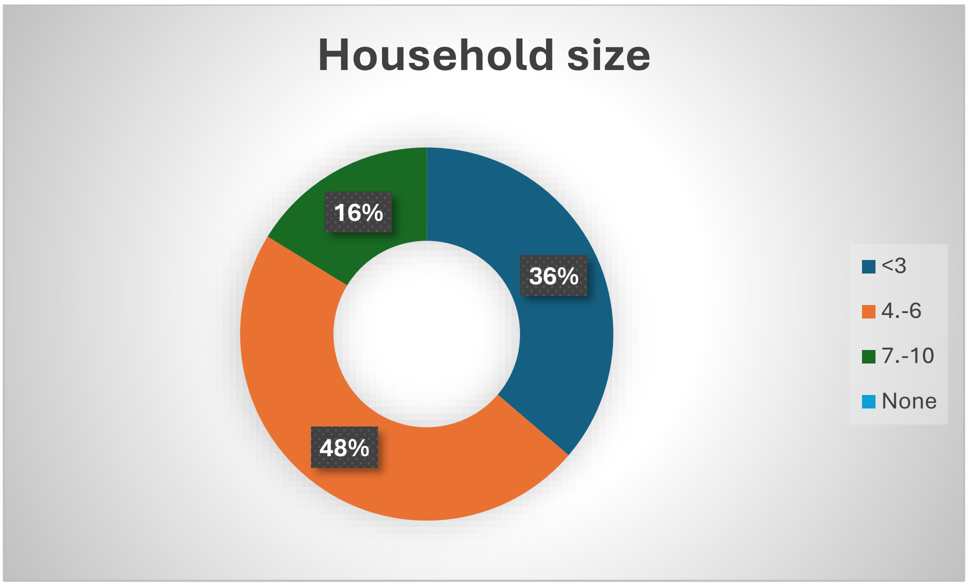


Figure 0.23: Average Household Size Among Respondents

4.5.4.1.5 Length of stay in the community

Figure 4.24 shows that more than 51% of respondents have lived in their communities for over 10 years, 27.1% and 24.3% of the respondents have stayed in the community for 11-20 years and above 21 years, respectively. Indicating strong place attachment and social cohesion. Long-term residents are likely to be more affected by land acquisition and displacement.

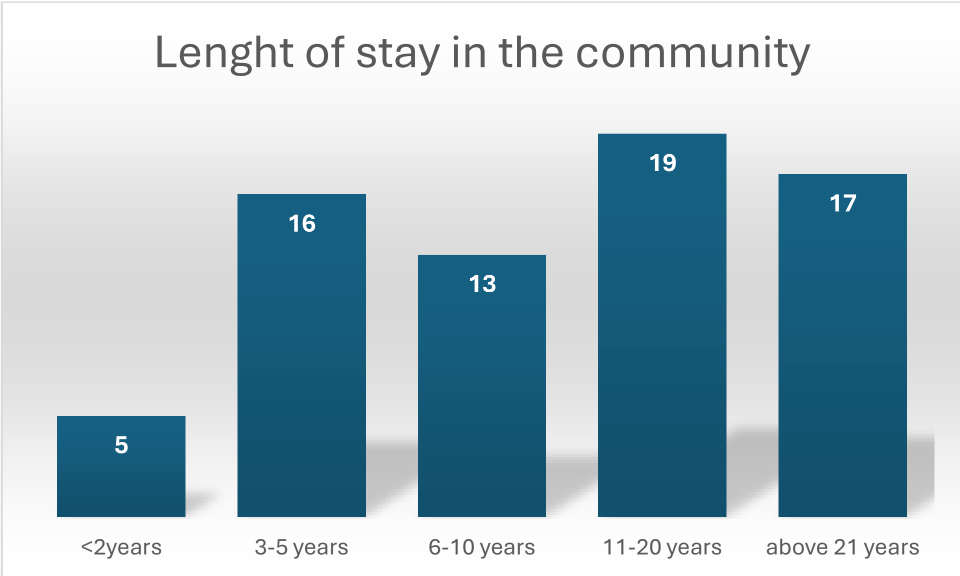


Figure 0.24: Respondents' Length of Stay in Project Communities

4.5.4.1.6 Education level of Respondents

Educational attainment within the Lot 2 AoI is relatively moderate to high, with 63.8% of respondents having at least secondary education (Figure 4.25). This suggests a generally literate population with potential capacity to engage in skilled or semi-skilled employment opportunities associated with the project. However, the presence of respondents with no formal education (10.0%) highlights the need for inclusive communication strategies and livelihood interventions that do not rely solely on formal educational qualifications.

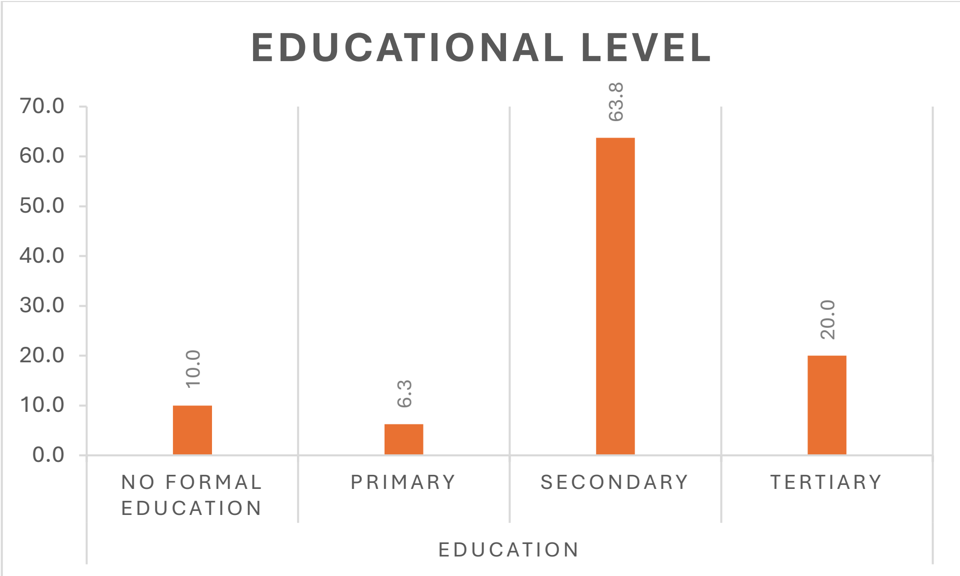


Figure 0.25: Educational Attainment Among Respondents in Project Communities

4.5.4.1.7 Highest Level of Education in Households

Most households (83.8%) have at least a secondary education among members (Table 4.23). Specifically,62.5% of households have at least secondary education, and 16.3% have HND/BSc, suggesting moderate human capital that could be leveraged for project-related employment and skills training.

Table 0.23: Highest Household Education Attainment

Level	Frequency	Percentage (%)
None	7	8.8
Primary	6	7.5
Secondary	50	62.5
OND/NCE	4	5.0
HND/BSc	13	16.3
Total	80	100.0

4.5.4.1.38 Religion

Religious affiliation is almost evenly split between Christianity and Islam, reflecting cultural diversity and coexistence within the Lot 2 AoI (Figure 4.26). This balance necessitates religiously sensitive engagement strategies, particularly when scheduling consultations and implementing community-based interventions.

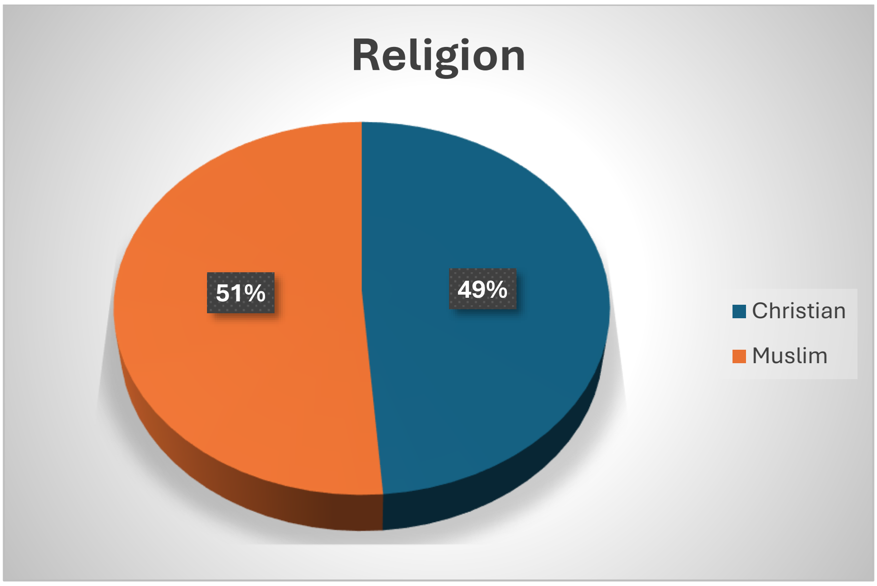


Figure 0.26: Respondents' Religious Affiliation

4.5.4.2 Settlement Patterns and Housing Structures

4.5.4.2.1 Settlement Structure

The settlement pattern within the Lot 2 Area of Influence (AoI) of the proposed Lagos 7th Axial Road reflects a linear, corridor-based development structure, strongly influenced by the Lekki-Epe expressway, existing access roads, coastal geography, and ongoing industrial and infrastructure expansion. Settlements are distributed along the proposed alignment in a manner that combines traditional rural communities, peri-urban growth settlements, and emerging urban nodes, resulting in a heterogeneous settlement landscape.

Settlements within the Lot 2 AoI are predominantly elongated and ribbon-like, following major transport routes and waterways. This linear pattern is most evident in communities located close to existing roads and junctions, where residential buildings, small-scale commercial activities, and community facilities are concentrated along road corridors. In contrast, settlements located farther from major access routes exhibit dispersed and clustered patterns, typical of agrarian and fishing communities.

The AoI includes settlements that are:

- Roadside-oriented, with housing, shops, and workshops fronting existing roads
- Clustered inland settlements, organised around family compounds and community centres
- Coastal and lagoon-side settlements, oriented towards fishing and water-based livelihoods
- Type of accommodations

Housing within the Lot 2 Area of Influence is overwhelmingly characterised by bungalow-type structures, accounting for 91.3% of surveyed households (Figure 4.27). This pattern is typical of peri-urban and semi-rural settlements along the Lekki-Epe corridor, where horizontal land development is more common than vertical construction. The low proportion of rented rooms (3.8%) and storey buildings (2.5%) suggests limited high-density housing and relatively stable residential tenure. However, the dominance of single-storey buildings may increase exposure to construction-related vibration and dust impacts, particularly for structures located close to the proposed road alignment.

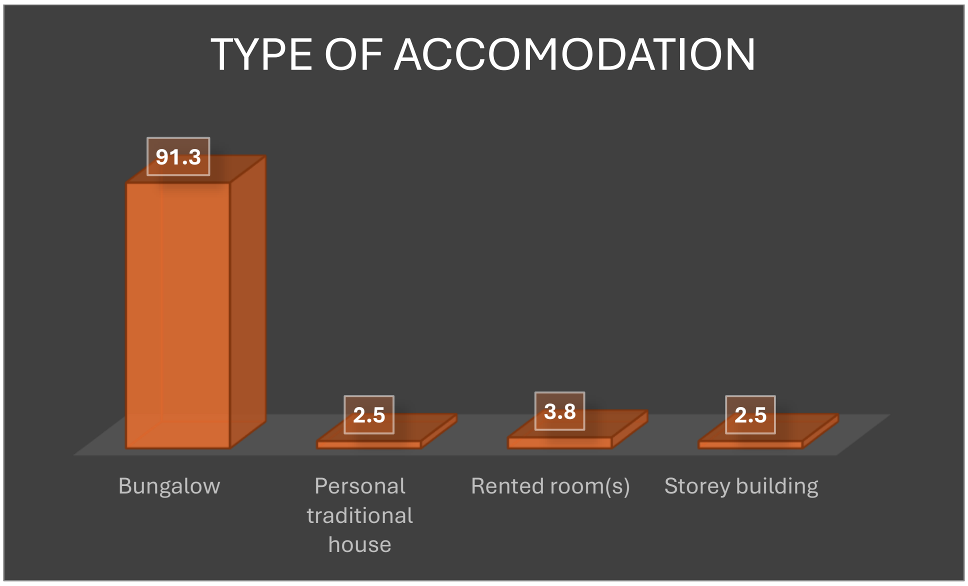


Figure 0.27: Accommodation Types Among Respondents

4.5.4.2.2 Materials Used for Wall Construction

The majority of residential buildings within the Lot 2 AoI are constructed with cement blocks (Figure 4.28), either plastered or unplastered, representing 92.6% of all surveyed houses. This indicates a generally moderate level of housing quality and structural durability. Nevertheless, 21.3% of houses remain unplastered, and 7.6% are constructed with mud blocks or plywood, reflecting pockets of lower-quality housing that may be more vulnerable to construction-induced vibration, cracking, and environmental stressors. These housing conditions warrant careful monitoring and the implementation of vibration control measures during construction.

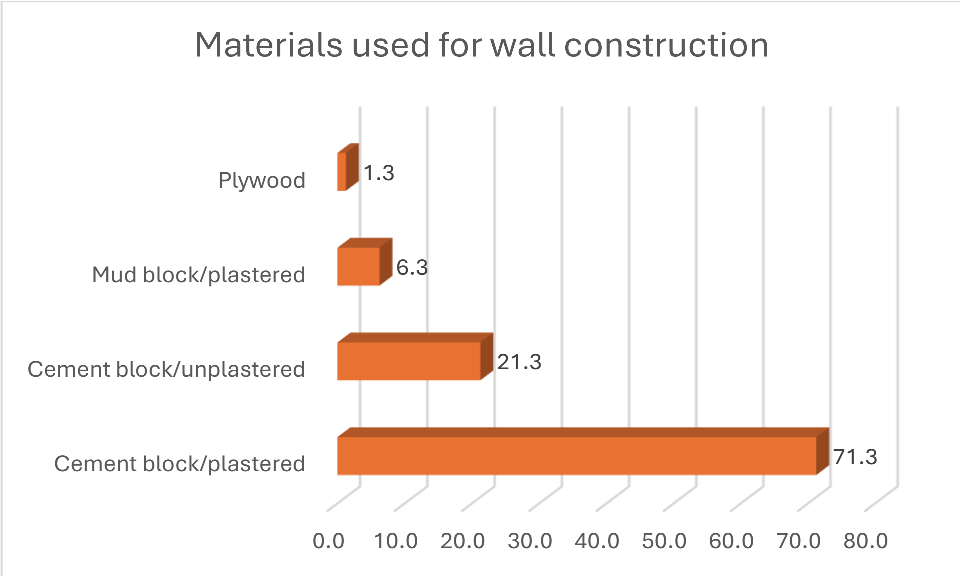


Figure 0.28: Wall Construction Material Types

4.5.4.2.3 Type of Roofing Material

Asbestos roofing is predominant within the Lot 2 AoI, accounting for 55.0% of surveyed households, followed by aluminium roofing (41.3%) (Figure 4.29). The widespread presence of asbestos roofing presents a notable environmental and public health concern, particularly during road construction activities that may generate vibrations or require demolition of affected structures. Disturbance of asbestos materials could release hazardous fibres, posing respiratory health risks. This finding highlights the need for strict construction controls, awareness measures, and safe handling procedures where asbestos-roofed buildings are affected.

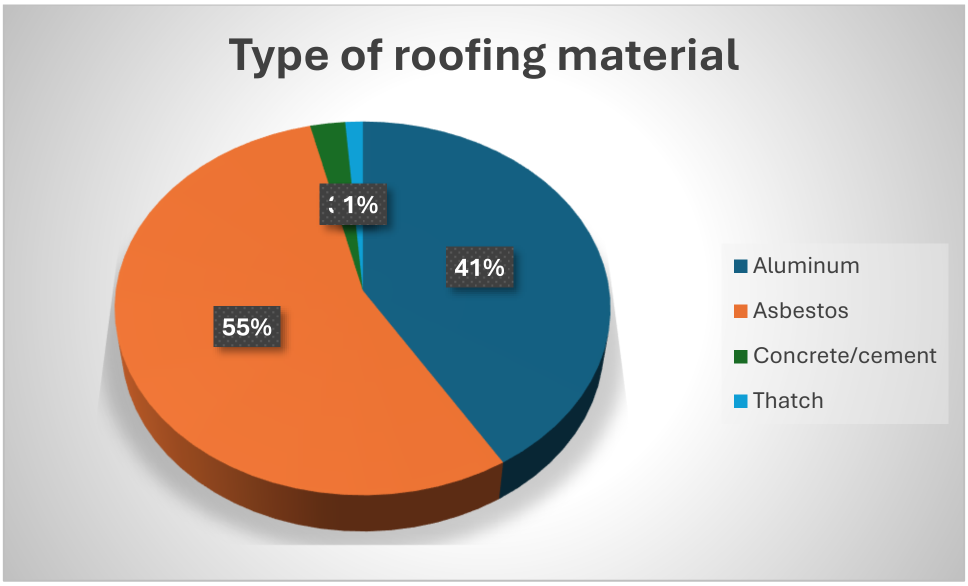


Figure 0.29: Roofing Material Types Among Respondents' Houes

4.5.4.2.4 Type of floor finish

Figure 4.30 shows that floor finishes within the Lot 2 AoI are generally of moderate quality, with ceramic tiles (50.0%) and cement finishes (45.0%) dominating. These materials suggest improving living standards and relatively durable housing interiors. However, a small proportion of households (5.0%) still have mud or PVC floor finishes, which may be associated with lower-income households and increased vulnerability to flooding, dampness, and hygiene-related health issues. Such conditions could be exacerbated if construction activities disrupt drainage patterns or access routes.

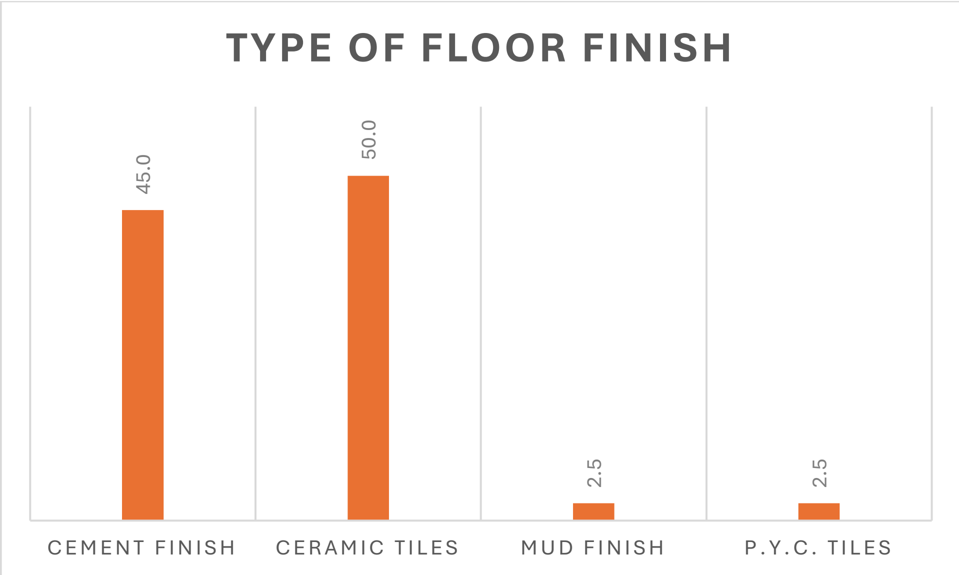


Figure 0.30: Floor Finishing Types Among Respondents' Homes

4.5.4.3 Economic Profile

4.5.4.3. Occupation of respondents

Trading dominates occupational activities, accounting for 47.5% of respondents, followed by artisanship (13.8%) (Figure 4.31). This reflects a strong informal and service-oriented local economy, highly dependent on mobility, roadside access, and market connectivity. Such livelihoods are particularly sensitive to construction-phase disruptions, underscoring the need for trader-friendly mitigation measures and livelihood restoration planning.

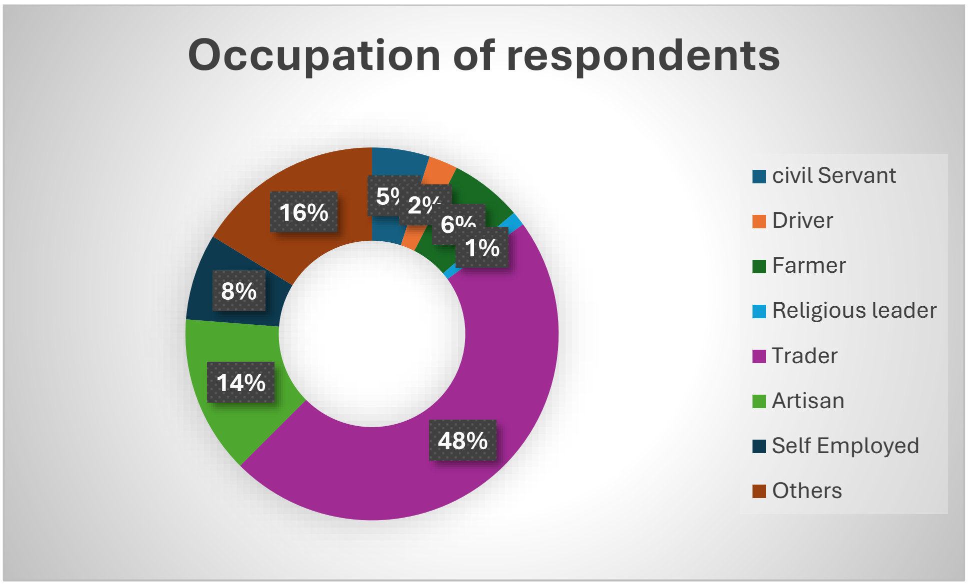


Figure 0.31: Respondents' Primary Occupations

4.5.4.3.2 Primary source of income

Trading constitutes the main income source for 57.5% of households (Table 4.24), confirming the dominance of commerce and small-scale enterprise within the Lot 2 AoI. Wage employment accounts for only 15.0%, indicating limited reliance on stable salaried jobs. The narrow income base increases vulnerability to economic shocks, especially during road construction, when access constraints may temporarily affect trading activities.

Table 0.24: Primary source of income of respondents

Source of Income	Frequency	Percentage (%)
Farming	6	7.5
Trading	46	57.5
Salary/Wage	12	15.0
Other sources	16	20.0
Total	80	100.0

4.5.4.3.3 Average annual income

Figure 4.32 shows that approximately 67.5% of households earn below ₦1,000,000 annually, indicating a predominantly low-income population. This income structure suggests limited resilience to livelihood disruption and highlights the importance of timely compensation, livelihood restoration, and construction-phase economic safeguards.

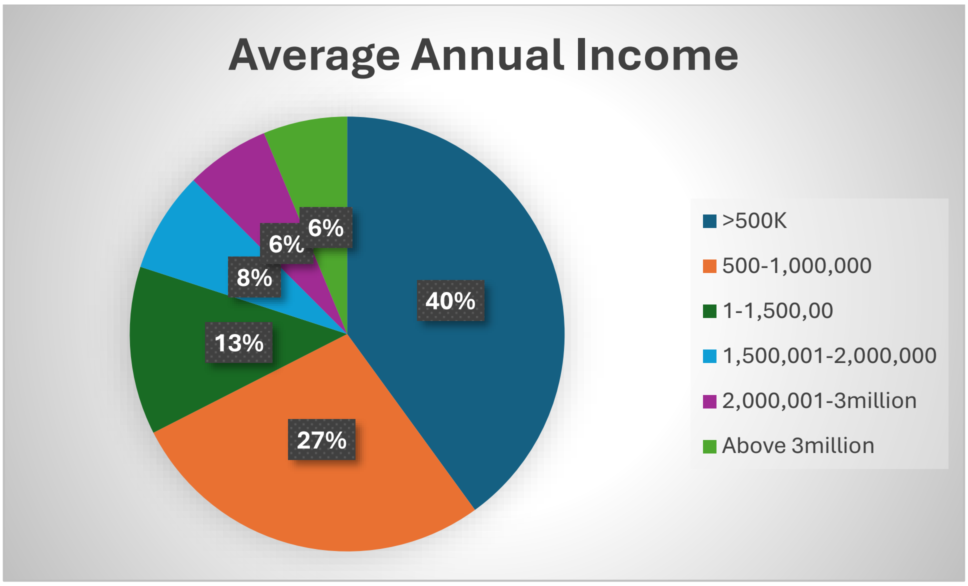


Figure 0.32: Respondents' Average Annual Income

4.5.4.3.4 Vulnerable Groups

Vulnerable groups within project-affected communities are individuals or households that, due to their socioeconomic characteristics, livelihoods, or social status, are less able to cope with or recover from project-induced impacts. Findings from the household surveys and FGDs indicate the presence of several vulnerable categories whose well-being may be disproportionately affected by the proposed road rehabilitation and widening project if adequate safeguards are not implemented.

Women, particularly those engaged in petty trading, farming, and food processing along the road corridor, constitute a major vulnerable group. Although many households reported positive expectations regarding improved access and economic opportunities, FGDs repeatedly emphasised the risk that women could lose trading spaces, farmlands, and informal income sources during construction. Women also expressed concerns about exclusion from decision-making processes, with specific calls for their involvement in project planning and ongoing consultations. Given their central role in household welfare and local economies, disruption to women's livelihoods could have significant knock-on effects on household food security and income stability.

Farmers and fisherfolk were identified as highly vulnerable due to their strong dependence on land and natural resources. Survey results indicate that 84.2% of households rely on farming and fishing as primary sources of income, making them particularly vulnerable to land acquisition, agricultural land degradation, and pollution of fishing grounds. Loss or fragmentation of farmland, reduced access to water bodies, and construction-related pollution could directly undermine livelihoods, particularly for small-scale and subsistence producers with limited alternative income sources. Low-income households and the economically marginalised also face heightened vulnerability. The low proportion of households with alternative income sources (6.3%) suggests limited livelihood diversification and reduced coping capacity in the event of income shocks. For these households, even temporary disruptions during construction may lead to significant economic stress. Without timely compensation, livelihood restoration, or short-term income support, such households risk falling deeper into poverty.

Elderly persons and persons with limited mobility, though less explicitly represented in quantitative data, were indirectly reflected in concerns about safety, access, and displacement. Road construction and increased traffic volumes may heighten accident risk and reduce opportunities for safe crossings, particularly for older adults and individuals with physical impairments. Any relocation or loss of proximity to essential services could further exacerbate their vulnerability.

Children and widows were highlighted during FGDs as groups requiring particular attention. Participants stressed the need for job creation and income-generating opportunities for women and widows, as well as for improved safety measures, such as pedestrian bridges, traffic calming, and adequate lighting, to protect children who will need to cross the expanded roadway to access schools, markets, and social services.

4.5.4.3.5 GBV/SEA/SH Risk Screening

A preliminary GBV/SEA/SH risk screening was conducted through FGDs with women's groups. Key findings include:

- 18% of households are women-headed, indicating potential economic vulnerability
- Women expressed concerns about safety during construction, particularly around worker camps
- Existing informal trading along the corridor exposes women to interaction with transient populations
- No formal GBV/SEA/SH reporting mechanisms currently exist in the project communities

These findings inform the GBV/SEA/SH Action Plan (Section 7.7) and will be updated through quarterly community perception surveys during construction.

4.5.4.4 Educational Access Indicators

4.5.4.4.1 Type of Educational Facilities Present

Primary schools are the most commonly available educational facilities within the Lot 2 AoI (43.5%), while access to secondary (21.7%) and tertiary (8.7%) institutions is limited (Figure 4.33). Notably, 43.5% of communities reported having no educational facility at all, a finding that aligns closely with the low-quality ratings and reasons provided by respondents. The limited presence of secondary and tertiary institutions implies that students in many communities must travel considerable distances to continue their education beyond the primary level. This situation may contribute to early school drop-out rates, increased transportation costs, and reduced educational attainment, particularly among low-income households.

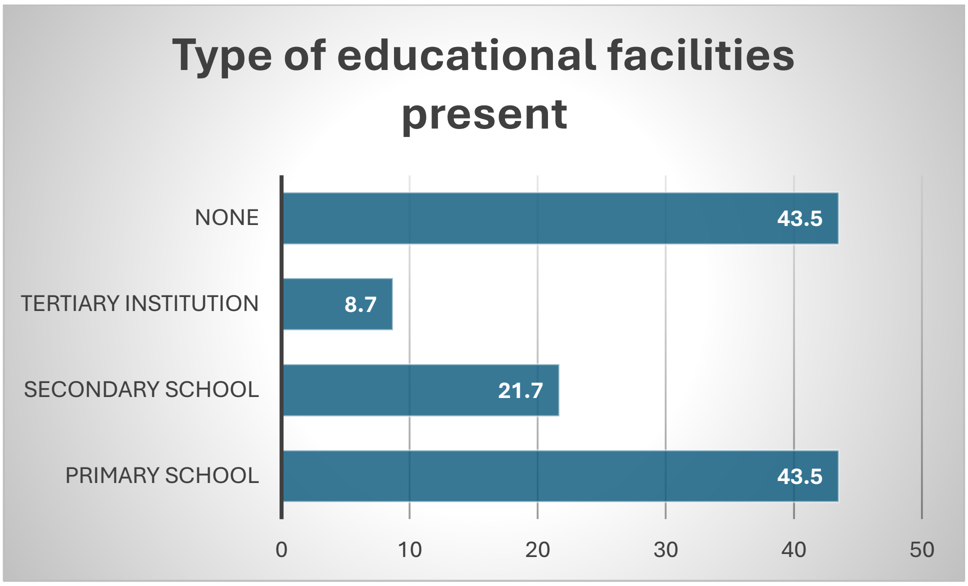


Figure 0.33: Types if Educational Facilities in the Project Area

4.5.4.4.2 Quality of Educational Facilities

The assessment of educational facilities within the Lot 2 Area of Influence reveals a polarised perception of quality. A large proportion of respondents (39.1%) rated educational facilities at the lowest level (score 1), indicating serious dissatisfaction with the availability or quality of education infrastructure (Table 4.25). When combined with ratings of 2 and 4, over 56% of respondents expressed low-to-moderate satisfaction. Conversely, 26.0% of respondents rated educational facilities highly (scores 9-10), suggesting that a subset of communities enjoys relatively good access to schools, likely due to proximity to peri-urban centres or existing public institutions. This disparity highlights the uneven distribution and quality of educational infrastructure across the Lot 2 corridor.

Table 0.25: Respondents' Rating of Educational Facilities (Scale 1-10)

Rating Score	Frequency	Percentage (%)
1	9	39.1
2	2	8.7
4	2	8.7
5	2	8.7
6	1	4.3
7	1	4.3
9	3	13.0
10	3	13.0

The primary reasons for low ratings are largely structural and access-related. Nearly 39.1% of respondents cited the absence of government or public schools, while 13.0% indicated that there is no school at all within their community (Figure 4.34). These responses explain the high proportion of very low ratings recorded. In contrast, respondents who assigned higher scores commonly referenced the proximity of schools (walking distance) and the availability of both primary and secondary education within or near their communities. This further reinforces the finding that educational access in the Lot 2 AoI is highly uneven, with some communities benefiting from nearby facilities while others remain underserved.

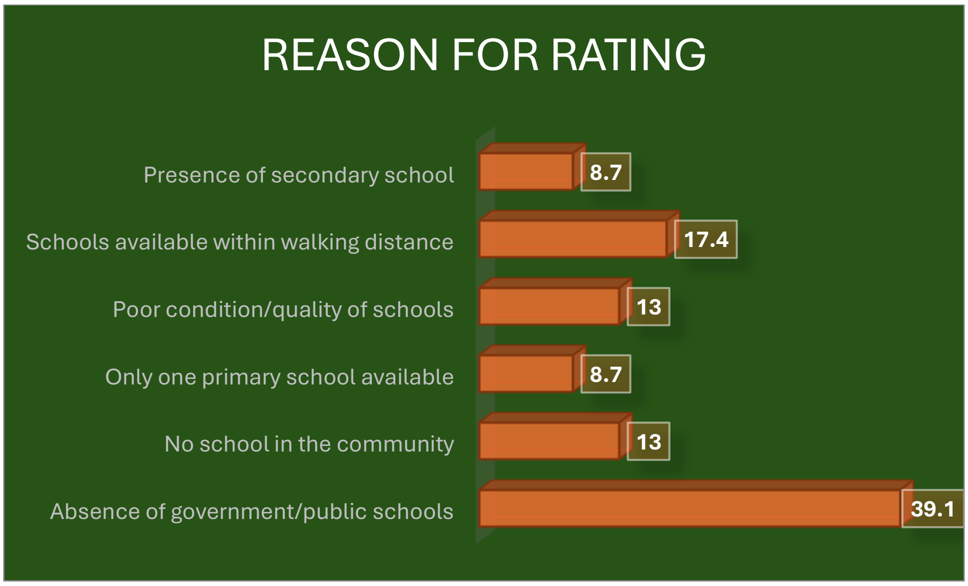


Figure 0.34: Reasons Affecting Respondents' Education Quality Rating

Note: Similar responses were harmonised under common themes for clarity.

4.5.4.5 Accessibility to Water Sources

Perceptions of water supply reliability within the Lot 2 Area of Influence are generally positive, with 56.5% of respondents rating reliability as high (scores 9-10) (Table 4.26). This suggests that a majority of communities have relatively consistent access to water, primarily through self-supply systems such as boreholes. However, 26.1% of respondents assigned low to moderate ratings (scores 3-5), indicating that water access is not uniformly reliable across the AoI. These lower ratings reflect challenges related to distance to water sources, uneven distribution of boreholes, and power-related constraints affecting water pumping.

Table 0.26: Rating of reliability of water supply (Scale 1-10)

Rating Score	Frequency	Percentage (%)	Cumulative (%)
3	3	13.0	13.0
4	1	4.3	17.4
5	2	8.7	26.1
6	1	4.3	30.4
7	1	4.3	34.8
8	2	8.7	43.5
9	6	26.1	69.6
10	7	30.4	100.0
Total	23	100.0	—

Figure 4.35 indicates that the dominant factor influencing high reliability ratings is the availability of boreholes within household compounds, reported by 56.5% of respondents. This underscores the reliance on private and semi-private water infrastructure rather than centralised water supply systems. Conversely, respondents who reported lower reliability cited a lack of power to pump water, the absence of boreholes within their compounds, and longer distances to water sources. These issues highlight underlying vulnerabilities related to energy supply and infrastructure inequality, particularly in less-developed settlements.

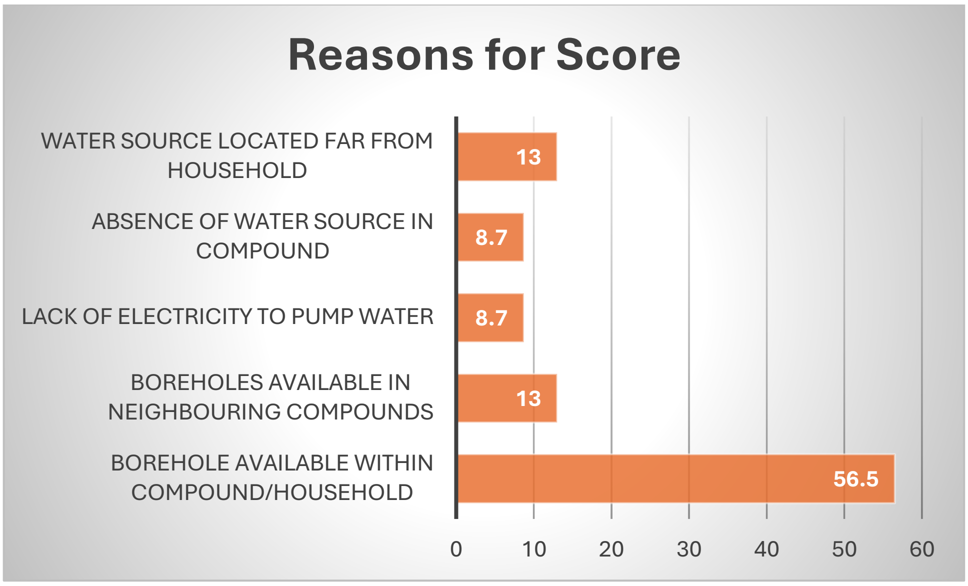


Figure 0.35: Reasons Affecting Respondents' Water Access Scoring

Note: Similar responses were grouped under common themes for analytical clarity.

4.5.4.5.1 Primary source of water supply

Boreholes constitute the primary source of water for 82.6% of respondents (Figure 4.36), confirming heavy dependence on groundwater resources across the Lot 2 AoI. A smaller proportion (13.0%) relies on river water, which raises concerns regarding water quality, seasonal variability, and potential exposure to contamination, particularly during construction activities.

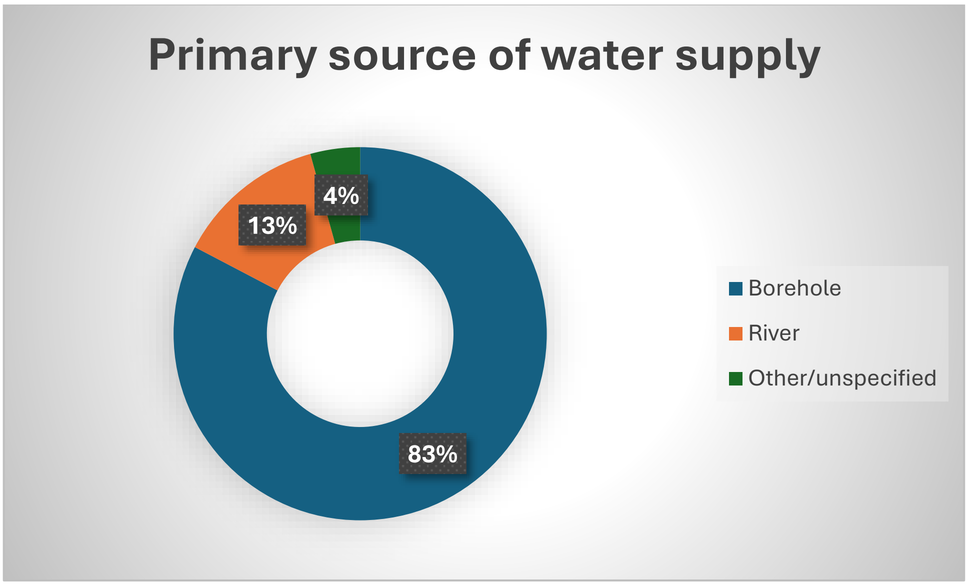


Figure 0.36: Distribution of Respondents' Access to Potable Water

4.5.4.6 Perceived Economic and Social Impact of the Project

This section discusses household socioeconomic responses, validated by the Focus Group Discussions (FGDs) and stakeholder responses on perceived community impacts, written in clear paragraphs, sectionalised, and explicitly linked to the Lagos 7th Axial Road (Lekki Port Access Road) Project.

4.5.4.6.1 Hopes and Expectations of the Project

The aspirations expressed by FGD participants demonstrate strong optimism about the potential developmental benefits of the road project. Each expectation category accounted for 20% of responses, indicating that community hopes are diverse but equally significant. Participants anticipate that the project will result in an improved quality road network, which is expected to enhance mobility, reduce travel time, and improve safety for road users. Others emphasised that the road would act as a catalyst for community development, facilitating interaction between communities, decongesting traffic, and reducing road accidents. Employment opportunities also featured prominently, with participants expressing expectations for job creation, particularly for both skilled and unskilled labour drawn from host communities. In addition, some participants expressed aspirations to be engaged beyond labour, including participation as suppliers or small-scale contractors, and access to construction waste materials for income-generating activities. These expectations reflect local interest in inclusive economic participation and the desire for host communities to derive direct monetary benefits from the project.

4.5.4.6.2 Perceived Impacts of the Project on the Community

Despite optimistic expectations, the FGDs revealed substantial concerns. Each identified concern constituted 20% of responses, indicating widespread anxiety across multiple social dimensions. A significant issue raised was the potential loss of farmlands, which poses direct risks to food security and household income, especially in agrarian communities along the project corridor. Participants also expressed fears about loss of livelihoods and properties, with specific reference to economic hardship following displacement. Concerns regarding flooding resulting from poor drainage design, based on experiences from previous road projects, were also highlighted.

Additionally, participants expressed apprehension about compensation processes, including fears that compensation may not reach actual affected persons or that projects may be abandoned after land and assets have been destroyed. The possibility of household displacement and homelessness was another critical concern, underscoring the social sensitivity of the project corridor.

4.5.4.6.3 Priority Needs in the Event of Project Impacts

When asked about priority support needs if their lives or livelihoods were affected, responses again showed equal weighting across categories, each representing 20%. Key priorities include adequate and timely compensation, livelihood restoration programmes, and relocation assistance. Participants stressed the importance of proper drainage systems to prevent flooding, as well as improved security, solar street lighting, and quality road infrastructure. Others highlighted the need for resettlement support, access to healthcare services, and financial assistance to help affected persons recover economically. Support for replacement farmlands and compensation for agricultural losses was also emphasised, reflecting the rural and peri-urban nature of many affected communities.

4.5.4.6.4 Household perceptions of socioeconomic impacts of the 7th Axial Road Project

From the perception of the household responses, community members anticipate both adverse social-environmental effects during construction and long-term socioeconomic benefits upon project completion. Overall, perceptions reflect cautious optimism, conditioned by concerns related to land acquisition, livelihoods, safety, and environmental disturbance.

Perceived Community-Level Impacts

Findings indicate that loss of land due to acquisition is a universal concern, reported by 100% of respondents, confirming land take as the most significant and unavoidable social impact associated with the Lot 2 alignment. This reflects the linear nature of the road project and the proximity of farmlands and settlements to the proposed corridor. A substantial proportion of respondents (70.0%) also anticipate damage to agricultural land, either independently or in combination with other impacts. This underscores the importance of farming as a key livelihood activity within the Lot 2 Area of Influence and highlights the risk of income loss and food security challenges if land acquisition and construction activities are not carefully managed.

Noise nuisance from construction equipment was identified by 42.5% of respondents (Table 4.27), particularly in communities where residential areas and farmlands are located close to the alignment. This concern is likely to be most pronounced during the construction phase and may affect health, productivity, and general well-being. Cultural interference (11.3%) and pollution of soils and farmlands (6.3%) were less frequently reported but remain important, especially in communities with cultural sites, traditional land-use practices, or reliance on soil quality for farming. Although reported by fewer respondents, these impacts can have disproportionate social and livelihood consequences if not adequately mitigated.

Table 0.27: Community-level impacts associated with the project

Impact Combination Reported	Frequency	Percentage (%)
Loss of land due to land acquisition only	21	26.3
Loss of land + damage to agricultural land	16	20.0
Loss of land + damage to agricultural land + noise nuisance	28	35.0
Loss of land + damage to agricultural land + pollution of soils/farmlands	5	6.3
Loss of land + damage to agricultural land + cultural interference	6	7.5
Loss of land + noise nuisance from working equipment	2	2.5
Loss of land + cultural interference + noise nuisance	1	1.3
Loss of land + damage to agricultural land + cultural interference + noise nuisance	1	1.3
Total	80	100.0

To better understand the severity and prevalence of individual impact types, the responses were further disaggregated into core impact categories (Figure 4.37).

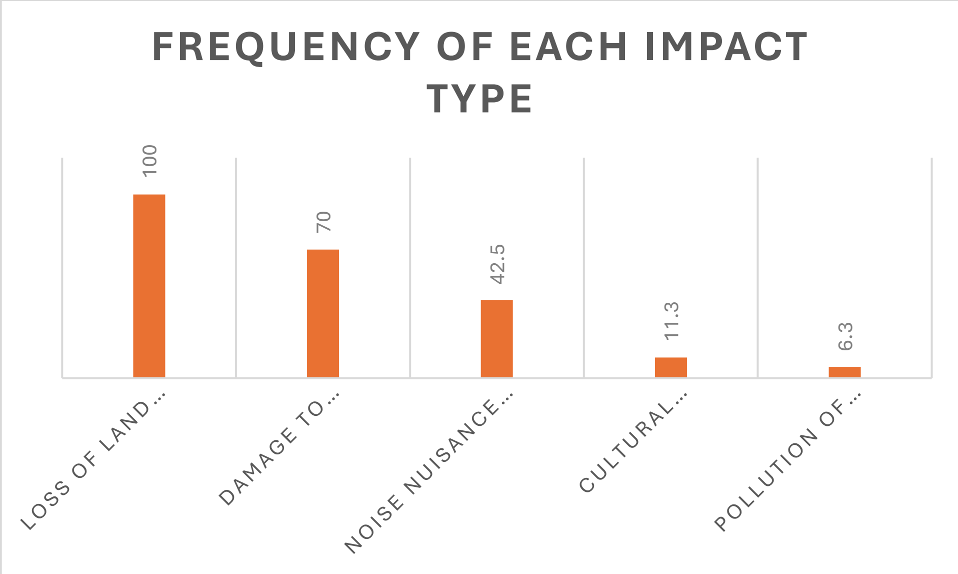


Figure 0.37: Respondents' Identification of the Project's Negative Impact

Overall, the community impact profile for Lot 2 is dominated by land acquisition and agricultural land loss, with secondary concerns relating to construction noise and, to a lesser extent, cultural and environmental disturbances. These findings clearly justify the preparation of a robust Resettlement Action Plan (RAP), targeted livelihood restoration measures, and strict construction-phase environmental controls.

4.5.4.6.5 Perceived Community Impacts of the Project (Lot 2 AoI)

The results indicate that loss of land due to land acquisition is a universal concern, reported by 100% of respondents across project-affected communities in Lot 2. This confirms land take as the most significant and unavoidable impact, reflecting the linear nature of the proposed road alignment and its interaction with existing settlements and farmlands. A substantial proportion of respondents (70.0%) anticipate damage to agricultural land, underscoring the importance of farming as a primary livelihood activity within the Lot 2 Area of Influence. This finding highlights a high risk of livelihood disruption, reduced agricultural productivity, and income loss, particularly for households dependent on subsistence and small-scale farming.

Noise nuisance from working equipment was identified by 40.0% of respondents, indicating widespread concern about construction-phase disturbances (Table 4.28). Such noise impacts are likely to affect residential comfort, health, and daily activities, especially in communities located close to the road corridor. Cultural interference was reported by 10.0% of respondents, suggesting the presence of culturally sensitive practices, sites, or social activities that may be affected by land acquisition or construction activities. Although reported by a smaller proportion of respondents, cultural impacts can be highly sensitive and require careful management. Only 6.3% of respondents identified pollution of soils and farmlands as a concern, while no respondents (0%) reported anticipated pollution of fishing grounds. This suggests that fishing activities are either limited within the Lot 2 AoI or are perceived to be less directly affected by the proposed road alignment.

Table 0.28: Community Impacts Identified by Respondents (Multiple Responses)

Impact Type	Frequency	Percentage (%)
Loss of land due to land acquisition	80	100.0
Damage to agricultural land	56	70.0
Noise nuisance from working equipment	32	40.0
Cultural interference	8	10.0
Pollution of soils and farmlands	5	6.3
Pollution of fishing grounds	0	0.0

Note: Multiple responses were allowed; percentages therefore, do not sum to 100%.

4.5.4.7 Health Impact Assessment of the 7th Axial Road Lot 2

4.5.4.7.1 Perceived Health Impact of Road Construction (Lot 2 AoI)

Perceptions of the health impacts of the proposed road construction within the Lot 2 Area of Influence are largely positive, with 68.8% of respondents expecting improvements in health-related outcomes (Figure 4.38). Positive perceptions are commonly associated with anticipated benefits such as improved access to healthcare facilities, reduced travel time, better emergency response, and enhanced mobility, which can contribute to overall well-being.

However, a notable proportion of respondents (31.3%) anticipate negative health impacts. These concerns are likely linked to construction-phase effects, including increased dust levels, noise exposure, air pollution from construction equipment, traffic-related risks, and potential stress associated with land acquisition and displacement. Such impacts may disproportionately affect vulnerable groups, including children, the elderly, and persons with pre-existing health conditions.

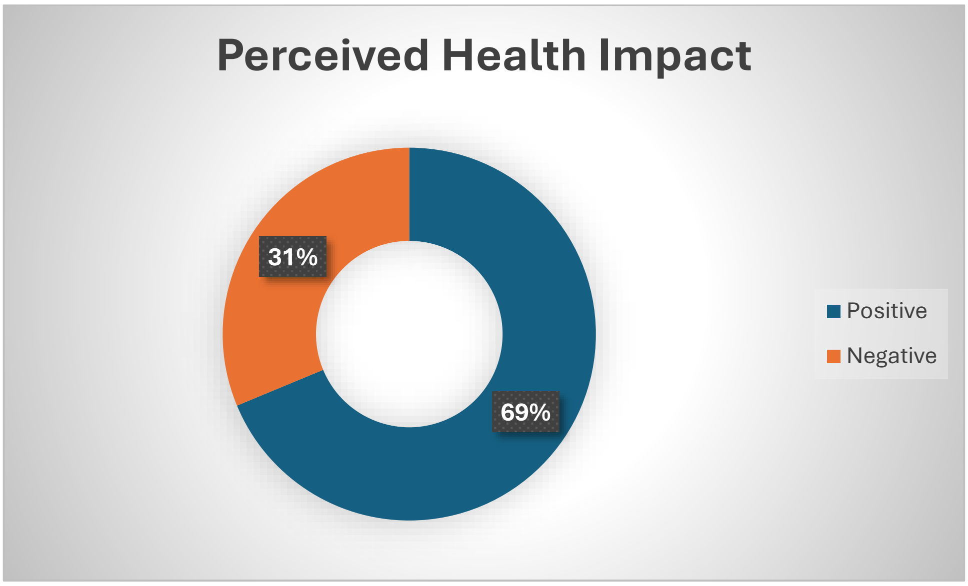


Figure 0.38: Respondent's Perceived Health Impacts of the Project

4.5.4.7.2 Health Risks Associated with Road Construction Activities

Table 4.29 shows that the most commonly identified health risk is increased dust and breathing problems, reported by 87.0% of respondents either alone or in combination with other risks. This reflects widespread concern about air quality deterioration during construction, particularly due to earthworks, vehicle movement, and material handling.

Noise-related stress or sleep disturbance was reported by 60.9% of respondents, highlighting concerns about prolonged exposure to construction noise, which may affect rest, mental well-being, and overall quality of life—especially for children, the elderly, and individuals with existing health conditions. More than half of respondents (52.2%) associated road construction with an increased risk of accidents and injuries, reflecting concerns about construction traffic, heavy equipment movement, and reduced pedestrian safety within communities.

To allow clearer interpretation, the multiple-response combinations reported by respondents were harmonised into core health risk categories.

Table 0.29: Health Risks Associated with Construction Activities (Multiple Responses)

Health Risk Category	Frequency	Percentage (%)
Increased dust and breathing problems	20	87.0
Noise-related stress or sleep disturbance	14	60.9
Increased risk of accidents and injuries	12	52.2

Note: Respondents could select more than one risk; percentages do not sum to 100%.

4.5.4.7.3 Perceived Health Risks Associated with Construction Activities (Lot 2 AoI)

The findings indicate that air quality-related impacts dominate health risk perceptions within the Lot 2 Area of Influence. A very high proportion of respondents (87.0%) associated road construction activities with increased dust and breathing problems, reflecting widespread concern about dust generation from earthworks, vehicle movement, and construction materials. This confirms dust exposure as the most significant perceived health risk during the construction phase. Noise-related stress or sleep disturbance was reported by 60.9% of respondents, indicating concern about prolonged exposure to construction noise and vibrations, particularly in communities located close to the proposed alignment. Such disturbances may affect mental wellbeing, sleep quality, and overall quality of life, especially for children, the elderly, and other vulnerable groups.

Nearly half of the respondents (47.8%) associated construction activities with an increased risk of accidents and injuries. This reflects concerns about heavy equipment movement, construction traffic, reduced pedestrian safety, and increased interaction between vehicles and community members during construction. Notably, no respondents (0%) associated construction activities with the spread of communicable diseases or increased mosquitoes and malaria. This suggests that, within the Lot 2 AoI, communities perceive construction-related health risks as being primarily environmental and safety-related, rather than disease-related.

However, the absence of perceived disease risk does not preclude the need for preventive public health measures, particularly where workforce influx and temporary settlements may occur.

4.5.4.7.4 Summary of Expected Health Impacts (Lot 2 Area of Influence)

This section presents a consolidated summary of the expected health impacts of the proposed Lagos 7th Axial Road (Lot 2) based on household survey responses, community consultations, and perception-based assessments. The summary draws directly from the analysed response tables and reflects both anticipated adverse construction-phase impacts and expected long-term health benefits.

Table 4.30 summarises respondents' perceptions of health impacts of the project, Table 4.31 their perception of the construction phase negative health impacts and Table 4.32 access-related health determinants influenced by the project.

Table 0.30: Summary of Community Perception of Project-Related Health Impacts

Health Impact Indicator	Response Category	Frequency	Percentage (%)
Perceived impact of road construction on health	Positive	55	68.8
	Negative	25	31.3
Household health likely to be affected by construction activities	Yes	18	78.3
	No	3	13.0
	Not sure	2	8.7

Table 0.31: Respondents' Expected Construction-Phase Health Risks

Health Risk	Frequency	Percentage (%)
Increased dust and breathing problems	20	87.0
Noise-related stress or sleep disturbance	14	60.9
Increased risk of accidents and injuries	11	47.8
Spread of communicable diseases (e.g. COVID-19, TB)	0	0.0
Increased mosquitoes and malaria	0	0.0

Note: Respondents could select more than one health risk; percentages do not sum to 100%.

Table 0.32: Access-Related Health Determinants Influenced by the Project

Health Determinant	Observed Condition	Implication
Access to healthcare facilities	Mixed; constrained in some communities	Potential improvement post-construction
Road safety conditions	Currently limited in several settlements	Increased accident risk during construction
Water supply reliability	Largely borehole-based	Vulnerable to construction disturbance
Environmental quality (air, noise)	Sensitive near alignment	Short-term deterioration expected

4.5.4.7.5 Interpretation of Expected Health Impacts

Survey findings indicate that the expected health impacts of the project are mixed, with communities anticipating both positive and negative outcomes. While a majority of respondents (68.8%) expect overall health improvements—largely linked to improved access, mobility, and emergency response—there is also strong recognition of construction-phase health risks, particularly at the household level.

More than three-quarters of households (78.3%) believe that construction activities may affect their health. This concern is driven primarily by environmental and safety-related risks, rather than disease transmission.

The most significant expected adverse health impacts include:

- Respiratory health risks arising from dust emissions (87.0%)
- Noise-related stress and sleep disturbance (60.9%)
- Increased accident and injury risk due to construction traffic and equipment (47.8%)

In contrast, no respondents identified communicable disease spread or increased malaria risk as major concerns, suggesting that health risks are perceived as direct, environmental, and activity-based, rather than epidemiological.

4.5.4.7.6 Perceived Negative Health Risks (Minority but Significant)

Although the majority of respondents within the Lot 2 Area of Influence anticipate overall positive health outcomes from the proposed road project, a substantial minority of households expressed concerns regarding adverse health impacts, particularly during the construction phase. These negative health risks, while affecting fewer respondents relative to perceived benefits, are considered significant due to their potential severity, cumulative nature, and disproportionate impact on vulnerable groups. Table 4.33 summarises respondents' negative perceptions of the negative health impacts.

Table 0.33: Summary of Negative Health Risks Identified by Respondents

Negative Health Risk	Frequency	Percentage (%)	Nature of Risk
Dust exposure and breathing problems	20	87.0	Environmental / Respiratory
Noise-related stress and sleep disturbance	14	60.9	Environmental / Psychosocial
Increased risk of accidents and injuries	11	47.8	Physical / Safety
General negative health perception	25	31.3	Perceived wellbeing impact

Note: Multiple responses were allowed. Percentages are based on respondents who identified negative health concerns.

Approximately 31.3% of respondents perceive the road construction as having a negative impact on health, indicating that nearly one-third of affected households anticipate adverse outcomes. While this group represents a minority, the types of risks identified are high-priority health concerns commonly associated with major road construction projects.

Dust exposure and respiratory problems emerge as the most prominent negative health risk, reported by 87.0% of respondents who identified health concerns. Dust emissions from earthworks, unpaved surfaces, and vehicle movement may aggravate respiratory conditions, particularly among children, elderly persons, and individuals with pre-existing respiratory illnesses.

Noise-related stress and sleep disturbance, identified by 60.9% of respondents, reflects concern over prolonged exposure to construction noise and vibration. Chronic noise exposure can affect sleep quality, mental well-being, and daily functioning, especially in settlements located close to the alignment. Nearly half of respondents (47.8%) associated construction activities with an increased risk of accidents and injuries, particularly due to heavy machinery movement, increased traffic, and reduced pedestrian safety. This risk is especially significant for roadside traders, schoolchildren, and other road users.

Although fewer respondents expressed negative health expectations compared to those anticipating benefits, the severity and immediacy of the identified risks elevate their significance. These risks:

- Are most likely to occur during the construction phase
- May have cumulative and compounding effects
- Disproportionately affects vulnerable groups
- Can undermine community acceptance if not adequately managed
- As such, these minority concerns warrant targeted mitigation and continuous monitoring, rather than being dismissed due to their lower frequency.

Implications for Mitigation and Management

The identified negative health risks justify the implementation of robust health protection measures, including:

- Dust suppression and air quality monitoring
- Noise control and restricted construction hours
- Traffic safety and pedestrian protection measures
- Community health sensitisation and grievance mechanisms

Addressing these risks proactively will be essential to reducing short-term health impacts and ensuring that the project's long-term health benefits are fully realised.

4.5.5 Project-Affected Persons (PAPs)

4.5.5.1 Project Affected Persons

The IFC Performance Standard 5 (Land Acquisition and Involuntary Resettlement) recognises Project-Affected Persons (PAPs) as individuals or households who experience physical displacement (loss of shelter) and/or economic displacement (loss of land, assets, access to assets, or income sources) as a result of project-related land acquisition or restrictions on land use. PS5 requires that displaced persons be identified through a systematic census and socioeconomic survey to establish eligibility and prevent opportunistic claims. Persons subject to physical displacement must be provided with compensation at replacement cost and adequate housing with security of tenure, where applicable. Persons subject to economic displacement must be assisted in restoring their livelihoods and standards of living to pre-displacement levels, or better, where feasible.

In accordance with PS5, the project undertook a structured census, asset inventory, and socioeconomic verification within the Lot 2 corridor to identify potential PAPs. This process confirmed the extent and nature of impacts, providing the baseline for subsequent Resettlement Action Plan (RAP) preparation.

Physical Structures and Residential Characteristics

Preliminary socioeconomic consultations and field surveys identified residential structures located along sections of the existing corridor within the Lot 2 Area of Influence. Housing is predominantly composed of roadside-oriented bungalows constructed mainly with cement block walls. Roofing materials include asbestos sheets, aluminium/zinc sheets, and other corrugated materials. At baseline, no residential structures are located within the currently defined RoW that would require relocation. Therefore, no physical displacement (loss of shelter) has been identified.

Economic Displacement

The structured census and asset inventory identified 32 potential PAPs within the RoW. Impacts are limited to economic displacement, primarily through crop loss, with no impact on residential structures. Agriculture remains a key livelihood source, supporting approximately 45% of respondents, underscoring the importance of livelihood restoration planning in subsequent assessment phases.

Trading and petty commerce are also prevalent within the corridor, with many businesses reliant on roadside access. While these activities are not currently affected by the project, temporary construction-phase disruptions could pose short-term livelihood sensitivity, particularly for women engaged in informal commerce.

In summary, the Lot 2 corridor exhibits a PS5 baseline profile of economic displacement only, with no anticipated physical relocation.

4.6 Traffic and Transport Baseline - Lot 2 Corridor

4.6.1 Existing Conditions

A traffic study conducted along the Lot 2 corridor indicates that average daily traffic (ADT) currently ranges between 8,500 and 12,000 vehicles, comprising a mix of passenger cars, motorcycles, tricycles, light trucks, and heavy goods vehicles (HGVs). HGVs, which are often associated with port and refinery activities, account for approximately 15% of total traffic. Peak hour traffic occurs during the evening (17:00-19:00), with 1,100-1,400 passenger car units (PCU) per hour recorded at key junctions. Observed levels of service (LOS) at major intersections fall within LOS D-E, reflecting moderate congestion and potential delays.

Compared with Lot 1, which experiences substantially higher volumes due to industrial expansion and port-related freight, Lot 2 currently carries lower traffic volumes, though key intersections, including the Epe-Ijebu Road and local feeder roads, already exhibit moderate congestion, particularly during peak periods.

4.6.2 Future Projections (Without Project)

Traffic volumes are expected to grow steadily, driven by regional development and anticipated increases in port and corridor activity. Using an annual growth rate of 4%, aligned with projections for Lot 1, the ADT along Lot 2 is forecast to reach 18,000-22,000 vehicles by 2030, with corresponding peak hour volumes likely to exceed current levels significantly. Under this scenario, LOS at major intersections could deteriorate to LOS F, indicating severe congestion and increased risk of delays, safety incidents, and impacts on local accessibility.

4.6.3 Key Observations and Implications

- **Freight Pressure:** HGV traffic, though lower than Lot 1, represents a significant proportion of corridor movement and may increase with regional development.
- **Passenger Flows:** Cars, tricycles, and motorcycles dominate passenger traffic, highlighting the need for careful pedestrian and local market access management.
- **Peak Congestion:** Evening rush hours are the critical periods for traffic-related safety and delay impacts.
- **Infrastructure Sensitivity:** Existing junctions and feeder roads are already operating near capacity; project activities may exacerbate congestion if mitigation is not implemented.
- **Cumulative Context:** Lot 2 traffic is currently lower than Lot 1, but the corridor's strategic linkage to regional transport and industrial areas makes it important to consider growth trends when assessing environmental and socioeconomic impacts, particularly for air quality, noise, and road safety.

4.7 Cumulative and Spatial Baseline Considerations

4.7.1 Cumulative Environmental Pressures

The Lot 2 corridor lies within a region characterised by multiple existing and planned developments, including the Dangote Refinery, Lekki Deep Sea Port, the Lekki Free Trade Zone (LFTZ), Lagos State University (LASU), Lagos State University of Education (LASUED), Alaro City, and adjacent industrial and residential estates. These developments, together with expanding regional transport infrastructure, generate cumulative environmental and socioeconomic pressures along the corridor. Baseline data from the Lot 1 ESIA and field monitoring provide a contextual framework for assessing these pressures within which Lot 2 will operate.

Air Quality

Operations at the Dangote Refinery and associated industrial clusters along the Lekki-Epe Expressway contribute to emissions of regulated air pollutants, including sulphur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM_{10} and $PM_{2.5}$), and volatile organic compounds (VOCs). Transport emissions further compound this burden. Traffic surveys indicate that freight vehicles constitute approximately 30% of flows along Lot 1 and approximately 15% along Lot 2, reflecting the corridor's industrial and logistics function. Peak traffic flows along these corridors occur between 16:00 and 19:00 hours, representing the convergence of commuter and freight movements.

Baseline air quality monitoring undertaken along the corridor indicates exceedances of applicable environmental air quality standards at certain locations, particularly for particulate matter. These findings demonstrate that sections of the corridor are already operating within a stressed ambient air quality environment. Increasing traffic volumes associated with ongoing economic development, together with construction activities and operational use of the completed corridor, establish a cumulative emissions context that will require careful evaluation in the impact assessment phase. Detailed baseline monitoring results are presented in Section 4.3.3.

Noise

Cumulative noise levels along the corridor also arise from overlapping industrial operations, port-related logistics traffic, and high commuter volumes. Baseline monitoring indicates exceedances of applicable regulatory standards at several locations influenced by traffic and industrial activity. Peak traffic periods between 16:00 and 19:00 hours are associated with the highest combined acoustic exposure along key road segments and junctions.

Sensitive receptors within the Area of Influence include roadside dwellings, schools, commercial areas, and ecologically sensitive habitats. The existing elevated acoustic environment establishes the cumulative exposure context against which incremental construction and operational contributions from Lot 2 will be assessed. Detailed baseline noise monitoring results are also provided in Section 4.3.3.

Hydrology

Upstream and adjacent developments, including floodplain modifications, drainage alterations, and other infrastructure works, have modified natural runoff patterns within the wider corridor. Hydrological assessments under Lot 1, including sampling at Mahin Creek and Lekki Lagoon, identified heightened flood susceptibility and aquifer vulnerability within the lagoonal system.

Tributaries and streams within Lot 2 discharge into the same lagoon system, establishing hydrological continuity in flow regimes, sediment transport, and water quality dynamics. This connectivity suggest that cumulative hydrological pressures, including increased runoff volumes and altered drainage regimes from upstream development, may influence baseline conditions within Lot 2. Baseline hydrological conditions, including flood risk mapping and water quality parameters, are detailed in Section 4.3.6.

4.7.2 Spatial Linkages with Lot 1

Lot 2 forms part of a continuous transport and environmental corridor extending into Lot 1 and the lagoon crossing. The spatial relationship between the two lots creates hydrological, ecological, traffic, and temporal interdependencies relevant to cumulative impact assessment.

Hydrological Continuity

Surface water systems within Lot 2 (CH 15, CH 16, and CH 17) are hydrologically connected to the broader lagoonal network assessed under Lot 1. Streams and drainage channels within Lot 2 ultimately discharge into the Lekki Lagoon system, establishing downstream continuity in flow regimes, sediment transport, and water quality dynamics.

Alterations to runoff characteristics within Lot 2, including increased impermeable surfaces or modified drainage patterns, may influence downstream hydrological conditions within Lot 1. Conversely, upstream hydraulic controls, lagoon water levels, and floodplain behaviour assessed under Lot 1 influence backwater effects and flood risk within portions of Lot 2. The two segments, therefore, share an interconnected hydrological system.

Ecological Corridors

Riparian zones and wetland margins along the corridor provide linear habitat features that facilitate wildlife movement between fragmented ecological patches across both lots. Baseline biodiversity surveys indicate that wetlands comprise approximately 41.8% of land cover within the Lot 2 Area of Influence, providing habitat for wetland-associated flora and fauna.

Given the spatial continuity of riparian vegetation and lagoon-edge habitats, habitat disturbance within one lot has the potential to affect ecological connectivity within the other. This establishes a baseline ecological linkage relevant to cumulative biodiversity assessment.

Traffic Flow and Network Integration

From a transport perspective, Lot 2 connects directly to the Lot 1 lagoon bridge and associated highway sections, forming part of a continuous corridor along the Lekki-Epe axis. Traffic modelling and surveys indicate that peak flows occur between 16:00 and 19:00 hours along Lot 1 and between 17:00 and 19:00 hours along Lot 2, reflecting convergence of commuter and freight movements across the corridor.

Upon completion, both lots will operate as an integrated transport system in which traffic flows bidirectionally between industrial, residential, commercial, and port-related destinations. As such, traffic performance, congestion dynamics, air emissions, and noise propagation cannot be attributed to a single segment in isolation but must be understood within a corridor-wide framework. Baseline traffic characteristics, including vehicle classification, peak hour volumes, and accident patterns, are detailed in Section 4.6.1.

4.7.3 Lender-Relevant Baseline Indicators

Several IFC PSs are applicable to Lot 2 corridor development due to its interaction with project receptors. These are described in the following sections and summarised in Table 4.34.

PS1: Assessment and Management of Environmental and Social Risks and Impacts

Baseline investigations confirm the presence of environmentally and socially sensitive receptors along the Lot 2 corridor. These include roadside residential dwellings, schools, commercial clusters, wetlands/riparian (25% of land cover), and three surface watercourses hydrologically connected to the Lekki Lagoon system.

Air quality monitoring indicates fine particulate matter ($PM_{2.5}$) exceedances at all locations, while ambient noise levels exceed national residential standards at multiple roadside receptors. The corridor also exhibits flood susceptibility in low-lying lagoon-influenced areas.

The high groundwater table along the Lot 2 corridor increases susceptibility to contamination, with groundwater samples at Chainage 17 measuring a highly acidic pH of 2.1. In addition, multiple water crossings along the corridor are vulnerable to sediment loading, particularly during construction activities. Influx of migrant workers during the construction phase. Collectively, these conditions expose the project to environmental and social risks, related to IFC PS1.

PS4: Community Health, Safety, and Security

Baseline conditions indicate pre-existing exposure of communities to environmental and safety stressors, including elevated ambient noise, fine particulate matter, and traffic-related accidents. Sensitive receptors, such as schools, roadside dwellings, and commercial clusters, are directly at risk. Communities also have limited access to adequate healthcare, exacerbating vulnerability. The cumulative presence of these stressors establishes the baseline context for community health and safety risk management under PS4.

PS5: Land Acquisition and Involuntary Resettlement

A structured census and asset inventory identified 32 potential Project-Affected Persons (PAPs) within the RoW. Impacts are limited to economic displacement in the form of crop loss, with no residential structures affected and no physical displacement at baseline.

Agriculture remains a primary livelihood for approximately 45% of respondents, highlighting the importance of livelihood restoration planning during RAP implementation. The PS5 risk profile is therefore restricted to economic displacement, focusing on the preservation and restoration of agricultural assets and associated income sources.

PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Baseline ecological surveys indicate that Lot 2 comprises modified terrestrial habitats (farmlands, secondary regrowth), wetland/riparian zones (25%), and built/settled areas (15%), with wetlands providing critical habitat for macro-invertebrates, avifauna, and herpetofauna.

Screening against IFC Critical Habitat criteria confirms that no Critical Habitat exists within the Project footprint, and no legally protected areas fall within the RoW. Species recorded are either Least Concern or not assessed under the IUCN Red List. The corridor is therefore classified as Modified/Habitat for PS6 purposes. High-risk activities, including bridge construction and sediment mobilisation, require careful management to avoid cumulative impacts on aquatic and riparian ecosystems.

PS8: Cultural Heritage

Baseline surveys identified both tangible and intangible cultural heritage assets:

- Tangible: Two shrines and one historic burial ground (outside the Right-of-Way).
- Intangible: Oral traditions and seasonal festivals.

Consequently, PS8 becomes applicable to manage these sensitive and cultural assets.

Table 0.34: Respondents Lender-Relevant Environmental and Social Baseline Summar

PS / Topic	**Baseline Condition / Observation**	**Risk Context / Implication**
PS1: Environmental & Social Risks	Roadside dwellings, schools, commercial clusters; wetlands (~25-42% land cover); surface water connected to Lekki Lagoon; flood-prone low-lying areas; PM and noise exceedances; Groundwater level susceptible to seepage, sedimentations	Project located in a sensitive corridor; structured risk management required.
PS4: Community Health & Safety	Elevated noise and PM; road accident exposure; limited access to healthcare, surface water contamination	Risk to project communities
PS5: Land Acquisition & Involuntary Resettlement	32 PAPs identified; impacts limited to crop loss; no physical displacement	Economic displacement only; livelihood restoration planning required.
PS6: Biodiversity & Natural Habitats	Modified and natural habitats; Modified Habitat; species of Least Concern. Presence of surface water bodies	Project occurs within Natural Habitat; guides PS6 impact assessment.
Cultural Heritage	Two shrines, one historic burial ground; oral traditions and seasonal festivals present	Source of conflicts with project communities

4.8 Summary of Key Baseline Sensitivities

This section summarises the key baseline environmental, ecological, and social sensitivities identified within Lot 2 of the Lagos 7th Axial Road corridor (CH 8+700 to CH 24+932). These sensitivities, derived from field surveys, secondary data, stakeholder consultations, and consideration of pre-existing pressures, provide the foundation for impact assessment and mitigation planning.

4.8.1 Environmental Sensitivities

The Lot 2 corridor exhibits several baseline environmental sensitivities:

- **Air Quality:** $PM_{2.5}$ levels are elevated across all sampling locations, indicating a moderate-high baseline sensitivity. Cumulative emissions from the refinery, port, and FTZ activities contribute to overall air quality pressures.
- **Noise**: Baseline noise levels are high in Epe Town and Chainage 24, primarily due to traffic and local industrial activities. These existing noise sources, combined with traffic from surrounding industrial zones, increase overall auditory stress on communities.
- **Soils and Erosion:** Sandy soils within the corridor present a moderate erosion risk, which may be exacerbated during construction and heavy rainfall, potentially mobilising sediment into downstream wetlands and watercourses.
- **Groundwater:** Groundwater is vulnerable to contamination, particularly in areas adjacent to riparian zones and shallow aquifers, with sensitivity heightened by existing industrial and urban pressures.

4.8.2 Ecological Sensitivities

Key ecological sensitivities along Lot 2 are associated with wetlands, riparian habitats, and species assemblages:

- **Freshwater Wetlands and Riparian Habitats:** Wetlands near Chainages 15-17 support a range of aquatic and riparian flora and fauna. These habitats are hydrologically connected to downstream water bodies, providing important ecosystem functions and already experiencing cumulative pressures from nearby industrial effluents and land use changes.
- **Biodiversity:** Species richness is moderate and dominated by disturbance-tolerant flora and fauna. No Critically Endangered or Endangered species were recorded; however, these habitats provide local ecological value and important ecosystem services under existing cumulative pressures.

4.8.3 Socioeconomic and Cultural Sensitivities

Communities within Lot 2 demonstrate moderate livelihood vulnerability due to high dependence on natural resources and informal economic activities:

Livelihoods: A total of 32 Project-Affected Persons (PAPs) are economically displaced. Agriculture is the primary source of income for approximately 45% of households, while petty trading (25%), fishing (10%), and transportation services (10%) constitute other livelihood sources. Women are disproportionately represented in informal labour and petty trading, requiring gender-sensitive mitigation measures. Existing economic pressures from neighbouring industrial and commercial activities further affect household resilience.

Cultural Heritage: Two heritage sites and sacred groves are present within the AoI and require protection from both direct and indirect project impacts.

Resource Dependence: Households rely on both land- and water-based activities, emphasising the importance of wetlands and riparian areas for subsistence and economic resilience.

Table 4.35 summarises these sensitivities and highlights the combined baseline and cumulative pressures for clarity.

Table 0.35: Table 4.35 Key Baseline Sensitivities with Cumulative Pressures

Sensitivity Type	Key Sensitivities	Baseline Sensitivity	Cumulative Pressure
Air Quality	Elevated $PM_{2.5}$ levels across all sampling locations	Moderate-High	Emissions from refinery, port, and FTZ activities increase overall air quality pressure
Noise	High baseline noise in Epe Town and Chainage 24	High	Existing traffic, industrial and commercial activities exacerbate auditory stress
Soils & Erosion	Sandy soils prone to erosion; sediment mobilisation	Moderate	Past and ongoing construction, land clearing, and runoff from neighbouring developments
Groundwater	Vulnerable to contamination, particularly near riparian zones	High	Industrial effluents, urban runoff, and port activities add to groundwater vulnerability
Wetlands & Riparian Habitats	Freshwater wetlands near Chainages 15-17	Moderate	Hydrological and ecological pressures from upstream industrial and urban land use
Biodiversity	Moderate species richness; disturbance-tolerant flora and fauna	Moderate	Habitat disturbance from cumulative land-use changes, effluents, and human activity
Livelihoods	High dependence on natural resources and informal economic activities	Moderate	Economic pressures from surrounding industrial, port, and FTZ activities affect household resilience
Cultural Heritage	Two heritage sites and sacred groves	Moderate	Risk of indirect impacts due to surrounding development and land-use changes
Resource Dependence	Reliance on land- and water-based livelihoods	Moderate	Wetlands and riparian zones affected by cumulative pressures from industrial and urban activities

4.9 Conclusion

The baseline environment for Lot 2 has been comprehensively characterised, providing a robust foundation for impact assessment, mitigation planning, and monitoring. The baseline integrates corridor wide data from Lot 1 and Section 2, ensuring consistency in cumulative impact assessment and regional environmental management.

CHAPTER FIVE

IMPACT ASSESSMENT

5.1 Introduction

This chapter presents a structured and evidence-based assessment of the potential environmental and social impacts associated with Lot 2 (CH 8+700 - CH 24+932) of the 7th Axial Road Project. The assessment covers the preconstruction, construction, operation, maintenance, and decommissioning phases of the project, ensuring that risks and opportunities are evaluated across the full project lifecycle.

The impact assessment follows the Nigerian EIA Act (1992, as amended), IFC Performance Standards (PS1-PS8), the Equator Principles (EP4), and relevant international good industry practice (GIIP). The assessment also aligns with FMEnv expectations for linear infrastructure and incorporates cumulative impact considerations consistent with IFC PS1.

The chapter provides a transparent analytical basis for:

- Identifying impact pathways;
- Predicting impact magnitude and spatial extent;
- Determining impact significance prior to mitigation (inherent risk);
- Applying the mitigation hierarchy; and
- Evaluating residual impacts following mitigation.

The assessment integrates corridor-wide data from Lot 1 and other major developments to ensure cumulative impacts are not underestimated.

The findings presented herein form the technical foundation for the Environmental and Social Management Plan (ESMP) in Chapter 7, ensuring that identified impacts are managed through clearly defined mitigation, monitoring, and adaptive management measures.

The assessment is directly predicated on the project description provided in Chapter 3. The magnitude, duration, and spatial extent of predicted impacts are based on the specific engineering designs, construction methodologies, traffic projections, material requirements, and operational characteristics described therein. Baseline environmental and social conditions established in Chapter 4 provide the reference against which predicted changes are evaluated.

Where relevant, corridor-wide data and findings from related infrastructure developments have been incorporated to ensure consistency in cumulative impact evaluation.

5.2 Impact Assessment Objectives

The objectives of this impact assessment are to:

- Identify and evaluate potential positive and negative environmental and social impacts associated with Lot 2;
- Distinguish between direct, indirect, induced, and cumulative impacts;
- Assess the magnitude of predicted changes relative to established baseline conditions;

- Evaluate receptor sensitivity, including vulnerable populations and ecologically sensitive habitats;
- Determine impact significance using defined and transparent criteria;
- Apply the mitigation hierarchy (avoid, minimise, restore, offset/compensate) in accordance with IFC requirements;
- Identify residual risks following mitigation; and
- Provide a defensible basis for environmental and social management measures to be implemented through the ESMP.

These objectives ensure compliance with IFC PS1 and FMEnv requirements for risk based impact evaluation.

5.3 Impact Assessment Methodology

5.3.1 Impact Identification

Impact identification was undertaken using a structured source-pathway-receptor framework. For each project activity described in Chapter 3, the assessment identifies:

- The source of potential impact (e.g., land clearing, earthworks, piling, traffic generation, worker influx);
- The pathway or mechanism through which change may occur (e.g., sediment runoff, noise propagation, hydrological alteration, economic displacement);
- The environmental or social receptor potentially affected (e.g., wetlands, lagoon ecosystems, aquifers, communities, livelihoods, cultural heritage); and
- The likely consequence of the interaction.

This framework ensures clear traceability between project activities, baseline conditions, and predicted outcomes, supporting systematic and defensible risk evaluation

Impacts are considered across all project phases and include routine operational effects as well as abnormal and accidental events. The methodology also incorporates climate-related impact pathways, consistent with IFC PS1 and PS3.

5.3.2 Impact Characterisation Criteria

Each identified impact is characterised using defined criteria to ensure consistency and comparability across environmental and social aspects.

- **Nature of Impact:** Impacts are classified as positive or negative, and as direct, indirect, induced, or cumulative.
- **Extent:** The spatial scale of the impact is identified as site-specific (within the right-of-way), local (adjacent communities and ecosystems), corridor-wide, or regional.
- **Duration:** Impacts are classified as temporary (typically confined to the construction phase), medium-term, long-term (extending through operation), or permanent.
- **Magnitude:** Magnitude reflects the scale and intensity of change relative to baseline conditions, informed by quantitative modelling where available (e.g., hydrology, traffic, emissions) and professional judgement where data gaps exist.

- **Receptor Sensitivity:** Receptor sensitivity is determined based on ecological value, conservation status, regulatory protection, social vulnerability, economic dependence on affected resources, and adaptive capacity. Sensitivity ratings follow IFC PS1 and PS6 guidance, ensuring transparent justification for each receptor category.

5.3.3 Significance Determination

Impact significance is determined using a structured risk-based approach that combines impact magnitude and receptor sensitivity, consistent with IFC Performance Standard 1 guidance on risk assessment. For certain impact categories, including labour risks, community health and safety, and accidental events, likelihood is also considered as part of the significance rating.

Significance is assessed at two stages:

- Inherent (Pre-Mitigation) Significance, reflecting the predicted impact without mitigation; and
- Residual (Post-Mitigation) Significance, reflecting the impact after application of mitigation measures in accordance with the mitigation hierarchy.

Impacts assessed as Moderate or above prior to mitigation are considered potentially significant and require specific management measures under the ESMP (Chapter 7). Residual impacts rated Moderate or above may require enhanced monitoring, adaptive management, or compensatory measures such as biodiversity offsets (IFC PS5, PS6).

5.3.3.1 Application of the Significance Matrix

Impact significance is determined by integrating Impact Magnitude with Receptor Sensitivity using the matrix presented in Table 5.1. Detailed characterisation criteria, magnitude thresholds, sensitivity classifications, and application guidance are provided in Appendix 5.

Magnitude reflects the scale and intensity of change caused by the project relative to baseline conditions and is categorised as Low, Moderate, or High (Appendix 5, Section A5.2.4).

Sensitivity reflects the importance, vulnerability, and adaptive capacity of the affected receptor and is categorised as Negligible, Low, Moderate, High, or Very High (Appendix 5, Section A5.2.5).

Table 0.1 Impact Significance Determination Matrix

Sensitivity → Magnitude ↓	Negligible	Low	Moderate	High	Very High
High	Minor	Moderate	Moderate-High	High	Critical
Moderate	Negligible	Minor	Moderate	Moderate-High	High
Low	Negligible	Minor	Minor	Moderate	Moderate-High

Note: Impacts of negligible magnitude (no detectable change; within baseline variability) are screened from detailed assessment as they result in negligible significance regardless of receptor sensitivity.

Table 5.2 summarises the significance categories used throughout this ESIA.

Table 0.2: Significance Categories

Significance Level	Definition	Management Response
Critical	Unacceptable impact; potential for irreversible damage to receptors of international/national importance	Requires project redesign, alternative selection, or abandonment of project element; fatal flaw
High	Significant impact requiring avoidance, design modification, or intensive mitigation	ESMP major commitment; may require design changes; intensive monitoring; triggers multiple IFC PS requirements
Moderate-High	Substantial impact requiring structured mitigation planning	Detailed management plan plus enhanced monitoring
Moderate	Noticeable impact requiring targeted mitigation and monitoring	Specific management plan required; regular monitoring and reporting; may trigger IFC PS requirements depending on the receptor
Minor	Detectable but minor effect; readily manageable through standard measures	Standard mitigation measures; basic monitoring
Negligible	No material changes from baseline; within natural variability	Standard construction good practice; routine monitoring

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5.3.3.2 Professional Judgment Adjustments

Matrix-derived significance ratings may be adjusted based on professional judgment considering:

Factors that may elevate significance:

- Permanent duration or regional extent
- Baseline stress (receptors already exceeding thresholds)
- Cumulative context (multiple projects affecting same receptor)
- Vulnerable receptors (children, elderly, pregnant women, low-income households)
- Limited reversibility

Factors that may reduce significance:

- Short duration or localised extent
- High reversibility
- Effective mitigation available

Professional judgment adjustments are documented in impact narratives (Sections 5.4.1-5.4.3) and impact tables (Tables 5.3-5.8).

5.3.3.3 Likelihood Integration for Accident and Emergency Scenarios

For accident and emergency scenarios only (e.g., fuel spills, traffic accidents, GBV/SEA/SH incidents), likelihood is integrated into significance determination. Likelihood is categorised as Very Low, Low, Moderate, or High based on indicative frequency (Table 5.3).

Table 0.3: Likelihood Classifications

Likelihood	Definition	Indicative Frequency
Very Low	Highly improbable; would require multiple simultaneous failures	<1 in 100 years
Low	Unlikely but credible given project activities	1 in 10-100 years
Moderate	May occur occasionally during the project lifecycle	1 in 1-10 years
High	Likely to occur multiple times if uncontrolled	>1 per year

Table 5.4 presents the Likelihood-Modified Significance Determination Matrix, integrating significance with likelihood of occurrence.

Table 0.4: Likelihood-Modified Significance Determination Matrix

Matrix Significance	Very Low Likelihood	Low Likelihood	Moderate Likelihood	High Likelihood
High	Moderate	Moderate-High	High	High
Moderate-High	Minor	Moderate	Moderate-High	Moderate-High
Moderate	Minor	Minor	Moderate	Moderate

Note: Likelihood assessment assumes implementation of standard mitigation measures (e.g., spill kits, traffic controls, worker training). Likelihood ratings reflect **residual risk** after these baseline controls, not inherent risk without any management.

5.3.4 Application of the Mitigation Hierarchy

Mitigation measures are developed in accordance with the mitigation hierarchy required under IFC Performance Standard 1:

- Avoidance, through route refinement, engineering design optimisation, and scheduling adjustments to prevent impacts where feasible. Avoidance is prioritised for sensitive receptors such as wetlands, schools, and cultural heritage sites.
- Minimisation, through technical controls, construction management measures, and operational safeguards.
- Restoration or Rehabilitation, to reinstate affected areas following disturbance.
- Compensation or offsets are applied where significant residual impacts remain, including livelihood restoration (PS5) and biodiversity offsets only where required under PS6. Offsets will not be considered unless avoidance and minimisation have been demonstrably exhausted.

Residual impacts are re-evaluated following the application of mitigation measures to determine acceptability and the need for additional management commitments.

5.3.5 Integration with Lot 1 and Cumulative Impact Assessment

Lot 2 forms part of the broader 7th Axial Road corridor and therefore interacts with impacts associated with Lot 1 and other major infrastructure developments in the Lekki corridor (See Section 5.5). Where impact pathways overlap, such as hydrological connectivity, lagoon water quality, traffic redistribution, air emissions, and community health and safety, corridor-wide effects are evaluated to ensure consistency and avoid segmentation of impacts. Seasonal variability is incorporated into impact prediction, recognising elevated erosion and sediment transport risks during the wet season and increased dust emissions during the dry season.

5.3.6 Limitations and Assumptions

The assessment is based on the current level of engineering design and available baseline data at the time of reporting. However, design parameters may be further refined during detailed engineering; hence, a precautionary approach has been adopted in this assessment. Adaptive management measures are incorporated within the ESMP to address uncertainties and to ensure continued compliance with regulatory requirements and lender standards throughout the project lifecycle.

5.4 Phase-Based Impact Assessment

5.4.1 Preconstruction and Construction Phase Impacts

The preconstruction and construction phases are expected to generate temporary medium-high environmental and social impacts arising from site clearance, earthworks, drainage works, civil construction, material transport, workforce mobilisation, and establishment of temporary facilities. Impact magnitude and significance are influenced by receptor proximity, baseline sensitivities, shallow groundwater conditions, cumulative pressures, and the duration and intensity of construction activities. Construction impacts are assessed assuming a worst-case scenario unless otherwise stated, consistent with IFC PS1. A summary of the identified impacts, their significance, and affected receptors is presented in Table 5.5.

5.4.1.1 Physical Environment

This section describes the anticipated impacts on the physical environment during preconstruction and construction. Impacts are summarised in Table 5.5 and include air quality, noise and vibration, water quality, soil erosion, and hydrology.

Air Quality (Dust and Exhaust Emissions)

Construction activities such as vegetation clearance, excavation, material handling, uncovered material stockpiles, haul road use, and heavy vehicle movement are expected to generate fugitive dust ($PM_{2.5}$ and PM_{10}) and exhaust emissions (NOx, SO2, CO, VOCs). Baseline monitoring shows elevated $PM_{2.5}$ concentrations across all sampling locations, indicating pre-existing air quality stress within the corridor. As such, construction-phase emissions may exacerbate localised deterioration in ambient air quality, particularly during the dry season when dispersion is limited. Sensitive receptors include schools, residences within the project's AoI (500 m) of the alignment, roadside traders, and construction workers. Without mitigation, temporary exceedances of applicable ambient air quality standards may occur, contributing to nuisance and respiratory discomfort.

Impact Significance (Pre-Mitigation): High

Noise and Vibration

Noise will be generated from excavators, compactors, haul trucks, generators, and (where applicable) piling activities. Baseline noise levels already exceed NESREA residential limits in several communities, increasing receptor sensitivity. Construction activities are therefore expected to exacerbate existing noise pressures, particularly near sensitive receptors such as community residences, schools, healthcare centres, and cultural sites.

Vibration from heavy machinery may cause community concern and perceived structural risk, even where structural damage thresholds are not exceeded.

Impact Significance (Pre-Mitigation): High

Water Quality

Earthworks, modification of drainage channels, and material stockpiling may generate sediment-laden runoff that could enter the three aquatic crossings (CH 15, CH 16, and CH 17) within the project corridor. Sedimentation may increase turbidity, reduce light penetration, impair primary productivity, and smother benthic organisms. Hydrological connectivity between seasonal streams and downstream wetlands elevates receptor sensitivity (IFC PS6).

Accidental spills of fuels, lubricants, and chemicals further increase the risk of contamination via runoff and potential seepage into the shallow, high-water-table groundwater.

Impact Significance (Pre-Mitigation): Moderate-High

Soil Erosion

Topsoil stripping, vegetation removal, and slope modification may increase susceptibility to erosion, particularly in areas with slopes exceeding 5% and erodible soils. Uncontrolled erosion may increase sediment loads in drainage channels and water bodies, affecting water quality and agricultural productivity. Temporary stabilisation measures for stockpiles and exposed soils are recommended.

Impact Significance (Pre-Mitigation): Moderate

Hydrology

Vegetation removal, temporary drainage disruption, culvert installation, and flow diversion during construction may alter local runoff patterns. Given the presence of seasonal streams, shallow groundwater, and low-lying terrain, inadequate drainage management may cause temporary ponding, localised flooding, erosion, and restricted access to agricultural plots or community pathways. Construction activities near wetland fringes (CH 15, CH 16, and CH17) require strict adherence to temporary drainage plans to avoid hydrological disruption and downstream sediment loading (IFC PS6).

Impact Significance (Pre-Mitigation): Moderate

Table 0.5: Lot 2 Preconstruction and Construction Phase Physical Environmental Impacts

Impact Category	Description	Magnitude	Sensitivity	Significance (Pre-Mitigation)
Air Quality (Dust)	Fugitive dust from earthworks, unpaved haul roads	High	High (schools, residences within 300m)	**High**
Noise and Vibration	Equipment (excavators, pile drivers, trucks)	High	High (3 schools, 2 health facilities)	**High**
Water Quality	Sediment runoff, accidental spills (fuels, lubricants)	Moderate	High (streams, wetland connectivity)	**Moderate-High**
Soil Erosion	Topsoil disturbance, slope instability	Moderate	Moderate (slopes >5%, erodible soils)	**Moderate**
Hydrology	Temporary drainage disruption, flow diversion	Low	Moderate (seasonal streams)	**Minor**

5.4.1.2 Biological Impacts

The biological impacts on habitats, fauna, and wetlands are discussed in the following section, and summarised in Table 5.6. All biological impacts are evaluated in accordance with IFC PS6, with specific attention to Natural Habitat, Modified Habitat, and ecosystem services.

Habitat Loss and Fragmentation

Approximately 28 hectares of modified terrestrial habitat will be cleared within the right-of-way. Although the affected area is classified as Modified Habitat under IFC PS6 and does not qualify as Critical Habitat, the loss of vegetation within the RoW is permanent and will reduce habitat availability for common fauna. Edge effects may extend beyond the RoW, potentially altering microhabitats and increasing vulnerability to invasive species such as *Chromolaena odorata*.

Impact Significance (Pre-Mitigation): Moderate

Fauna Disturbance

Noise, vibration, lighting, and increased human presence may temporarily disturb terrestrial fauna. Recorded fauna species are predominantly common, adaptable, and non-threatened; therefore, disturbance impacts are expected to be temporary and reversible following construction. No IFC PS6-listed endangered or critically endangered species were recorded during baseline surveys.

Impact Significance (Pre-Mitigation): Minor

Wetland Encroachment

Temporary construction workspace within the three wetland fringes may result in short-term disturbance, compaction, or vegetation removal. These wetlands provide hydrological regulation, groundwater recharge, and ecological connectivity, increasing receptor sensitivity under IFC PS6. Controlled access, buffer zones, and sediment control measures are essential. Wetland disturbance may also affect amphibian breeding sites and waterbird foraging areas, requiring strict avoidance measures.

Impact Significance (Pre-Mitigation): Moderate

Table 0.6: Lot 2 Preconstruction and Construction Phase Biological Impacts and IFC PS6 Relevance

Impact	Description	Magnitude	Sensitivity	Significance (Pre-Mitigation)	IFC PS6 Relevance
Habitat Loss/ Fragmentation	Clearing of 28 ha of modified terrestrial habitat	Moderate	Moderate	**Moderate**	Natural Habitat affected; no Critical Habitat
Fauna Disturbance	Noise and movement	Low	Moderate	**Minor**	Minor impact on non-

	disruption to wildlife				threatened species
Wetland Encroachment	Temporary workspace in 3 wetland fringes	Low	Moderate	**Moderate**	Requires buffer zone compliance
Invasive Species Spread	Risk of *Chromolaena odorata* colonisation of disturbed soils within and adjacent to RoW	Moderate	Moderate	**Moderate**	Edge effect risk; requires invasive species management protocol

5.4.1.3 Socioeconomic Environment

This section addresses the social and economic impacts of the project, including economic displacement, access disruption, community health and safety, and traffic, summarised in Table 5.7. All socioeconomic impacts are evaluated in accordance with IFC PS1, PS4, and PS5, with particular attention to vulnerable groups and livelihood dependencies.

5.4.1.3.1 Economic Displacement

Preconstruction confirmation of the RoW will result in economic displacement affecting 32 PAPs, primarily due to crop loss. Although no physical displacement is anticipated, livelihood sensitivity is high due to dependence on smallholder agriculture and limited alternative income sources. Economic displacement triggers IFC PS5 requirements for compensation at full replacement cost and livelihood restoration. Delays in compensation, inadequate livelihood restoration, or inequitable access to mitigation measures may heighten community vulnerability and dissatisfaction.

Impact Significance (Pre-Mitigation): Moderate-High

5.4.1.3.2 Access Disruption

Temporary closure or diversion of local access roads, drainage paths, and footpaths may affect four communities. Although temporary, access disruptions may affect mobility, market access, school attendance, social connectivity, and emergency response times. Seasonal rainfall may exacerbate disruptions, particularly where temporary diversions intersect with flood-prone areas.

Impact Significance (Pre-Mitigation): Moderate

5.4.1.3.3 Community Health, Safety, and Labour Influx

Increased heavy vehicle movement, construction machinery, dust emissions, and material handling elevate the risk of traffic accidents, respiratory discomfort, and occupational injuries for workers and community members. Poor waste management and runoff from earthworks may lead to soil and water contamination, further affecting human health.

The influx of approximately 800 workers may increase communicable disease risks, strain local services, elevate GBV/SEA/SH risks, and generate social tensions if not properly managed. Vulnerable groups include schoolchildren, roadside traders, elderly residents, and women engaged in informal trade.

Impact Significance (Pre-Mitigation): High

5.4.1.3.4 Traffic and Mobility

Preconstruction and construction activities will significantly increase heavy vehicle movements along local and haul roads, generating congestion, delays, and detours along community access points.

Key risks include elevated crash likelihood at community crossings and informal pedestrian crossing points, reduced pedestrian safety from haul truck movements, delays to emergency vehicle access where traffic management measures are absent, and night-time visibility hazards from inadequate lighting along active haul routes.

Vulnerable road users include pedestrians, schoolchildren along school approach roads, motorcyclists, and roadside traders. Seasonal rainfall may further compromise temporary haul road conditions, increasing accident risk and disrupting access to agricultural plots and markets. Emergency vehicle access could be critically compromised during peak construction periods without coordinated traffic management.

Impact Significance (Pre-Mitigation): High

5.4.1.3.5 Labour Rights and Working Conditions (IFC PS2)

The mobilisation of an estimated 800 construction workers during peak activity introduces labour-related risks typical of large civil works programmes.

Key risks include:

- Occupational health and safety incidents arising from heavy machinery operation, working at height, and increased traffic within the construction corridor.
- Labour rights risks include potential violations of working hours, wage disputes, and discriminatory practices, particularly where subcontractors are engaged without adequate oversight.
- Supply chain risks, including the potential use of child labour or forced labour within lower tiers of the contractor supply chain, require proactive management.
- Worker influx may also strain local housing, water, and sanitation services, generating social tension with host communities if not adequately managed.

Impact Significance (Pre-Mitigation): Moderate-High

5.4.1.3.6 GBV/SEA/SH Risk (IFC PS4)

The presence of a large, predominantly male workforce significantly increases the risk of gender-based violence (GBV), sexual exploitation and abuse (SEA), and sexual harassment (SH) within and adjacent to the construction corridor. Vulnerable groups include women traders operating near work sites, schoolgirls along haul routes, and economically vulnerable households exposed to transactional relationships with workers. Key risks include harassment of women and girls near construction areas, increased domestic tension arising from economic and social disruption, and systematic underreporting due to stigma and fear of retaliation. The cumulative concentration of workforces from Lot 1, Lot 2, and adjacent industrial developments amplifies this risk at the corridor level, as noted in Section 5.5.1.5.

Impact Significance (Pre-Mitigation): High

5.4.1.3.7 Accidental Events and Emergency Scenarios (IFC PS4)

Accidental events during construction represent discrete impact pathways requiring assessment under the likelihood-modified significance framework (Table 5.4). Key scenarios include fuel and chemical spills from storage areas or vehicle incidents, fire events near fuel storage or temporary facilities, worker injuries from machinery, falling objects, or traffic incidents, and flooding of active works areas during heavy rainfall events. Likelihood ratings reflect the elevated probability of incidents on a large civil works site operating over an extended construction period. Spill and fire risks are elevated by the proximity of fuel storage to wetland drainage pathways at CH 15–17.

Likelihood ratings are applied at the pre-mitigation stage, assuming only routine construction site precautions rather than the full suite of project-specific ESMP commitments described in Chapter 6.

Applying the likelihood-modified significance matrix (Table 5.4):

- Fuel/chemical spill: Moderate likelihood × Moderate-High significance = **Moderate-High**
- Fire incident: Low likelihood × Moderate significance = **Minor**
- Worker injury: High likelihood × Moderate significance = **Moderate**
- Flooding of works: Moderate likelihood × Moderate significance = **Moderate**

Table 0.7: Lot 2 Preconstruction and Construction Phase Socioeconomic Impacts

Impact	Description	Key Receptors	Magnitude	Sensitivity	Significance
Economic Displacement	Loss of crops (cassava, maize, oil palm) within RoW.	32 households	Moderate	High	**Moderate-High**
Access Disruption	Temporary closure of local access roads/drainage paths.	4 communities	Moderate	Moderate	**Moderate**
Community Health and Safety	Increased risk of accidents, dust-related respiratory issues	General population	Moderate	High	**High**

Labor Influx	Approximately 800 construction workers; pressure on local services.	N/A	Moderate	Moderate	**Moderate**
Labour Rights and Working Conditions	OHS incidents, wage disputes, subcontractor supply chain risks	Construction workforce	Moderate	High	**Moderate-High**
GBV/SEA/SH	Harassment, exploitation, and domestic tension linked to the workforce influx	Women, schoolgirls, vulnerable households	High	High	**High**
Traffic and Road Safety	Crash risk at crossings, pedestrian exposure, emergency access delays, night-time hazards	Pedestrians, schoolchildren, motorcyclists, and roadside traders	High	High	**High**
Accidental Events: Fuel/Chemical Spill	Spill from storage or vehicle incident near wetland/ drainage	Wetlands, downstream communities	Moderate	High	**Moderate-High**
Accidental Events: Worker Injury	Machinery, traffic, and falling object incidents	Construction workforce	Moderate	Moderate	**Moderate**
Chance Finds	Encounter of archaeological/ cultural material during excavation	Cultural heritage receptors	Low	Low	**Low**

5.4.2 Operational Phase Impacts

The operational phase of the project is expected to generate both positive and adverse impacts on the physical, biological, and socioeconomic environment. Positive impacts arise primarily from improved connectivity, economic opportunities, and enhanced road safety. Adverse impacts are associated with increased traffic, vehicle emissions, noise, hydrological changes, and potential pressures on land use and local communities.

5.4.2.1 Positive Operational Phase Impacts

The operational phase of Lot 2 is expected to generate substantial and long-term socioeconomic benefits at the local, corridor-wide and regional levels. These benefits arise primarily from improved transport efficiency, enhanced connectivity, strengthened economic activity, and improved road safety outcomes (Table 5.8). Collectively, these positive impacts support regional integration, facilitate access to essential services, and contribute to sustainable economic growth.

1. **Improved Connectivity and Transport Efficiency**

Once commissioned, Lot 2 will significantly enhance mobility along the Lekki-Epe corridor and linkage to the national road network via Epe-Ijebu Road. Travel time between Epe and Lekki Port is expected to reduce from approximately 45 minutes to 25 minutes under normal traffic conditions, representing a substantial improvement in transport efficiency. Reduced congestion on the existing Lekki-Epe Expressway will also improve travel reliability for freight and emergency services. Improved infrastructure is likely to attract private sector investment, strengthen regional supply chains, increase land value, and support expansion of roadside services and ancillary businesses.

The impact is direct, long-term, and regional in extent, benefiting commuters, freight operators, emergency services, and businesses dependent on time-sensitive logistics.

Impact Significance (Pre-Enhancement): High (Beneficial)

2. Economic Growth, Trade Facilitation and Investment Stimulation

Enhanced accessibility along the corridor is expected to stimulate economic activity by improving market access and reducing transportation constraints. Efficient movement of goods and people will support industrial operations, logistics hubs, port-linked enterprises, and small- and medium-sized businesses operating along the corridor.

Improved infrastructure may also attract new private-sector investment, strengthen regional supply chains, increase the commercial viability of adjacent land parcels, and support the expansion of roadside services and ancillary businesses

These effects are both direct and indirect, long-term in nature, and extend beyond the immediate project footprint.

Impact Significance (Pre-Enhancement): High (Beneficial)

3. Employment and Livelihood Opportunities

During the operational phase, employment opportunities will arise through road management, routine maintenance, tolling, security services, and corridor-based commercial activities. Improved accessibility may also stimulate job creation within nearby communities through expanded trade, transport services, warehousing, retail activities, and informal enterprises. Improved accessibility may also stimulate micro-enterprise development, particularly among women and youth

Employment gains are expected to be moderate in scale relative to construction-phase employment; however, they are more sustained over time and contribute to local income generation and economic stability.

Impact Significance (Pre-Enhancement): Moderate-High (Beneficial)

4. Road Safety Improvements

The Project is expected to improve road safety conditions along the corridor. The design incorporates grade-separated interchanges, improved geometry, enhanced signage, controlled pedestrian crossings, and speed calming measures. These interventions align with IFC PS4 requirements for community health and safety.

Diversion of heavy-duty vehicles from congested sections of the existing Lekki-Epe Expressway will reduce traffic conflict points and alleviate pressure on overstretched infrastructure.

The design incorporates grade-separated interchanges, improved road geometry, traffic signage and markings, controlled pedestrian crossings, and speed regulation measures

These interventions are expected to reduce accident frequency and severity, particularly for vulnerable road users such as schoolchildren, pedestrians, motorcyclists, and roadside traders.

Impact Significance (Pre-Enhancement): Moderate-High (Beneficial)

5. Regional Integration and Improved Access to Services

Improved corridor efficiency will enhance access to social infrastructure, including schools, healthcare facilities, markets, and employment centres. Reduced travel times may improve emergency response capability and facilitate movement between peri-urban communities and economic hubs. Reduced travel times may improve emergency response capability and strengthen social cohesion among peri-urban communities.

The impact is indirect but long-term, contributing to social cohesion, regional integration, and improved quality of life for communities along the corridor.

Impact Significance (Pre-Enhancement): Moderate (Beneficial)

Table 0.8: Lot 2 Operational Phase Positive Impacts

Impact Theme	Impact Description	Key Receptors / Beneficiaries	Nature of Impact	Significance (Pre-Enhancement)
Improved Connectivity and Transport Efficiency	Reduction in travel time, improved traffic flow, reduced vehicle operating costs, enhanced logistics reliability	Commuters, freight operators, businesses, and emergency services	Direct, long-term, regional	High (Beneficial)
Economic Growth and Trade Facilitation	Improved market access, investment attraction, strengthened supply	SMEs, traders, logistics operators, regional economy	Direct and indirect, long-term	High (Beneficial)

	chains, and expansion of commercial activity			
Employment and Livelihood Opportunities	Long-term employment in operations, maintenance and corridor-based services; stimulation of local enterprise	Local workforce, host communities	Direct and indirect, long-term	Moderate-High (Beneficial)
Road Safety Improvements	Reduced traffic conflicts, improved infrastructure design, enhanced pedestrian protection	Motorists, pedestrians, schoolchildren, and roadside traders	Direct, long-term	Moderate-High (Beneficial)
Regional Integration and Access to Services	Improved access to healthcare, education, markets and employment centres; strengthened regional linkages	Corridor communities	Indirect, long-term	Moderate (Beneficial)

5.4.2.2 Adverse Operational Phase Impacts

The operational phase may also generate environmental and social pressures, including increased traffic, air and noise emissions, changes to hydrology, and induced land-use pressures, as summarised in Table 5.9.

Air Quality (Vehicle Emissions)

Air Quality (Vehicle Emissions): The operational phase will result in increased emissions of $PM_{2.5}$ and PM_{10}, NOx, SO2, CO, VOCs, and greenhouse gases due to higher traffic volumes. Sensitive receptors include communities within 500 m of the road, roadside traders, and commuters. Baseline $PM_{2.5}$ concentrations already exceed WHO and NESREA guidelines, increasing receptor sensitivity. Without mitigation, operational emissions may exacerbate long term exposure for communities within 500 m of the corridor.

Impact Significance (Pre-Mitigation): High

Noise

Operational traffic, especially heavy-duty trucks and buses, will generate continuous noise along the corridor. Noise propagation may be amplified by flat terrain, limited vegetation buffers, and the absence of engineered noise barriers. Nighttime noise is of particular concern for residential areas and health facilities.

Impact Significance (Pre-Mitigation): Moderate-High

Road Safety

The introduction of new interchanges, junctions, and higher traffic volumes may increase the risk of road accidents, particularly during peak periods or at locations with high pedestrian activity. Vulnerable groups include schoolchildren, motorcyclists, and roadside traders. Although the design incorporates climate-resilient drainage, inadequate maintenance may lead to ponding, erosion, or downstream flooding.

Impact Significance (Pre-Mitigation): Moderate

Hydrological Change

Paved surfaces, culverts, and road embankments may alter natural runoff patterns, potentially increasing localised flooding during heavy rainfall events. Although the project includes climate-resilient drainage design, there remains a risk of temporary ponding and erosion downstream of culverts if maintenance is inadequate. Cumulative runoff effects from adjacent developments are also considered.

Impact Significance (Pre-Mitigation): Moderate

Induced Development

Improved accessibility may trigger secondary effects, such as land-use change, informal settlements, or pressure on public services. Induced development impacts require coordination with Lagos State planning authorities to avoid unmanaged sprawl. Although these changes support economic growth, they may also result in social and environmental stress if not proactively planned and managed.

Impact Significance (Pre-Mitigation): Moderate

Community Health and Safety

Increased traffic may elevate accident risks and expose sensitive receptors to dust and noise. Long-term exposure to $PM_{2.5}$ and NO_x may increase respiratory risks for vulnerable populations. Operational traffic could also affect vulnerable populations, including schoolchildren, roadside traders, and commuters.

Table 0.9: Lot 2 Operational Phase Negative Impacts

Impact Category	Description	Magnitude	Sensitivity	Significance (Pre-Mitigation)
Air Quality (Vehicle Emissions)	Increased NOx, PM, and CO from traffic.	High	High	**High** (background levels already stressed)
Noise	Traffic noise (especially at night) near settlements.	Moderate	High	**Moderate-High** (sensitive receptors within 150m)

Road Safety	Risk of accidents at new interchanges.	Low	High	**Moderate** (design includes safety features)
Hydrological Change	Altered runoff patterns, flood risk at culverts.	Low	High	**Moderate** (climate-resilient design)
Induced Development	Pressure on land use and informal settlements.	Moderate	Moderate	**Moderate** (requires planning control)

5.4.4.3 Summary

Overall, the operational phase will provide substantial social and economic benefits but also carries environmental and social risks associated with traffic, emissions, noise, and induced land-use changes. Mitigation, monitoring, and enforcement of planning controls are essential to ensure that benefits are maximised while adverse impacts are minimised.

5.4.3 Decommissioning Phase Impacts

5.4.3.1 Physical and Biological Environment

Decommissioning impacts are expected to mirror construction phase impacts, including temporary increases in dust, noise, waste generation, and traffic disruption. Decommissioning will require a site-specific Decommissioning and Restoration Plan (DRP) consistent with IFC PS1, PS3, PS4, and PS5. However, these impacts are expected to be of lower magnitude, shorter duration, and spatially limited.

Impacts related to air quality, noise, waste generation, soil disturbance, and temporary hydrological alteration are expected to arise from demolition activities and site restoration works. Decommissioning may also require removal of culverts and drainage structures, potentially affecting hydrology and wetlands (PS6).

These impact pathways are consistent with those described under the construction phase and are anticipated to be short-term and reversible with implementation of standard environmental controls (e.g., dust suppression, waste segregation, erosion and sediment control).

Ecological disturbance is expected to be limited, as works will occur within an already modified corridor footprint. Restoration and revegetation will support the recovery of ecological function.

Overall Significance (Physical and Biological, Pre-Mitigation): Moderate

5.4.3.2 Socioeconomic Transition and Legacy Impacts

Unlike construction-type impacts, decommissioning presents distinct socioeconomic considerations:

Employment and Economic Transition:

Cessation of maintenance activities and corridor-related services may temporarily reduce income for workers and small-scale traders who have become economically linked to the project.

Impact Significance (Pre-Mitigation): Moderate

Cultural and Community Closure

Where project activities have interacted with culturally sensitive sites or intangible heritage values, formal closure processes may be required. Failure to appropriately engage communities could result in social dissatisfaction.

Impact Significance (Pre-Mitigation): Moderate to High (socially sensitive)

Public Health and Safety

Temporary risks may arise from dismantling activities, unsecured structures, or equipment demobilisation.

Impact Significance (Pre-Mitigation): Moderate

Decommissioning activities, including dismantling of infrastructure, removal of materials, haulage of debris, and site reinstatement works, may require temporary lane closures, traffic diversions, or partial access restrictions along sections of the corridor and adjoining roads. Increased movement of heavy vehicles associated with waste transport and equipment removal may also affect traffic flow efficiency and road safety. Table 5.10 summarises the Decommissioning Impact rating.

Impact Significance (Pre-Mitigation): Moderate

Table 0.10: Lot 2 Decommissioning Phase Impacts

Impact Category	Impact Description	Key Receptors	Impact Nature	Significance Before Mitigation
Air Quality	Fugitive dust and intermittent exhaust emissions	Nearby communities, workers	Direct, short-term	Moderate
Noise and Vibration	Machinery, demolition vehicle movements	Residences, schools, and healthcare facilities	Direct, intermittent, short-term	Moderate
Hydrology and Soil	Temporary alteration of runoff patterns, erosion or ponding	Downstream drains, wetland fringes	Direct, short-term	Low-Moderate

Impact Category	Impact Description	Key Receptors	Impact Nature	Significance Before Mitigation
Habitat and Ecology	Vegetation clearance and fauna disturbances	Terrestrial habitats, wetland edges	Direct, short-term	Low
Employment Loss	Cessation of operational employment and related economic activity	Project employees, local service providers	Indirect, short-term	Moderate
Community Health and Safety	Risks associated with machinery, demolition works, waste handling and vehicle movement	Nearby communities, workers	Direct, short-term	Moderate
Access and Livelihoods	Temporary restrictions on access roads	Communities, traders	Direct, short-term	Low-Moderate
Temporary Traffic Disruption	Lane closures, diversions	Commuters, freight operators, local communities, and roadside businesses	Direct, short-term, localised	Moderate

5.5 Cumulative Impact Assessment (CIA)

Cumulative impacts arise from the interaction of Lot 2 with other existing or planned developments in the Lekki-Epe corridor. The assessment focuses on valued Environmental and Social Components (VECs): air quality, noise, traffic/road safety, water resources (Lekki Lagoon), and socioeconomic pressures that are sensitive to incremental pressures from multiple developments. This assessment follows IFC Performance Standard 1 (PS1) guidance, emphasising integrated corridor-level management, identification of sensitive receptors exposed to overlapping pressures, and the incremental contribution of Lot 2 to existing stressors.

Key cumulative impact drivers include:

- Dangote Refinery
- Lekki Deep Sea Port
- Lekki Free Trade Zone
- Lagos-Calabar Coastal Highway
- Urban expansion around Epe and Ibeju Lekki

The spatial boundary of the assessment covers the Lot 2 corridor and associated hydrological, ecological, and transport linkages, while the temporal scope considers long-term operational conditions.

Even where Lot 2's incremental contribution is Moderate, cumulative significance may be elevated to High due to baseline stress, temporal overlap of multiple projects, or exhausted receptor adaptive capacity.

5.5.1Cumulative Impact Themes

5.5.1.1 Air Quality (PS1, PS3 and PS4)

The Lot 2 project will add traffic-related emissions, including $PM_{2.5}$, PM_{10}, NO_x, CO, VOCs, and greenhouse gases. Although Lot 2 is not the primary source of these pollutants, its contribution is material within the already stressed airshed. Dry-season conditions are likely to exacerbate pollutant concentrations and dust resuspension, increasing cumulative exposure for sensitive receptors, including roadside dwellings, schools, commercial clusters, and workers along the corridor. Regional $PM_{2.5}$ levels are already elevated; additional traffic from multiple projects may worsen long term exposure

IFC Relevance:

- PS1 requires the consideration of project risks and impacts for qualifying projects
- PS3 (Pollution Prevention) and PS4 (Community Health and Safety) require monitoring, engineering controls, and coordination with other corridor developments and the adoption of Good International Industry Practice (GIIP)

Cumulative significance: Moderate-High (Adverse)

5.5.1.2 Noise (PS1, PS3, and PS4)

Baseline noise along the corridor, as described in Section 4.7, already exceeds residential and school standards at multiple locations due to traffic, industrial activity, and port logistics. Peak-hour acoustic exposure occurs between 16:00 and 19:00 hours, coinciding with combined commuter and freight flows. Lot 2 operations will incrementally increase cumulative traffic volumes along the corridor. While smoother traffic flow may reduce stop-start noise locally, the increase in heavy-duty vehicles will raise overall acoustic exposure for sensitive receptors, including schools, roadside dwellings, and ecologically sensitive habitats. Noise from the surrounding industries and transportation networks adds to the cumulative noise impact.

IFC Relevance:

- PS1 requires the consideration of project risks and impacts for qualifying projects
- PS3 (Pollution Prevention) and PS4 (Community Health and Safety) require monitoring, engineering controls, and coordination with other corridor developments and the adoption of Good International Industry Practice (GIIP)

Cumulative significance: Moderate-High (Adverse)

5.5.1.3 Traffic and Road Safety (PS1 and PS4)

Traffic surveys indicate that Lot 2 is directly linked to Lot 1, creating a continuous transport corridor with interdependent flows. Peak commuter and freight movements converge along the corridor, with freight vehicles representing a significant portion of daily traffic, while traffic modelling indicates that by 2030, combined vehicle movements across all categories may exceed five million annually within the broader corridor.

Lot 2 will improve capacity and connectivity, redistributing traffic but also inducing additional demand. Without integrated corridor management, key interchanges, including Epe-Ijebu, may exceed operational capacity during peak periods. The combined traffic growth also increases cumulative accident risk, particularly for vulnerable road users such as schoolchildren, roadside traders, and motorcyclists.

IFC Relevance:

- PS1 requires the consideration of project risks and impacts for qualifying projects
- PS4 mandates regional traffic management, signal optimisation, and enforcement coordination

Cumulative significance: High (Adverse, manageable with regional coordination)

5.5.1.4 Hydrology and Flood Risk (IFC PS6)

Hydrological assessments (Section 4.7.2) demonstrate connectivity between surface water systems in Lot 2 and the Lekki Lagoon, including tributaries, culverts, and floodplains. Upstream developments, impervious surfaces, and drainage modifications have already altered baseline runoff patterns, creating elevated flood susceptibility.

Lot 2 introduces additional impervious surfaces and drainage infrastructure, which, while climate-resilient in design, may incrementally elevate peak flows and downstream flood risk in combination with Lot 1, port developments, and other industrial sites.

IFC Relevance:

- PS1 mandates risk management
- PS6 requires the protection of integrated water management and coordination across developments.

Cumulative significance: Moderate (Adverse, dependent on integrated drainage management)

5.5.1.5 Socioeconomic Pressures (PS1, PS2, PS4, PS5)

The Lot 2 corridor intersects with communities already experiencing pressures from workforce influx, changing land use, and evolving livelihoods. Combined workforces across Lot 1, Lot 2, port, and industrial developments may exceed several thousand individuals during peak periods, straining housing, water, sanitation, and healthcare services. Sensitive groups include women, children, local households, and migrant workers.

Additional cumulative social pressures include:

- Elevated Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH) risk where large workforces operate concurrently.
- Livelihood transition from agriculture to logistics and services, creating economic opportunities but transitional vulnerabilities.

IFC Relevance:

- PS1 (Social Risk) PS2 (Labour), PS4 (Community Health & Safety), PS5 (Livelihood Restoration)

Cumulative significance: Moderate-High (Adverse/Beneficial depending on management)

5.5.1.6 Overall Cumulative Conclusion

The Lot 2 corridor operates within an already stressed environmental and socioeconomic context. Lot 2's incremental contribution is additive rather than primary, but it increases cumulative pressures along the corridor in areas such as:

- Air quality ($PM_{2.5}$ and NO_x hotspots)
- Noise exposure at sensitive receptors
- Traffic congestion and road safety risks
- Lagoon-connected hydrological and flood pressures
- Social stressors linked to workforce influx and livelihood transition

Effective management requires corridor-level coordination, monitoring, and mitigation in line with IFC Performance Standards (PS1, PS2, PS3, PS4, PS5, PS6).

Table 5.11 presents the consolidated summary of cumulative impacts, receptors, drivers, significance ratings, and relevant IFC PSs.

Table 0.11: Cumulative Impact Summary

Impact Theme	Impact Description	Key Receptors / Beneficiaries	Drivers / Interacting Projects	Cumulative Significance (Pre-Mitigation)	Residual Significance (Post-Mitigation)	Relevant IFC PS
Air Quality	Incremental traffic and construction emissions, combined with industrial and port activities, increase $PM_{2.5}$, PM_{10}, NO_x, CO, and VOC exposure.	Local communities	Lot 1, LCCH, Dangote Refinery, Lekki Port, LFTZ, Alaro City, corridor traffic growth	Moderate-High (Adverse)	Moderate (with corridor-level monitoring, dust/emission controls, and GIIP)	PS1, PS3, PS4
Noise	Increased vehicle and industrial activity raises acoustic exposure across the corridor.	Roadside dwellings, schools, commercial clusters, wetlands	Lot 1, Dangote Refinery, Lekki Port, LFTZ, Alaro City, corridor traffic growth	Moderate-High (Adverse)	Moderate (with traffic management, noise mitigation, and monitoring)	PS1, PS3, PS4
Traffic & Road Safety	Higher corridor volumes, peak congestion, and increased accident risk.	Commuters, Local communities	Lot 1, LCCH, Lekki Port, industrial and residential developments	High (Adverse)	Moderate-High (with regional traffic planning, signal optimisation, and enforcement)	PS1, PS4
Hydrology & Flood Risk	Impervious surfaces and drainage modifications raise cumulative runoff and flood risk.	Communities in low-lying areas, lagoon-dependent ecosystems	Lot 1, LCCH, Lekki Port, LFTZ, Alaro City	Moderate (Adverse)	Low-Moderate (with integrated drainage management, maintenance, and monitoring)	PS1, PS6
Socioeconomic Pressures	Workforce influx, livelihood transition, GBV/SEA/SH risks, service demand.	Local households, women, children, and migrant workers	Lot 1, LCCH, Dangote Refinery, Lekki Port, LFTZ, Alaro City, corridor workforce	Moderate-High (Adverse/Beneficial)	Moderate (with grievance mechanisms, livelihood support, service coordination,	PS1, PS2, PS4, PS5

					and corridor-level PS1 management)	

5.6 Climate Change and Resilience Impacts

5.6.1 Physical Risks

Increased Rainfall Intensity

Hydrological analyses indicate that the corridor experiences high peak discharges during extreme rainfall events, driven by low slopes, poorly defined natural drainage channels, and high surface saturation. These conditions, in combination with upstream and adjacent developments, contribute to elevated corridor-level flood and erosion risks. Lot 2 introduces additional impervious surfaces and drainage structures that interact with existing pressures, potentially affecting roadway flooding, pavement stability, and downstream hydrological flows. Adjacent communities and corridor ecosystems may be exposed to these compounded physical risks.

Sea-Level Rise and Groundwater

Although Lot 2 is located further inland, global sea-level rise is projected to reach approximately 0.44-0.76 m by 2100 under an intermediate emissions scenario (SSP2-4.5), according to the IPCC (2021) AR6. For low-lying coastal and lagoon-connected infrastructure along the Lot 2 corridor, this represents a potential risk to drainage capacity and pavement integrity. Consequently, under IFC PS1, PS3, and PS4, the project design and cumulative impact assessment must consider climate-resilience measures to maintain long-term safety and operational functionality. Additionally, elevated flood risks may reduce drainage efficiency, affect shallow groundwater quality, and alter surface water flow regimes along the corridor, thereby amplifying cumulative hydrological pressures identified in Section 5.5 and presented in Table 5.11.

Heat Stress

Asphalt and concrete surfaces generate localised heat island effects, increasing ambient temperatures along the corridor. This contributes to cumulative thermal stress for construction workers, maintenance personnel, and roadside communities already exposed to high daytime temperatures, particularly where housing and informal structures have limited ventilation or heat-reflective materials.

5.6.2 Transition Risks

Construction and operational activities along Lot 2 contribute to greenhouse gas (GHG) emissions, including:

- Construction materials, equipment, and transport-related emissions
  Operational vehicle traffic along the corridor
- One-time emissions from land-use change associated with vegetation clearance

These emissions incrementally add to cumulative corridor-level GHG loads already generated by Lot 1, Dangote Refinery, Lekki Port, and other industrial and transport developments, thereby influencing regional carbon exposure and potential regulatory compliance requirements.

Climate change impacts are summarised in Table 5.12.

Table 0.12: Climate Change Impact Summary

Climate Impact	Magnitude	Sensitivity	Significance (Pre-Mitigation)
Increased Rainfall Intensity (flood risk; culvert capacity exceedance)	Moderate	High	**Moderate-High**
Sea-Level Rise and Groundwater Salinisation (drainage efficiency; groundwater quality)	Low	Moderate	**Minor**
Heat Stress (workers, roadside communities)	Moderate	Moderate	**Moderate**
Construction GHG Emissions (materials, equipment, land-use change)	Moderate	Low	**Minor**
Operational GHG Emissions (vehicle traffic)	Moderate	Moderate	**Moderate**
Carbon Stock Loss (vegetation clearance)	Low	Low	**Minor**
Cumulative Corridor-Level GHG Load (Lot 1+2+Dangote+Port+LCCH+LFTZ)	High	Moderate	**Moderate-High (Cumulative)**

5.6.3 Cumulative Climate Impact Context

Lot 2's climate risks are therefore intrinsically linked to the broader corridor context. Increased rainfall intensity contributes to cumulative flood and erosion exposure, heat stress amplifies existing thermal pressures, and incremental GHG emissions add to corridor-wide carbon loads. Situating Lot 2 within this corridor-level perspective allows the assessment to recognise that climate impacts are interdependent with existing and planned developments, consistent with IFC PS1 and PS3 guidance, and aligns with the cumulative impact considerations summarised in Table 5.11.

5.7 Human Rights Impact Screening

Human rights risks are assessed in line with IFC PS1, PS2, PS4, and PS5.

Potential risks include:

- Labour rights violations if contractors are not properly supervised
- Community exposure to GBV/SEA/SH risks from labour influx
- Unequal access to project benefits
- Inadequate compensation for vulnerable PAPs

The ESMP will include a Human Rights Action Framework aligned with international best practice.

5.8 Gender Considerations

Gender differentiated impacts are recognised, particularly regarding livelihoods, safety, and access to opportunities. Women traders, farmers, and caregivers may face disproportionate impacts from access disruption, labour influx, and market changes.

The project will implement gender responsive measures, including safe pedestrian crossings, GBV/SEA/SH mitigation, and targeted livelihood support.

5.9 Lender-Specific Impact Considerations

This section summarises how the Lot 2 project interacts with key international lender requirements, including the IFC Performance Standards (PS), Equator Principles IV, and the World Bank Environmental, Health, and Safety (EHS) Guidelines. It highlights the specific triggers, obligations, and relevance to the project's pre-mitigation impacts.

5.9.1 Applicable IFC Performance Standards

The following IFC Performance Standards are identified as applicable and relevant to Lot 2 development based on the project characteristics and its interaction with the environment.

A. PS1: Assessment and Management of Environmental and Social Risks

All identified environmental and social impacts, including air quality deterioration, noise, hydrological changes, and socioeconomic pressures, fall under PS1. The ESIA and proposed Environmental and Social Management Plan (ESMP) provide the framework for mitigation, monitoring, and adaptive management.

B. PS2: Labour and Working Conditions

The anticipated labour influx of approximately 800 construction workers requires compliance with PS2. Key considerations include worker health and safety, accommodation, non-discrimination, grievance mechanisms, and occupational health monitoring.

C. PS3: Resource Efficiency and Pollution Prevention

Impacts such as dust emissions, vehicle exhaust, wastewater generation, and soil erosion are covered under PS3.

Management measures include the application of Good International Industry Practice.

D. PS4: Community Health and Safety

Risks to communities from traffic, dust, gaseous emissions, pollution incidents, and accidents due to project activities.

PS4. Mitigation measures include safe haul routes, traffic management, and public health awareness campaigns.

E. PS5: Land Acquisition and Economic Displacement

The project affects 32 Project-Affected Persons (PAPs) through crop loss within the RoW.

Livelihood restoration, compensation, and stakeholder engagement measures ensure PS5 compliance.

F. PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Clearance of approximately 28 ha of modified terrestrial habitat and temporary wetland encroachment triggers. Risk to surface water degradation.

PS6. Mitigation includes controlled habitat clearance, controlled access to wetland fringes, and prevention of surface water pollution.

C. PS8: Cultural Heritage

The risk of encountering archaeological or cultural heritage material during excavation and earthworks within the corridor is assessed as Low significance (pre-mitigation), given the absence of known heritage sites within the RoW, but requires a formal Chance Finds Procedure as a precautionary measure consistent with IFC PS8.

5.9.2 Equator Principles IV Compliance

- **Project Categorisation:** Lot 2 qualifies as a Category A project due to potential significant environmental and social impacts. This requires stringent management, independent monitoring, and transparent reporting.
- **Stakeholder Engagement:** Ongoing consultation with affected communities, PAPs, and local authorities is required to ensure informed participation throughout the project lifecycle.
- **Grievance Mechanism:** A transparent, accessible, and effective grievance mechanism must be in place for workers, communities, and other stakeholders, consistent with Equator Principles guidance.

5.9.3 World Bank EHS Guidelines

- **Air & Noise:** Construction and operational emissions must comply with the relevant EHS guideline values for $PM_{2.5}$, PM_{10}, NOx, SO_2, CO, and noise levels near sensitive receptors.
- **Water:** Discharges, runoff, and sediment loads must not degrade receiving water quality, in line with surface and groundwater protection standards.
- **Waste Management:** Both hazardous and non-hazardous wastes generated during construction and operation must be managed according to EHS requirements, including segregation, storage, transport, and disposal.

5.10 Conclusion

Lot 2 of the 7th Axial Road presents a range of moderate to high environmental and social impacts, particularly during construction and in cumulative combination with other projects in the corridor. The assessment confirms that no critical or irreversible impacts are anticipated, and all identified impacts can be managed through a robust mitigation framework aligned with lender safeguards, seasonal adaptations, and regulatory compliance.

The next chapter outlines the mitigation hierarchy (Avoid, Minimise, Restore, Offset) and detailed management measures to reduce all impacts to acceptable residual levels.

CHAPTER SIX

MITIGATION MEASURES

6.1 Introduction

This chapter outlines the mitigation measures developed to address the environmental and social impacts identified and assessed in Chapter 5, in accordance with the mitigation hierarchy established under IFC PS1-PS8, Equator Principles IV, World Bank EHS Guidelines, and Nigerian regulatory frameworks (NESREA, LASEPA, FMEnv). The measures are directly linked to the inherent (pre-mitigation) impact significance ratings presented in Chapter 5 (Tables 5.1-5.7) and prioritise impacts rated Moderate or High, for focused management attention and resource allocation.

Mitigation measures outlined in this chapter are implemented through specialised management plans that provide detailed procedures, operational controls, and monitoring requirements. These plans are cross-referenced within the relevant sections (See Chapter 7.7 and Appendices 4.1-4.6).

6.1.1 Mitigation Framework

The mitigation framework applied to Lot 2 is structured in accordance with IFC Performance Standard 1, applying the mitigation hierarchy as follows:

1. **Avoidance:** Where possible, impacts are avoided through design modifications, scheduling, and spatial planning.
2. **Minimisation:** Where impacts cannot be avoided, they are minimised through engineering controls, good practice, and management plans.
3. **Restoration/Rehabilitation**: Affected environments and livelihoods are restored post-impact.

Mitigation measures are prioritised according to impact significance, receptor sensitivity, and technical and financial feasibility, applying the principles of Best Available Technology Not Entailing Excessive Cost (BATNEEC) and As Low As Reasonably Practicable (ALARP).

- **As Low As Reasonably Practicable (ALARP):** Applied throughout the mitigation hierarchy to ensure that risks are reduced to the lowest level reasonably practicable, taking into account technical feasibility, proportional cost, and societal considerations.
- **Best Available Technology Not Entailing Excessive Cost (BATNEEC):** Applied in the selection of technical solutions to ensure optimal environmental performance without disproportionate financial burden.

6.2 Preconstruction and Construction Phase Mitigation Measures

This section presents mitigation measures for the combined preconstruction and construction phases, addressing the environmental and social risks and pre-mitigation impacts identified in Chapter 5. Measures are designed to prevent, reduce, or manage impacts in accordance with the internationally recognised mitigation hierarchy:

6.2.1 Physical Environment

6.2.1.1 Mitigation Measures for Air Quality Impact Control

Air quality mitigation measures include controls targeting fugitive dust and gaseous emissions mitigation, as shown in Table 6.1.

Table 0.1 Air Quality and Dust Control

Impact	Mitigation Measure	Implementation	Compliance Standard
Fugitive Dust	Water spraying on unpaved roads and work areas (minimum 2x daily in dry season).	Contractor (CHEC)	NESREA $PM_{10} \leq$ 150 µg/m³ (24-hr Ambient limit)
	Covered trucks for transporting loose materials; speed limits (30 km/h) on site.	Environmental Officer (EO)	IFC PS3, World Bank EHS
	Windbreaks & silt fencing at the perimeter of active work zones.	Contractor	LASEPA Guidelines
Equipment Emissions	Use of EURO IV/V compliant machinery; regular engine maintenance.	Fleet Manager	IFC PS3
	Idling restrictions (max 3 minutes) for all vehicles and equipment.	Site Supervisor	

6.2.1.2 Noise and Vibration

Noise mitigation measures are shown in Table 6.2.

Table 0.2 Noise and Vibration Control

Impact	Mitigation Measure	Implementation	Compliance Standard
Equipment Noise	Acoustic barriers around stationary noise sources (e.g., generators, crushers).	Contractor	NESREA: 70 dB(A) at site boundary
	Regular maintenance of equipment; use of mufflers/silencers.	Maintenance Team	
Piling/Vibration Community Exposure	Restrict piling to daytime hours (7:00-18:00); pre-bore where possible.	Piling Subcontractor	IFC PS4, BS 5228-2
	Noise monitoring at 3 sensitive receptors (schools, clinics); real-time alerts.	Environmental Monitor	WHO Community Guidelines
	Community notice issued 48 hours before high-noise activities.	Community Liaison Officer (CLO)	

6.2.1.3 Water Quality and Erosion Control

Surface water and erosion control measures are presented in Table 6.3, while Spill prevention and emergency response procedures are further detailed in the Spill Prevention & Response Plan (SPRP) (Appendix 7.1).

Table 0.3 Water Quality and Erosion Control Measures Control

Impact	Mitigation Measure	Implementation	Compliance Standard
Sediment Runoff	Silt fences, sediment basins, and check dams on slopes >5%.	Erosion Control Officer	NESREA TSS ≤ 50 mg/L in runoff
	Stabilisation of exposed soils within 14 days using mulch/geotextiles.	Contractor	
Spill Prevention	Spill kits at fuel storage areas; secondary containment for all chemicals.	HSE Officer	IFC PS3, SPCC Plan
	Training for equipment operators on spill response	Contractor	
Drainage Protection	Temporary diversion channels to maintain natural flow during construction.	Civil Engineer	LASEPA Water Quality Standards
	No works within 50m of wetland/stream banks without approval.	Site Manager	IFC PS6

6.2.1.4 Waste Management

Waste management measures are shown in Table 6.4. The detailed procedures for waste segregation, storage, transport, disposal, and record-keeping are set out in the Waste Management Plan (WMP) (Appendix 7.2).

Table 0.4 Waste Management Control

Waste Type	Mitigation Measure	Disposal Location	Compliance
Construction & Demolition Waste	Segregation (concrete, metal, wood); recycling ≥ 50%.	Approved recycling facility	NESREA Regs
Hazardous Waste (oils, paints)	Licensed hazardous waste contractor; manifest system.	LAWMA-approved facility	IFC PS3
Domestic Waste	Provision of skips and regular collection in worker camps.	Epe landfill	Public Health Law

6.2.1.5 Hazardous Materials Management (IFC PS3, PS4)

The project will implement a Hazardous Materials Management Plan covering all fuels, lubricants, solvents, concrete additives, and other hazardous substances used during construction.

All hazardous materials will be stored in bunded, clearly labelled areas away from drainage channels, watercourses, and wetland buffers. Secondary containment will be provided for all bulk storage. A materials register will be maintained on site, recording quantities received, consumed, and disposed of for all hazardous substances.

Workers handling hazardous materials will receive specific induction training prior to first use, covering safe handling, personal protective equipment requirements, and emergency spill response procedures. Hazardous waste, including spent oils, paint residues, and contaminated materials, will be segregated, stored in sealed containers, and disposed of through a licensed contractor in accordance with NESREA regulations and IFC PS3.

Incident reporting will be mandatory for all spills, near-misses, and non-conformances, with records maintained by the EO and reviewed at each quarterly ESMP review meeting. Detailed procedures are set out in the Hazardous Materials Management Plan (Appendix 7.3).

6.2.1.6 Emergency Response and Accidental Events (IFC PS4)

The project will implement an Emergency Response Plan (ERP) covering all foreseeable accidental event scenarios during construction, including fuel and chemical spills, fire incidents, worker injuries, and flooding of active works areas during heavy rainfall.

An Emergency Response Team will be established before construction commencement, with clearly assigned roles, communication protocols, and escalation procedures. Spill kits and containment materials will be maintained at all fuel storage locations and at each active works area. All fuel storage will be bunded with secondary containment sufficient to hold 110% of the largest vessel volume.

In the event of a spill, the EO will initiate immediate containment, notify the IESM and LASEPA within 24 hours, and prepare an incident report within 48 hours. Where a spill reaches a drainage channel or watercourse, the CLO will notify affected downstream communities immediately.

Emergency drills will be conducted at least twice annually, with outcomes documented and used to update ERP procedures. Coordination arrangements with Epe General Hospital, the Nigeria Police Force, the FRSC, and Lagos State Fire Service will be formalised prior to construction commencement.

Full procedures are set out in the Emergency Response Plan (Appendix 7.4).

6.2.2 Ecological Mitigation Measures

The measures below address residual ecological impacts identified in Chapter 5, covering habitat loss, flora and fauna disturbance, and wetland encroachment during preconstruction and construction. Responsibilities and verification arrangements are detailed in the ESMP (Chapter 7).

6.2.2.1 Habitat Protection

- A 50-metre buffer zone shall be established and demarcated around all wetland and riparian areas prior to construction. No clearing, equipment storage, or spoil deposition shall occur within these buffers, verified by the Environmental Inspector during site establishment.
- Preconstruction wildlife salvage shall be conducted by qualified ecologists across all work areas prior to clearance, including systematic search and relocation of reptiles and small mammals to suitable adjacent habitat. Results shall be documented in a Salvage Report.
- Construction in or adjacent to wetland areas shall be prohibited during the peak breeding season (April to September).

6.2.2.2 Flora and Fauna

- Where clearing of priority flora is unavoidable, transplantation to designated receptor sites shall be undertaken prior to clearance, guided by feasibility assessments prepared by the project ecologist. This measure applies to specimens of conservation or cultural significance, not routine vegetation clearance.
- An Invasive Species Management Protocol shall be implemented throughout construction to prevent the spread of *Chromolaena odorata* during soil disturbance, covering contractor induction, machinery hygiene checks, and post-clearance monitoring.
- Artificial lighting shall be downward-facing, low-intensity, and directed away from wetland and vegetated areas, subject to ecologist review prior to installation. Bird activity monitoring during preconstruction shall inform any refinement of lighting specifications or seasonal restrictions.

6.2.2.3 Biodiversity Enhancement Commitment under PS6

No Critical Habitat has been identified within the project corridor. Permanent conversion of 28 hectares of Modified Habitat does not constitute a significant residual impact at the landscape scale following application of the mitigation hierarchy and does not trigger a biodiversity offset obligation under IFC PS6.

Notwithstanding this, the project has adopted a voluntary commitment to restore 56 hectares of degraded forest land within Epe Forest Reserve, pre-approved by the Lagos State Ministry of Forestry. Activities will include reforestation using locally appropriate native species, targeted invasive species removal, and community-based monitoring to support long-term ecological stability. The 2:1 restoration ratio reflects a conservative enhancement approach, not a compensatory offset, and is consistent with PS6 expectations for Modified Habitat management.

Implementation arrangements, success metrics, and monitoring protocols are set out in the Biodiversity Enhancement Plan appended to the ESMP.

6.2.2.4 Wetland Restoration

Where temporary construction workspace has disturbed wetland fringes at CH 15-17, the project will implement targeted restoration to reinstate hydrological function and ecological condition.

Restoration actions will include removal of temporary fill and compaction, regrading to natural contours, and replanting of sedges, grasses, and riparian shrubs appropriate to the local ecological context.

Hydrological function will be monitored for a minimum of 12-24 months following restoration, with adaptive management applied if vegetation fails to re-establish within expected timeframes.

Restoration activities will be implemented in accordance with the Biodiversity Rehabilitation Plan (Appendix 7.5).

6.2.2.5 Biodiversity Management and No Net Loss

The project will implement a suite of measures to achieve No Net Loss of biodiversity within the Modified Habitat classification, consistent with IFC PS6. These include habitat restoration on unused construction areas following demobilisation, maintenance of wetland buffer zones and sediment controls throughout construction, invasive species monitoring and removal with particular attention to *Chromolaena odorata* colonisation of disturbed soils, and replanting of native species within disturbed areas. No Net Loss is considered achievable given the Modified Habitat classification, the availability of suitable restoration receptor areas, and the 2:1 voluntary enhancement commitment described in Section 6.2.2.3.

6.2.3 Socio-Economic Mitigation Measures

This section outlines measures designed to reduce, manage, and compensate for social and economic impacts identified in Chapter 5, including economic displacement, access disruption, community health and safety risks, and labour influx. All measures are consistent with IFC Performance Standards (PS1-PS5, PS2, PS4), Equator Principles IV, and Nigerian regulations.

6.2.3.1 Economic Displacement and Livelihood Restoration

The project will implement a Livelihood Restoration Plan (LRP) for all 32 PAPs. The LRP provides the overarching framework for restoring livelihoods through compensation, transitional assistance, and income enhancement measures.

As part of the LRP, all affected crops and economic trees will be compensated at Full Replacement Cost (FRC), based on independent professional valuation using the Income Capitalisation and Replacement Cost Approach. The Valuation Report (Appendix 7.6) contains the asset inventory, replacement cost calculations, and signed acknowledgements from all 32 Project Affected Persons (PAPs). 100% of compensation will be paid prior to site clearance as a condition precedent to loan disbursement, in accordance with IFC PS5 requirements and lender conditions.

The LRP also includes agricultural input support, vocational training (small business management, driving, and tailoring), and access to microcredit through partnership with the

Lagos State Employment Trust Fund. Implementation will adopt a gender-responsive approach, with at least 40% of benefits directed to women-headed households, and additional support provided to identified vulnerable groups.

A summary of the compensation framework parameters is provided in Table 6.5 below. The underlying documentation, including the full asset inventory and PAP identification records, is contained in the stand-alone Resettlement Action Plan (RAP) and accompanying Valuation Report, developed in accordance with IFC PS5.

Table 0.5: PAP Compensation Framework Summary

Parameter	Commitment
Number of PAPs	32 (crop loss only; no physical displacement)
Compensation Standard	Full Replacement Cost (FRC) based on professional valuation
Valuation Date	[Insert date]
Valuation Method	Income Capitalisation and Replacement Cost Approach
Compensation Timeline	100% disbursement before any site clearance (Condition Precedent)
Vulnerable Groups Identified	Women-headed households (18%), elderly (8%), unemployed youth (30%)
Livelihood Restoration	Agricultural input support, vocational training, and microcredit access, with 40% targeting women
Grievance Mechanism	Dedicated community desk; 30-day resolution target; escalation to FMEnv

All compensation and livelihood restoration activities will be implemented in accordance with the stand-alone Resettlement Action Plan (RAP) and LRP, consistent with IFC PS5 requirements.

6.2.3.2 Access and Mobility

The project shall:

- Maintain at least one accessible route through construction zones at all times.
- Provide temporary footbridges or alternative pedestrian access where routes are disrupted.
- Issue advance notice of road closures through community meetings, SMS alerts, and local announcements.

6.2.3.3 Traffic Management and Road Safety

The project will implement a Traffic Management Plan (TMP) covering all construction-phase vehicle movements, haul routes, and community access points along the Lot 2 corridor.

Speed limits of 20 km/h will be enforced within village sections and at community crossings, supported by signage, speed bumps, and traffic marshals during peak movement periods. Dedicated pedestrian crossings with physical barriers will be established at schools, markets, and other high-footfall locations, with flagmen deployed during school opening and closing hours.

Heavy haulage movements will be scheduled outside school peak hours (07:30-08:30 and 14:30-15:30) and will avoid community market days where practicable. Night-time haulage will be restricted unless operationally necessary, and where permitted, adequate lighting and additional marshalling will be required.

Driver induction will cover speed limits, haul route restrictions, pedestrian awareness, and fatigue management. Drivers involved in incidents or repeated violations will be subject to disciplinary procedures and may be removed from the project.

Emergency vehicle access will be maintained at all times through coordinated traffic management with the Epe Division of the Nigeria Police Force and Lagos State Emergency Management Agency.

The TMP will be reviewed and updated following any road safety incident and at each quarterly ESMP review. Detailed procedures are set out in the Traffic Management Plan (Appendix 7.7).

6.2.3.4 Community Health and Safety (IFC PS4)

The project will conduct weekly health and safety briefings for communities adjacent to active construction zones, covering dust, noise, access disruption, and emergency contact information. Temporary footbridges or alternative pedestrian routes will be provided wherever existing routes are disrupted by construction.

6.2.3.5 Labour and Working Conditions (IFC PS2)

The project will implement a Contractor Labour Management Plan (LMP) aligned with IFC PS2 and ILO Core Conventions, covering all direct employees and subcontractor workers throughout the construction phase.

Recruitment will prioritise host communities, with a minimum target of 30% local hiring for unskilled and semi-skilled positions. Written contracts, issued in a language understood by each worker, will specify wages, working hours, entitlements, and grievance procedures prior to mobilisation.

Working hours will not exceed ILO standards, and overtime will be voluntary and compensated at the applicable premium rate. Wage payments will be made directly to workers on a regular and documented schedule, with no unauthorised deductions permitted.

A confidential Worker Grievance Mechanism, separate from the community GRM, will be established and maintained throughout construction. Workers will be informed of this mechanism during induction and at regular intervals thereafter.

Subcontractor and supplier compliance will be managed through mandatory contractual requirements, pre-engagement screening, and quarterly audits covering working conditions, wage records, and supply chain practices. Any finding of child labour or forced labour within the supply chain will trigger immediate remediation and escalation to the IESM and lenders.

All workers will receive mandatory induction training covering OHS procedures, their rights under the LMP, the Worker Grievance Mechanism, and GBV/SEA/SH prevention obligations. Refresher training will be conducted annually and following any significant incident.

Detailed procedures are set out in the Labour Management Plan (Appendix 7.8).

6.2.3.6 GBV/SEA/SH Prevention and Response (IFC PS2, PS4)

The project will implement a GBV/SEA/SH Action Plan applying a zero-tolerance policy to all forms of gender-based violence, sexual exploitation and abuse, and sexual harassment within and adjacent to the construction corridor.

All workers will sign a Code of Conduct prior to mobilisation, committing to acceptable behaviour standards and acknowledging the consequences of violations. Mandatory GBV/SEA/SH awareness training will be delivered to all workers and supervisors on induction and biannually thereafter, facilitated by a specialist NGO.

Confidential reporting channels, including the community GRM hotline and a dedicated reporting line accessible to both workers and community members, will be maintained throughout construction. A survivor-centred response protocol will be applied to all reported incidents, ensuring the safety, privacy, and dignity of survivors as the primary consideration.

The project will collaborate with local women's groups and health centres to strengthen community-level awareness and referral pathways. Incidents will be tracked, investigated, and reported to the IESM on a quarterly basis, with patterns informing adaptive management of prevention measures.

Full procedures are set out in the GBV/SEA/SH Action Plan (Appendix 7.9).

6.2.3.7 Worker Accommodation (IFC PS2)

Worker accommodation will meet IFC/EBRD performance standards throughout the construction phase. Facilities will provide adequate living space, natural ventilation, potable water, and sanitation at ratios consistent with IFC guidance. Gender-segregated sleeping quarters, washing facilities, and toilets will be provided and maintained throughout the occupation.

Security arrangements will be proportionate and will not restrict workers' freedom of movement outside working hours. Waste management and pest control procedures will be implemented within all accommodation areas, with regular inspections conducted by the CHEC HSE team. A dedicated accommodation grievance channel, separate from the main Worker Grievance Mechanism, will be available to all residents.

Accommodation standards will be independently verified by the IESM on a quarterly basis. Detailed standards and inspection procedures are set out in the Worker Accommodation Plan (Appendix 7.10).

6.3 Operational Phase Mitigation Measures

The operational phase mitigation measures aim to manage long-term environmental and social impacts post-construction. The measures address traffic, noise, air quality, and hydrological changes, consistent with IFC Performance Standards, Equator Principles IV, World Bank EHS Guidelines, and Nigerian regulatory frameworks.

6.3.1 Traffic Safety and Noise Control

The project shall:

- Install noise barriers at four locations near sensitive receptors (residential clusters) to reduce community exposure.
- Implement speed cameras and traffic calming measures at approaches to settlements to manage vehicle speeds and enhance pedestrian safety.
- Conduct regular road maintenance to prevent potholes and reduce tire-related noise.

Note: Construction-phase traffic management measures are implemented in accordance with the Traffic Management Plan (Construction) (Appendix 7.11).

6.3.2 Air Quality

The project shall:

- Carry out road sweeping and washing at least twice weekly during the dry season to reduce fugitive dust.
- Establish vegetative barriers (trees/shrubs) along the corridor to absorb particulates and improve local air quality.
- Promote low-emission transport by incentivising Compressed Natural Gas (CNG) and electric port trucks through toll discounts or priority lane access.

6.3.3 Drainage and Flood Resilience

The project shall:

- Conduct monthly inspection and cleaning of culverts, particularly before the rainy season, to ensure free flow and prevent localised flooding.
- Implement a community flood early-warning system, linked to Lagos State Alerts, to enhance preparedness.
- Construct retention basins to manage peak runoff from increased impervious surfaces and reduce downstream flood risk.

6.4 **Cumulative Impact Mitigation**

This section addresses impacts arising from the combined activities of the Lot 2 Project with other developments in the Lekki Corridor, ensuring that cumulative pressures on environmental and social receptors are managed in line with IFC PS1, PS3, PS4, PS5, PS6, and World Bank

EHS Guidelines. Cumulative impact mitigation emphasises collaborative, corridor-wide management to address shared environmental and social pressures.

6.4.1 Regional Coordination

- Lekki Corridor Environmental Committee (LCEC) established with representatives from Dangote, Lekki Port, CHEC, LASEPA, and FMEnv to coordinate monitoring and mitigation.
- Shared environmental monitoring data (air quality, noise, water quality) published on a public dashboard for transparency and adaptive management.
- Joint traffic management strategies implemented during peak construction periods (2025-2027) to reduce congestion, noise, and accident risk.

6.4.2 Airshed Management

- Annual updates to cumulative air quality modelling to track corridor-wide $PM_{2.5}$, PM_{10}, NOx, and other pollutant levels.
- Emission reduction agreements with other major corridor emitters to optimise collective mitigation measures and ensure compliance with national and IFC/World Bank standards.

6.4.3 Social Services Strengthening

- Upgrade of Epe General Hospital by adding one additional ward, improving capacity to manage cumulative health pressures from construction and operational activities.
- Improvements to water supply in host communities, including borehole rehabilitation, to support population growth and workforce influx.

6.5 Climate Resilience and GHG Mitigation

This section outlines measures to enhance Lot 2 climate resilience and minimise greenhouse gas emissions, consistent with IFC PS1, PS3, and World Bank EHS Guidelines. Measures focus on both adaptive infrastructure design and operational GHG reduction.

6.5.1 Adaptive Design

- Culvert Oversizing: All culverts are designed with 20% additional capacity to accommodate projected increases in rainfall intensity and reduce flood risk.
- Pavement Technology: Use of cool pavement materials to mitigate urban heat island effects and improve thermal comfort along the corridor.
- Tree Planting and Greenery: Strategic planting of shade and carbon-sequestering trees along the corridor to enhance microclimate regulation and provide ecosystem services.

6.5.2 GHG Reduction

- GHG Inventory: Annual assessment of Scope 1, 2, and 3 emissions from construction and operational activities to inform mitigation planning and reporting.
- Construction Phase Reduction Target: Achieve 30% reduction in GHG emissions by:
    - Using electric or hybrid equipment where feasible.
    - Sourcing materials locally to reduce transport-related emissions.
    - Implementing fleet fuel-efficiency standards and idle-time restrictions.

- Operational Phase Opportunities: Encourage low-emission vehicles, including CNG/electric trucks for port logistics, through toll incentives.

All climate adaptation and GHG mitigation measures described in this section are integrated into the core engineering design and the project's ESMP budgets (Section 7.4, Chapter 7). Drainage, pavement resilience, embankment stabilisation, tree planting, and monitoring systems are fully costed within the approved capital and operational allocations. The project does not maintain a separate climate adaptation budget line; rather, resilience measures are mainstreamed within infrastructure design and subject to independent supervision and ESMP audit verification.

Note: Adaptive design specifications and greenhouse gas monitoring procedures are further elaborated in the Climate Resilience Plan (Appendix 7.12).

6.6 Summary of Mitigation Measures

Table 6.6 provides a consolidated overview of the key environmental and social mitigation measures for all project phases, including preconstruction, construction, operational, cumulative, and climate/greenhouse gas management. Each measure specifies the responsible party for implementation and the relevant compliance standard, offering a structured framework to ensure that mitigation actions are implemented effectively and in accordance with regulatory, lender, and international standards. The table is directly linked to the impact categories and significance ratings presented in Chapter 5, allowing prioritisation of measures according to risk and sensitivity.

Table 0.6 Summary of Mitigation Measures

Phase	Impact Category	Key Mitigation Measures	Compliance / Standard
Preconstruction & Construction	Air Quality & Equipment Emissions	Water spraying, covered trucks, speed limits, windbreaks; EURO IV/V machinery, idling limits.	NESREA, IFC PS3, WB EHS
	Noise & Vibration	Acoustic barriers, daytime piling, equipment maintenance, monitoring at sensitive receptors, and community notices.	NESREA, IFC PS4, BS 5228-2, WHO Guidelines
	Water Quality & Erosion	Silt fences, sediment basins, soil stabilisation, spill prevention & training, temporary diversion channels.	NESREA, LASEPA, IFC PS3 & PS6
	Waste Management	Segregation & recycling ≥50%, licensed hazardous waste disposal, domestic waste collection	NESREA, IFC PS3, LAWMA, Public Health Law
	Ecological / Biodiversity	50 m wetland buffers, preconstruction wildlife salvage, seasonal work restrictions,	IFC PS6

		vegetation transplanting, invasive species control, low-intensity lighting	
	Habitat (Biodiversity) Rehabilitation	Rehabilitation of 28-ha degraded habitat at a 2:1 ratio; reforestation, invasive species removal, and community monitoring.	IFC PS6
	Socioeconomic	Full crop compensation, Livelihood Restoration Plan (32 households, 40% women), maintain access, footbridges, speed limits, safe crossings, weekly community H&S briefings.	IFC PS4 & PS5
	Hazardous Materials	Bunded storage, materials register, handler training, licensed hazardous waste disposal, mandatory incident reporting	IFC PS3, NESREA
	Emergency Response	Emergency Response Team, spill kits, 24-hour spill notification, community notification for watercourse spills, bi-annual drills, coordination with emergency services	IFC PS1, PS4
	Labour Rights and Working Conditions	Contractor Labour Management Plan (LMP); written contracts issued prior to mobilisation; ILO-compliant working hours and conditions; direct wage payment; 30% local hiring target for unskilled and semi-skilled roles; subcontractor and supply chain screening and audits; worker grievance mechanism; mandatory OHS induction and ongoing training	IFC PS2, ILO Core Conventions
	GBV/SEA/SH	Code of Conduct, specialist NGO training, confidential reporting channels, survivor-centred response, collaboration with women's groups and health centres	IFC PS2, PS4
	Traffic and Road Safety	TMP, 20 km/h speed limits, dedicated pedestrian crossings, school-hour haulage restrictions,	IFC PS4, FRSC

		driver induction, emergency access coordination	
	Worker Accommodation	IFC/EBRD accommodation standards, gender-segregated facilities, potable water, sanitation, quarterly IESM inspections	IFC PS2, EBRD
Operational	Traffic & Noise	Noise barriers near sensitive receptors, speed cameras, traffic calming, and road maintenance.	IFC PS4, WB EHS
	Air Quality	Road sweeping, vegetative barriers, and promotion of low-emission trucks.	IFC PS3, WB EHS
	Drainage & Flood Resilience	Culvert inspection, retention basins, and a community early-warning system.	LASEPA, IFC PS1
Cumulative	Regional Coordination & Airshed	Corridor committee, shared monitoring, joint traffic management, annual air quality modelling, and emission reduction agreements.	IFC PS1 & PS3
	Social Service	Hospital upgrade (+1 ward), water supply improvements	PS4
Climate / GHG	Adaptive Design & Emissions	Oversized culverts (+20%), cool pavement, tree planting, annual GHG inventory, 30% reduction target via electric equipment, local sourcing, fleet efficiency.	IFC PS1 & PS3, WB EHS

6.7 Residual Impacts

Following implementation of the mitigation measures described in Sections 6.2-6.6, most impacts are expected to be reduced to low or moderate levels. Residual impacts represent those that cannot be fully avoided due to the inherent characteristics of road infrastructure, including noise, operational emissions, and long-term traffic generation. These impacts are managed to acceptable levels through engineering controls, management measures, and habitat rehabilitation where required. Table 6.7 identifies residual impacts.

Table 0.7 Residual Environmental and Social Impacts (Post-Mitigation)

Impact Category	Residual Significance	Justification
Air Quality	Moderate	Fugitive dust and vehicle emissions are controlled via water spraying, vegetative barriers, covered transport, and fleet management; continuous monitoring ensures compliance with NESREA PM limits.
Noise	Moderate (night-time)	Noise barriers, speed controls, and equipment maintenance reduce exposure, but nighttime traffic noise cannot be completely eliminated near sensitive receptors.
Habitat Loss	Low	Preconstruction habitat protection and a 2:1 biodiversity rehabilitation ensure no net loss of ecological function in modified habitats.
Economic Displacement	Low	Full replacement-cost compensation and livelihood restoration plans for 32 PAPs mitigate economic loss; gender-responsive measures ensure equitable benefit distribution.
Cumulative Traffic	Moderate	Regional traffic coordination, speed management, and monitoring reduce congestion risks, though peak-period pressures may persist.
Labour Rights and OHS	Low	Labour Management Plan, written contracts, ILO-compliant conditions, and quarterly subcontractor audits reduce risk of violations; confidential worker grievance channel provides additional safeguard
GBV/SEA/SH	Moderate	Code of Conduct, mandatory training, and confidential reporting substantially reduce risk, but residual risk remains moderate given workforce size and corridor-level cumulative pressures; sustained supervision required
Traffic and Road Safety	Moderate	TMP measures reduce accident risk significantly, but elevated traffic volumes and vulnerable road user exposure mean moderate residual risk persists; ongoing enforcement essential
Accidental Events (Spills)	Low	Bunded storage, spill kits, trained response team, and mandatory 24-hour notification reduce spill impact to low; proximity to wetland drainage pathways requires continued vigilance

Residual impact ratings assume full implementation and monitoring of all mitigation measures. Moderate residual impacts, particularly for traffic, require ongoing attention through regional coordination and adaptive management.

6.8 Conclusion

This chapter provides a comprehensive mitigation framework aligned with IFC Performance Standards, World Bank EHS Guidelines, and Nigerian regulatory requirements. It addresses all significant environmental and social risks and impacts through a combination of avoidance, minimisation, restoration, and rehabilitation measures. Each mitigation action is practical, technically feasible and proportionate to the identified risks, and assigned clear responsibilities, enabling systematic implementation and monitoring throughout the project lifecycle.

The following chapter (Chapter 7: Environmental and Social Management Plan) outlines the institutional arrangements, financial provisions, capacity building, and assurance mechanisms required to implement and sustain these mitigation measures throughout the project lifecycle.

CHAPTER SEVEN

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

7.1 Introduction

This Environmental and Social Management Plan (ESMP) operationalises the mitigation measures and commitments presented in Chapter 6, establishing a structured, monitored, and enforceable framework for implementation across the preconstruction, construction, and operational phases of Lot 2 of the 7th Axial Road. The ESMP ensures compliance with Nigerian regulations, including the EIA Act 2004, NESREA regulations, and LASEPA regulations, as well as international lender requirements under IFC PS1-PS8 and the Equator Principles IV.

The ESMP integrates mitigation measures into contractor obligations, supervision arrangements, monitoring systems, and reporting mechanisms to ensure effective implementation and continuous performance improvement throughout the project lifecycle.

Primary Objectives:

- Ensure effective implementation of mitigation measures to prevent, minimise, and manage adverse environmental and social impacts.
- Define clear institutional roles, responsibilities, and resource allocations for implementation and oversight.
- Establish a robust Monitoring, Reporting, and Verification (MRV) framework to track compliance and performance.
- Facilitate adaptive management through periodic review, corrective actions, and stakeholder engagement.
- Provide transparent reporting to regulators, lenders, and affected communities.

7.2 Institutional Roles and Responsibilities

Table 7.1 outlines the institutional roles and responsibilities to ensure accountability in implementing, supervising, and verifying the Lot 2 ESMP. A clear definition of roles and reporting lines ensures accountability, compliance with regulatory and lender compliance, facilitating effective coordination among the project proponent, contractor, supervisors, independent monitors, and community liaison personnel.

Table 0.1: Institutional Roles and Responsibilities for ESMP Implementation

Institution / Role	Responsibility	Reporting Line
Federal Ministry of Works (FMW)	Project proponent; overall accountability for ESMP implementation	FMEnv and Lenders
CHEC (Contractor)	Day-to-day implementation of ESMP, including environmental, social, and occupational measures	Supervising Consultant (AEC)
Advanced Engineering Company (AEC)	Supervision, quality assurance, and compliance verification of ESMP	FMW and Lenders
Independent Environmental & Social Monitor (IESM) - NEC/MAISA	Third-party monitoring, audit, and validation of environmental and social performance	Lenders and FMEnv
Environmental Officer (EO) - CHEC	On-site ESMP implementation, daily inspections, monitoring, and reporting	CHEC Site Manager and IESM
Community Liaison Officer (CLO)	Stakeholder engagement, grievance intake, community reporting, and facilitation of PAP compensation	IESM and CHEC HSE Manager
Lagos State Agencies (LASEPA, MOE)	Regulatory oversight, spot checks, and enforcement of environmental and social standards	FMEnv (coordinated)

*: The Valuation Report (Appendix 7.6) provides the detailed asset inventory, replacement cost calculations, and signed acknowledgements from all 32 PAPs, underpinning the CLO's facilitation of compensation disbursement. This report is available to lenders upon request and is a Condition Precedent for loan disbursement.

7.3 Monitoring and Evaluation Framework

The Monitoring and Evaluation (M&E) framework for Lot 2 provides a structured system to track the implementation and effectiveness of the mitigation measures described in Chapter 6. The M&E framework supports adherence to regulatory requirements and lender conditions by systematically monitoring, reporting, and verifying ESMP implementation. It also enables transparent communication with stakeholders and promotes adaptive management to continuously improve mitigation outcomes throughout the project lifecycle.

7.3.1 Key Performance Indicators (KPIs) and Thresholds

To evaluate the effectiveness of environmental and social management under the Lot 2 ESMP, key performance indicators (KPIs) have been established. These KPIs provide measurable benchmarks to track environmental quality, social safeguards, and operational compliance, reflecting both regulatory requirements and international best practice. Table 7.2 presents the selected KPIs, associated thresholds, monitoring frequency, and responsible parties.

Table 0.2: Key Performance Indicators for ESMP Implementation

Indicator	Threshold (Standard)	Frequency	Responsible
PM_{10} (24-hr avg)	≤ 150 µg/m³ (NESREA construction)	Continuous with monthly reporting	EO, IESM
Noise (Leq day/night)	70 dB(A) at site boundary; 45 dB(A) at sensitive receptors	Quarterly	IESM
Water Quality (TSS)	≤ 30 mg/L (FMEnv)	Monthly (wet), Bi-monthly (dry)	Accredited Lab
Erosion Control	No visible silt runoff beyond the site boundary	Weekly inspection	EO
Waste Management	≥50% recycling rate of construction and demolition (C&D) waste	Monthly audit	CHEC HSE
Biodiversity Rehabilitation (BR): Native species survival rate	≥80% after 24 months	Quarterly (Years 1-2), Annually (Years 3-5)	Ecologist / IESM
BR: Invasive species cover	<5% of restored area	Quarterly	Ecologist
BR: Species richness (flora)	Return of ≥80% of baseline species	Annually	Ecologist
BR: Community satisfaction with restoration	≥85% positive rating	Annually	CLO
PAP Compensation	100% paid before site entry	Preconstruction	CLO, IESM

GBV/SEA/SH Incidents	Zero tolerance; all staff trained	Quarterly reporting	CHEC HR, IESM
GRM Resolution Rate	≥90% resolved within 30 days	Monthly	CLO, IESM
Lost Time Injury Frequency Rate (LTIFR)	≤ 1.0 per 200,000 hours worked (IFC EHS Guideline)	Monthly	CHEC HSE, IESM
Subcontractor Compliance Audits	100% of subcontractors audited within first 3 months; no child or forced labour findings	Quarterly	CHEC HR, IESM
Worker Grievance Resolution	≥90% of worker grievances resolved within 21 days via confidential channel	Monthly	CHEC HR, CLO
Accommodation Standards Compliance	100% of worker accommodation inspected and meeting IFC/EBRD standards	Quarterly	CHEC HSE, IESM
Hazardous Material Spill Incidents	Zero uncontrolled spills; 100% of spills reported within 24 hours	Monthly	CHEC EO, IESM
Hazardous Material Storage Compliance	100% of storage areas bunded and inspected; no non-conformances outstanding >7 days	Monthly inspection	CHEC EO
Stakeholder Engagement Meetings	Minimum quarterly community meetings held per corridor section	Quarterly	CLO, IESM
Lost Time Injury Frequency Rate (LTIFR)	≤ 1.0 per 200,000 hours worked (IFC EHS Guideline)	Monthly	CHEC HSE, IESM
Subcontractor Compliance Audits	100% of subcontractors audited within first 3 months; no child or forced labour findings	Quarterly	CHEC HR, IESM

7.3.2 Monitoring Locations

Monitoring locations are selected to provide representative coverage of environmental and social conditions along the Lot 2 corridor. Locations are chosen to capture sensitive receptors, high-risk zones, and biodiversity rehabilitated sites.

- **Air and Noise:** 8 fixed stations and 3 mobile units positioned near sensitive receptors (schools, clinics, residential areas) provide continuous and event-based measurement of particulate matter and noise levels.
- **Water Quality:** Monitoring is conducted at 6 surface water points, including streams, wetlands, and other watercourses affected by project activities, to track sediment load and chemical quality.
- **Ecological/Biodiversity:** Permanent ecological transects are established within the 56-ha biodiversity rehabilitation area (4 transects) and at 3 locations along the project Right-of-Way (RoW) to monitor habitat condition, species presence, and restoration success over time.
- **Social Monitoring:** Five community feedback points and a dedicated GRM hotline capture grievances, measure stakeholder satisfaction, and support effective community engagement.

7.4 Phased Implementation and Timeline

The Lot 2 ESMP is implemented according to a phased timeline, ensuring that mitigation, monitoring, and management activities are carried out at the appropriate stage of the project lifecycle. This phased approach allows sequenced allocation of resources, timely engagement of responsible parties, and integration of monitoring outcomes into management decisions, thereby supporting regulatory compliance, lender requirements, and continuous improvement of environmental and social performance.

Table 0.3: ESMP Implementation Activities and Budget Timeline

Category	Allocation (USD)	Purpose	Performance Indicator
Air Quality Monitoring	180,000	Continuous $PM_{2.5}$, PM_{10}, NOx monitoring at 5 stations	Monthly reports to LASEPA
Noise Monitoring	120,000	Real-time monitoring at 3 sensitive receptors	Compliance with NESREA 55 dB(A) day/45 dB(A) night
Water Quality Monitoring	150,000	Monthly sampling at CH 15, 16, 17; TSS ≤30 mg/L	Quarterly lab reports
Soil Erosion Control	200,000	Silt fences, sediment basins, slope stabilization	Zero sediment discharge

Biodiversity Restoration (56 ha)	350,000	Native species replanting, invasive species removal, and monitoring	≥80% survival after 24 months
Livelihood Restoration (32 PAPs)	250,000	Agricultural inputs, vocational training, microcredit access (40% women)	100% compensation before site entry
GBV/SEA/SH Action Plan	120,000	Training, confidential reporting, survivor-centred response	100% workforce trained
Community Liaison & GRM	150,000	5 community desks, 24/7 hotline, quarterly meetings	≥90% grievance resolution within 30 days
Emergency Response	125,000	Spill kits, training, and drills	Annual drills completed
Capacity Building	100,000	ESMP training for contractors, refresher courses	Training records maintained
Independent Monitoring (IESM)	150,000	Quarterly audits, unannounced inspections	Audit reports to lenders
TOTAL	**1,895,000**		

Total ESMP Budget: USD 1.895 million (~0.48% of Lot 2 contract value)

7.5 Reporting and Documentation

The M&E framework provides structured monitoring, reporting, and verification of all mitigation measures. This ensures that responsibilities, frequencies, and thresholds align with regulatory requirements, IFC Performance Standards, and lender conditions, while facilitating transparent communication with stakeholders.

7.5.1 Reporting Matrix

Table 7.4 summarises the main reports generated during the Lot 2 project lifecycle, specifying frequency, preparers, and submission recipients. This ensures accountability, timely communication, and compliance with regulatory and lender requirements.

Table 0.4: ESMP Reporting Requirements and Responsibilities

Report	Frequency	Prepared By	Submitted To
Weekly Site Environmental Report	Weekly	CHEC EO	AEC, IESM
Monthly Compliance Report	Monthly	AEC	FMW, LASEPA, IESM
Quarterly Monitoring Summary	Quarterly	IESM	Lenders, FMEnv, Public Portal
Annual ESMP Performance Report	Annually	IESM + CHEC	FMEnv, LASEPA, Lenders
Incident Reports	Within 24 hrs of the event	CHEC HSE	AEC, IESM, LASEPA
GRM Log & Resolution Report	Monthly	CLO	IESM, Community Noticeboards

7.5.2 Public Disclosure

To ensure transparency and promote stakeholder engagement, Lot 2 monitoring results and ESMP performance information will be communicated to affected communities, regulators, and financiers. The disclosure strategy includes:

- ESMP Summary translated into local languages (Yoruba, Pidgin).
- Monitoring data accessible via public dashboard (online and community centres).
- Annual stakeholder meetings to present performance, receive feedback, and update mitigation approaches as needed.

This approach facilitates inclusive communication, supports accountability, and allows the ESMP to adapt based on stakeholder inputs and observed outcomes.

7.6 Grievance Redress Mechanism (GRM)

The GRM for Lot 2 of the 7th Axial Road provides a formal, accessible, and transparent system for stakeholders to raise concerns, complaints, or suggestions related to the project's environmental, social, and operational impacts. The GRM aligns with IFC Performance Standard 1, Nigerian regulatory requirements, and lender expectations, ensuring timely resolution, accountability, and continuous improvement. It complements the M&E framework (Section 7.3) and reporting procedures (Section 7.5), supporting adaptive management and stakeholder confidence.

7.6.1 GRM Structure

The GRM is structured to provide multiple, accessible channels for stakeholders along the project corridor, catering to both digital and face-to-face engagement:

- **Toll-Free Hotline:** A dedicated number (0800-7TH-AXIAL) operates 24/7 for convenient grievance submission.
- **GRM Officer:** A trained officer based in Epe manages intake, logging, follow-up, and escalation, ensuring continuity and accountability.
- **Community Help Desks:** Five strategically located desks along the corridor facilitate in-person grievance submission, information provision, and guidance.

7.6.2 GRM Process

The GRM follows a defined, time-bound process to ensure grievances are addressed efficiently, fairly, and in alignment with ESMP implementation requirements. The process is as follows:

- **Intake:** Complaints received via the hotline, community help desks, email, or other official channels are logged into a secure digital database within 24 hours of receipt.
- **Acknowledgement:** The complainant receives formal acknowledgement within 48 hours, confirming receipt of the grievance and outlining the next steps.
- **Assessment and Action:** The complaint is assessed for severity, potential environmental or social impacts, and required corrective measures. Where feasible, mitigation or corrective actions are implemented within 15 days of intake.
- **Resolution and Feedback:** The proposed resolution is communicated to the complainant within 30 days, detailing actions taken and outcomes achieved.
- **Appeal:** If the complainant is not satisfied with the proposed resolution, they may submit a formal appeal within 14 days of receiving the resolution notice.

7.6.3.1 Appeal and Escalation

Appeals may be submitted in writing or recorded verbally through the GRM Officer (to accommodate non-literate complainants) using any official communication channel. The Community Liaison Officer (CLO) escalates all appeals to the Independent Environmental & Social Monitor (IESM).

The IESM conducts an independent review of the grievance file, including actions taken, adherence to timelines, and compliance with ESMP commitments and applicable standards. Where necessary, the IESM may consult relevant project personnel, affected stakeholders, or regulatory authorities.

A written determination is issued within 15 days of receipt of the appeal, outlining findings and any corrective measures required. The decision is communicated to the complainant and the Project Proponent. If the complainant remains dissatisfied, they retain the right to pursue resolution through applicable judicial or administrative channels under Nigerian law.

7.6.3 GRM Tracking

The GRM also includes a tracking system mechanism that supports auditable, evidence-based, and responsive grievance management, enhancing regulatory compliance, lender confidence, and community trust. The system includes:

- **Digital Database:** Each grievance is assigned a unique case ID, capturing intake, follow-up actions, responsible parties, and resolution status.

- **Monthly Reporting:** The GRM Officer prepares a monthly report summarising grievances received, actions taken, pending cases, and resolutions. Reports are shared with the CLO, IESM, and community representatives.
- **Analysis and Feedback:** Trends and recurrent issues are analysed to inform improvements in ESMP implementation, mitigation measures, and stakeholder engagement strategies.

7.6.4 GRM Roles, Responsibilities, and Reporting Lines

Table 7.5 summarises the key roles, responsibilities, and reporting lines for personnel and structures involved in implementing the Lot 2 GRM. It clarifies accountability for grievance intake, follow-up, resolution, and escalation, ensuring that community concerns are addressed efficiently and transparently. The table aligns with the GRM structure (Section 7.6.1), process (Section 7.6.2), and tracking mechanisms (Section 7.6.3), while supporting compliance with IFC PS1, Nigerian regulatory requirements, and lender expectations.

Table 0.5: GRM Roles, Responsibilities, and Reporting Lines

GRM Component / Role	Key Responsibilities	Reporting Line
GRM Officer	Receive and log grievances; ensure timely follow-up; maintain GRM database	Reports to CLO for daily operations; submits monthly summaries to IESM for oversight
Community Liaison Officer (CLO)	Consolidate grievances; coordinate responses; escalate unresolved issues; stakeholder engagement	Reports to IESM and CHEC HSE Manager
Community Help Desks (5 locations)	First point of contact for communities; intake complaints; provide feedback	Reports to CLO
Toll-Free Hotline (0800-7TH-AXIAL)	24/7 complaint intake; triage and forward issues	Managed by GRM Officer; escalates complex cases to CLO
Independent Environmental & Social Monitor (IESM)	Oversight, verification, and audit of grievance handling; ensures compliance with ESMP and lender requirements	Reports externally to FMW, FMEnv, and Lenders
CHEC HSE Manager	Supports resolution of safety, GBV/SEA/SH, and operational grievances; monitors compliance	Reports to AEC and FMW

7.7 Specialised Management Plans

Table 7.6 provides an overview of the specialised management plans supporting the Lot 2 ESMP. Each plan addresses specific environmental and social aspects in greater operational detail than is presented in the main ESMP. These standalone documents provide practical guidance, define roles and responsibilities, and specify mitigation, monitoring, and reporting requirements, ensuring alignment with IFC Performance Standards, Nigerian regulatory frameworks, and lender expectations.

The specialised management plans operationalise the mitigation measures presented in Chapter 6. They establish detailed procedures, implementation frameworks, and monitoring mechanisms to ensure that environmental and social commitments are effectively executed throughout the project lifecycle. All plans are included in Appendix 7.

Table 0.6: Specialised Management Plans Supporting the ESMP

Plan	Purpose	Alignment
Spill Prevention & Response Plan	Manage fuel, chemical, and hazardous material spills	IFC PS3, NESREA
Emergency Response Plan	For emergency situations, including accidents and fire outbreaks	IFC PS1, PS2, PS4
Traffic Management Plan (Construction)	Control construction traffic, maintain safe local access, minimise community disruption	IFC PS4, FRSC
Livelihood Restoration Plan (LRP)	Restore livelihoods of 32 affected households, including gender-responsive measures	IFC PS5
GBV/SEA/SH Action Plan	Prevent, mitigate, and respond to gender-based violence, sexual exploitation, and harassment risks	IFC PS2, PS4
Biodiversity Rehabilitation Plan	Restore 56 ha of modified habitat within Epe Forest Reserve	IFC PS6
Waste Management Plan	Manage construction and demolition, hazardous, and domestic waste	IFC PS3, LAWMA
Climate Resilience Plan	Promote adaptive design, reduce GHG emissions, and enhance climate resilience	IFC PS3, Climate Change Act
Labour Management Plan	Manage worker rights, OHS obligations, subcontractor oversight, and supply chain compliance in accordance with IFC PS2 and ILO Core Conventions	IFC PS2, ILO
Worker Accommodation Plan	Ensure worker accommodation meets IFC/EBRD standards for space, sanitation, ventilation, and security	IFC PS2, EBRD
Hazardous Materials Management Plan	Control storage, handling, and disposal of fuels, lubricants, solvents, and construction chemicals	IFC PS3, PS4, NESREA

Stakeholder Engagement Plan	Structure engagement with 15 corridor communities, PAPs, women's groups, traders, and transport unions throughout construction and operation	IFC PS1, EP4

7.8 Financial Assurance and Budgeting

Effective implementation of the Lot 2 ESMP requires dedicated financial provision to ensure that mitigation, monitoring, and adaptive management measures are delivered as planned. The ESMP budget is ring-fenced within the project's finance agreements, guaranteeing the availability of resources for all environmental and social activities throughout the project lifecycle. In addition, specific financial instruments have been established to ensure compliance, provide for adaptive management, and address decommissioning obligations.

Table 7.7 summarises the financial provisions and assurance mechanisms for Lot 2 ESMP implementation.

Table 0.7: Lot 2 ESMP Financial Provisions and Assurance Mechanisms

Financial Instrument	Purpose	Amount / Allocation	Responsible Party
Ring-Fenced ESMP Budget	Ensure dedicated funding for all ESMP activities, including mitigation, monitoring, and reporting	Fully integrated within project finance agreements	Project Proponent / FMW
Contingency Fund	Support adaptive management, corrective actions, or unforeseen environmental/social interventions	15% of ESMP budget	Project Proponent / FMW
Performance Bond	Guarantee CHEC compliance with ESMP commitments	As per the agreement with FMW	FMW (held)
Decommissioning Bond	Cover environmental restoration, site rehabilitation, and residual liabilities at project closure	USD 3.5 million	Project Proponent / FMW

These financial instruments collectively ensure that the ESMP is fully funded, enforceable, and capable of supporting both routine and unforeseen environmental and social management requirements. Regular audits and reporting on budget utilisation will form part of the ESMP monitoring framework, maintaining transparency and accountability to lenders, regulators, and stakeholders.

7.9 Capacity Building and Training

A structured capacity building and training programme has been developed to ensure that all personnel and relevant community stakeholders are equipped to manage environmental and social risks, comply with mitigation measures, and respond effectively to grievances. This programme is critical for the effective implementation of the ESMP, as it strengthens the competency, awareness, and accountability of project staff, contractors, and community representatives. Training also promotes understanding of IFC Performance Standards, Nigerian regulatory requirements, and lender expectations, enhancing both compliance and stakeholder engagement.

The training programme targets CHEC staff, supervisors, security personnel, and selected community monitors. It is delivered through a combination of induction, periodic refresher sessions, and specialist workshops. Training content covers ESMP awareness, environmental monitoring, GBV/SEA/SH prevention, grievance handling, and community-based environmental monitoring.

Table 7.8 shows the proposed ESMP capacity building and training programme for project personnel and selected community stakeholders, highlighting the target groups, frequency, and training providers.

Table 0.8: ESMP Capacity Building and Training Programme

Training Program	Target Group	Frequency	Provider
ESMP Awareness	All CHEC staff	On induction	IESM
Environmental Monitoring	CHEC EO, Supervisors	Quarterly	IESM
GBV/SEA/SH Prevention	All workers, security personnel	Bi-annual	Specialist NGO
GRM Handling	CLOs, GRM Officer	Quarterly	IESM
Community Environmental Monitors	Selected community members	Annual	NEC / MAISA
Worker Rights and OHS Induction	All construction workers and subcontractor staff	On induction; annual refresher	CHEC HR, ILO-accredited trainer
Subcontractor Compliance and Supply Chain Standards	CHEC procurement and HSE supervisors	On contract award; annual refresher	CHEC HR, IESM
Hazardous Materials Handling and Spill Response	All workers handling fuels, lubricants, solvents, or construction chemicals	On induction; following any spill incident	CHEC HSE, accredited trainer

This training framework ensures that project personnel and community representatives are aware of their roles and responsibilities, can identify and manage environmental and social risks effectively, and are able to apply ESMP requirements in daily operations. Regular refresher sessions, coupled with annual evaluations, support continuous improvement, reinforce capacity across all levels, and help sustain mitigation and monitoring outcomes over the project lifecycle (Section 7.10).

7.10 Adaptive Management and Review

Adaptive management is a core principle of the Lot 2 ESMP. It ensures that mitigation measures remain effective, responsive to changing conditions, and compliant with regulatory and lender requirements. The process establishes structured monitoring, review, and corrective actions based on KPIs, incident reports, and stakeholder feedback. These review mechanisms work in tandem with dedicated ESMP resources and trained personnel, ensuring that mitigation measures are both funded and effectively applied.

Key elements of the adaptive management and review process include:

- **Quarterly ESMP Review Meetings**: Convened with CHEC, AEC, IESM, and the Community Liaison Officer (CLO) to evaluate implementation progress, discuss emerging issues, and adjust management measures as needed.
- **Annual ESMP Audit**: Conducted by the lender's Environmental and Social (E&S) advisor to independently verify compliance with ESMP commitments, performance standards, and applicable regulations.
- **Trigger-Based Reviews**: Initiated when specific thresholds or incidents occur, including:
    - Exceedance of key performance indicators (KPIs) for more than seven consecutive days
    - Significant community complaints not resolved through the GRM
    - Regulatory sanctions or non-compliance notices
    - Major incidents such as spills, accidents, or unforeseen environmental impacts

Table 7.9 summarises the ESMP Adaptive Management and Review Trigger Framework

Table 0.9: Overview of the Lot 2 ESMP Adaptive Management and Review Trigger Framework

Review Type	Responsible Parties	Trigger	Frequency	Purpose
Quarterly ESMP Review	CHEC, AEC, IESM, CLO	Implementation progress, emerging issues	Every 3 months	Evaluate progress, identify gaps, implement corrective actions
Annual ESMP Audit	Lender's E&S Advisor	Overall ESMP implementation	Annually	Independent verification of compliance and performance
Trigger-Based Review	CHEC, AEC, IESM	KPI exceedance >7 days; major complaints; regulatory sanctions; major incidents	As needed	Assess and implement corrective action to prevent escalation

The adaptive management cycle, supported by dedicated resources and trained personnel, feeds directly into lender oversight and verification, ensuring that ESMP performance is independently monitored, validated, and aligned with both regulatory and financial obligations.

7.11 Lender Assurance and Verification

The outputs of adaptive management, coupled with financial provision and trained personnel, feed directly into the project's lender assurance and verification framework. This multi-tiered system ensures that ESMP implementation is independently monitored, verified, and aligned with both regulatory requirements and lender conditions.

Independent oversight is provided by the Independent Environmental and Social Monitor (IESM), who maintains a direct reporting line to the lenders (Standard Chartered and Afreximbank), delivering objective performance data. This oversight is reinforced by the lenders' E&S advisors, who are empowered to conduct unannounced site inspections to verify that mitigation measures, monitoring activities, and grievance mechanisms are fully operational.

Additionally, an annual third-party audit, conducted in accordance with ISO 19011, evaluates the overall effectiveness and compliance of the ESMP. ESMP compliance is a Condition Precedent (CP) for loan disbursement, linking financial incentives to environmental and social performance.

Table 7.10 summarises the key mechanisms, responsibilities, and frequency of lender assurance and verification activities, providing a clear reference for oversight and accountability throughout Lot 2 ESMP implementation.

Table 0.10: ESMP Lender Assurance and Verification Mechanisms

Mechanism	Responsible / Implementing Party	Frequency	Purpose / Scope
Independent Oversight	IESM	Continuous/ongoing	Provides objective monitoring and reporting of ESMP implementation directly to lenders.
Unannounced Site Inspections	Lenders' E&S Advisors	As needed	Verify that mitigation measures, monitoring, and grievance mechanisms are operational and compliant.
Annual Third-Party Audit	ISO 19011 Certified Auditor	Annually	Evaluate overall ESMP effectiveness, compliance, and reporting accuracy.
ESMP Compliance as Condition Precedent	Project Proponent / FMW	At each disbursement milestone	Ensures that financial disbursement is contingent on ESMP compliance, linking financial incentives to environmental and social performance.

Specific CP milestones, verification methods, and required timelines are set out in Table 7.11 below. No construction activities shall commence until all CP milestones have been verified by the IESM and confirmed to lenders.

Table 0.11: Condition Precedent Milestones

Milestone	Verification Method	Timeline
1. Valuation Report Completion	Signed by all 32 PAPs confirming asset inventory accuracy	Pre-financial close
2. Compensation Disbursement	100% of verified claimants paid at Full Replacement Cost	Before site clearance
3. ESMP Budget Ring-fenced	Confirmation of USD 1.895M allocation within financing agreements	Pre-financial close
4. GBV/SEA/SH Training Plan	Training plan approved; trainers identified	Before worker mobilization
5. GRM Operational	Community desks established; hotline active; CLOs appointed	Before construction
6. IESM Appointment	Independent Environmental & Social Monitor contracted with unannounced access rights	Pre-financial close

7.12 Conclusion

The Lot 2 ESMP establishes a clear, bankable, and enforceable framework to manage all environmental and social impacts in accordance with Nigerian regulatory requirements and international lender standards. By integrating structured monitoring, transparent reporting, dedicated grievance mechanisms, and active stakeholder engagement, the plan ensures accountability, promotes adaptive management, and safeguards the sustainability of mitigation and development outcomes throughout the project lifecycle.

CHAPTER EIGHT

DECOMMISSIONING AND RESTORATION PLAN

8.1 Introduction

This Decommissioning and Restoration Plan (DRP) outlines the procedures for the safe, systematic, and environmentally responsible decommissioning of Lot 2 of the 7th Axial Road at the end of its operational life. While decommissioning is not anticipated for 40-50 years (based on the CRCP design life and maintenance schedule), this plan is prepared in accordance with IFC PS1, World Bank EHS Guidelines, and the Nigerian Environmental Impact Assessment (EIA) Act to ensure future liability management, environmental stewardship, and social responsibility.

8.1.1 Primary Objectives

The primary objectives of the decommissioning plan include:

- Ensure safe removal of infrastructure with minimal risk to communities and the environment.
- Restore disturbed land to a stable, ecologically functional, or socially beneficial state.
- Manage materials sustainably through reuse, recycling, and responsible disposal.
- Fulfill regulatory and lender requirements for lifecycle planning and financial assurance.
- Engage stakeholders in planning and implementation to ensure transparency and social acceptance.

8.2 Decommissioning Triggers and Timing

Decommissioning may be triggered by:

- End of design life (projected 2070-2080).
- Major realignment or upgrade of the transport corridor.
- Permanent closure due to changes in land use or regional planning.
- Regulatory or safety requirement (e.g., structural failure, climate-related risks).

8.2.1 Planning horizon

- Formal review and update of this DRP every 10 years during operation, with full activation 5 years prior to projected decommissioning.

8.3 Decommissioning Activities and Methods

Decommissioning works will be implemented in clearly defined phases to ensure safety, environmental protection, and efficient material recovery. The methodologies outlined below reflect international good practice for infrastructure demolition and restoration.

8.3.1 Pavement and Roadway Removal

Removal of pavement layers and embankments will prioritise controlled demolition and progressive rehabilitation to minimise dust, vibration, and erosion risks (Table 8.1).

Table 0.1: Pavement and Roadway Decommissioning Activities and Environmental Controls

Activity	Method	Equipment	Controls
Demolition of CRCP	Hydraulic breakers → concrete crushing on-site	Excavators, crushers, loaders	Dust suppression, noise barriers, vibration monitoring
Removal of Sub-base & Embankment	Excavation and grading to the original contour	Excavators, graders, dump trucks	Erosion control, sediment basins
Disposal/Reuse of Materials	Crushed concrete reused as fill; excess transported to licensed facilities	Crushers, screening plants, trucks	Materials tracking manifest, no illegal dumping

8.3.2 Structure Dismantling (Bridges, Culverts, Interchanges)

Table 8.2 outlines the proposed dismantling approaches and key environmental and technical considerations for structural dismantling.

Table 0.2: Structure Dismantling Methods and Special Environmental Considerations

Structure	Method	Special Considerations
Box Culverts	Break and remove in sections; backfill with clean material	Maintain drainage flow during works
Interchanges & Flyovers	Systematic dismantling using cranes; segmental removal	Traffic management on existing roads
Drainage Bridges	Full removal; restore natural channel alignment	Aquatic habitat protection, silt curtain

8.3.3 Utility and Service Relocation

- Coordination with service providers (IKEDC, Lagos Water, telecommunications) prior to demolition.
- Temporary service continuity ensured for remaining users.
- Salvage of reusable infrastructure (e.g., street lighting, signage).

8.4 Environmental Restoration Measures

8.4.1 Landform and Soil Restoration

- Regrade to preconstruction contours using as-built survey records.
- Apply topsoil (stockpiled during construction or sourced locally) to a depth of 150-200 mm.
- Stabilise soils with erosion control mats, seeding, or mulching.

8.4.2 Ecological Rehabilitation

- Revegetation using native species mix (consistent with Biodiversity Rehabilitation Plan).
- Wetland and riparian restoration where the road footprint intersects natural waterways.
- Long-term monitoring of restored areas for 5 years post-decommissioning.

8.4.3 Watercourse and Drainage Restoration

- Re-establish natural flow paths and remove artificial channels.
- Stabilise banks with vegetation and bioengineering techniques.
- Monitor water quality for 2 years post-restoration.

8.5 Social and Economic Restoration

8.5.1 Community Transition Support

- Livelihood transition programs for workers and local businesses dependent on road operations.
- Skills retraining in partnership with Lagos State Ministry of Wealth Creation.
- Micro-enterprise support for affected small businesses (e.g., roadside vendors, mechanics).

8.5.2 Access and Connectivity

- Restore preconstruction access roads and pedestrian pathways.
- Ensure continued connectivity between communities where the road served as a key link.
- Implement alternative transport solutions if road removal affects mobility.

8.5.3 Cultural Heritage Protection

- Chance finds protocol reactivated during earthworks.
- Salvage archaeology if previously unrecorded sites are discovered.
- Consultation with traditional custodians throughout decommissioning.

8.6 Waste Management and Materials Recovery

Decommissioning will apply circular economy principles to maximise reuse and recycling while ensuring safe disposal of residual waste streams (Table 8.3).

Table 0.3: Material Recovery and Disposal Plan for Decommissioning Waste Stream

Material	Destination/Use	Recovery Target
Concrete (CRCP)	Crushed for fill or road base in other projects	≥ 85% reuse/recycling
Asphalt (shoulders)	Recycled in hot mix asphalt plants	≥ 90% recycling
Steel (reinforcement, barriers)	Sold to licensed metal recyclers	100% recycling
Wood, plastics	Segregated and sent to licensed recovery facilities	≥ 60% recycling

Hazardous waste (lights, paints)	Licensed hazardous waste contractor	100% safe disposal

8.7 Health, Safety, and Emergency Preparedness

Demolition activities present occupational and community risks that will be actively managed through enhanced safety and emergency response protocols.

8.7.1 Safety Protocols

- Decommissioning Safety Plan compliant with IFC PS2 and NOSHA.
- Training for all workers on demolition safety and hazardous material handling.
- Implementing community safety zones and signage to prevent public access to work areas.
- Enforcing the use of appropriate personal protective equipment, s
- Enforcing safe systems of work.
- Conducting health surveillance for workers engaged in demolition activities.

8.7.2 Emergency Response

- Updated Emergency Preparedness and Response Plan (EPRP) for decommissioning phase.
- Coordination with Lagos State Emergency Management Agency (LASEMA).
- Maintenance of spill kits and emergency equipment throughout the decommissioning phase.

8.8 Monitoring and Verification

Post-closure monitoring will confirm that restoration objectives have been achieved and that no residual environmental or social liabilities remain.

8.8.1 Performance Indicators

Clear performance indicators will be applied to measure restoration success over defined timeframes (Table 8.4).

Table 0.4: Post-Decommissioning Restoration Performance Indicators

Indicator	Target	Duration
Soil Stability	No erosion gullies > 0.5 m depth	3 years post-restoration
Vegetation Survival	≥ 80% cover of native species	5 years
Water Quality	Within baseline levels	2 years
Community Satisfaction	≥ 85% positive feedback	Annual survey
Materials Recovery	≥ 85% recycling rate	Throughout decommissioning

8.8.2 Reporting

Transparent reporting will provide regulatory and lender assurance throughout the decommissioning and post-closure period.

- Monthly decommissioning progress reports to FMEnv, LASEPA, and lenders.
- Final Restoration Report upon completion, subject to regulatory approval.
- Post-closure monitoring reports annually for 5 years.

8.9 Financial Assurance and Budgeting

Financial assurance measures include:

- Estimated Decommissioning Cost (present value): USD 4.2 million
- Funding Mechanism: Annual contributions from toll revenue + contractor performance bond.
- Inflation Adjustment: Fund indexed to CPI + 2% annually.
- Release Conditions: Funds released only upon FMEnv certification of satisfactory restoration.

8.10 Institutional Roles and Responsibilities

Implementation of this Plan requires coordinated action among federal and state authorities, the project operator (or successor entity), independent monitors, and community representatives.

Table 8.5 summarises institutional responsibilities for implementing the DRP.

Table 0.5: Decommissioning Institutional Roles and Responsibilities

Entity	Responsibility
Federal Ministry of Works	Overall accountability, fund administration
Lagos State Ministry of Environment	Regulatory oversight, site inspections
CHEC (or successor operator)	Execution of decommissioning works
Independent Monitor	Verification, reporting to lenders
Community Committee	Feedback, monitoring participation

8.11 Stakeholder Engagement

The decommissioning phase will engage stakeholders throughout implementation to ensure transparency and responsiveness to community concerns.

- Decommissioning planning workshops with communities, local governments, and traditional leaders.
- Public disclosure of DRP updates every 10 years.
- Grievance mechanism remains active throughout decommissioning.

8.12 Integration with Broader Planning

The project will align decommissioning activities with regional land-use, transport, and climate adaptation strategies to support long-term development objectives.

- This DRP aligns with the Lagos State Urban and Regional Planning Law and the Ibeju-Lekki Model City Plan.
- Coordination with Lagos State Ministry of Transportation on long-term transport strategy.
- Linkages to national climate adaptation plans regarding future land use.

8.13 Conclusion

This Decommissioning and Restoration Plan ensures that Lot 2 of the 7th Axial Road will be retired responsibly, with lands restored, materials recycled, and communities supported through transition. The plan is financially assured, fully compliant with regulatory obligations, and aligned with international lender standards, reflecting best practice in sustainable infrastructure lifecycle management.

CHAPTER NINE

CONCLUSION

9.1 Introduction

This chapter consolidates the findings of the Environmental and Social Impact Assessment (ESIA) for Lot 2 of the 7th Axial Road (CH 8+700 - CH 24+932) and presents actionable recommendations to ensure the project is implemented in an environmentally sound, socially responsible, and financially sustainable manner. The conclusions reflect compliance with applicable regulatory requirements and international lender standards.

9.2 Summary of Key Findings

9.2.1 Strategic and Economic Context

- Lot 2 is an essential extension of the 7th Axial Road corridor, completing the critical link between the Lekki industrial zone and the regional highway network.
- The project supports national economic priorities, including port efficiency, industrial competitiveness, and regional integration under the African Continental Free Trade Area (AfCFTA).
- Economic viability is confirmed with a positive Economic Internal Rate of Return (EIRR) and strong alignment with the Lagos State Development Plan and Ibeju-Lekki Model City Plan.

9.2.2 Environmental and Social Baseline

- The Area of Influence comprises modified terrestrial habitats, freshwater wetlands, and peri-urban settlements with no Critical Habitats identified under IFC PS6.
- Socio-economic conditions are characterised by agrarian livelihoods, moderate infrastructure access, and vulnerable groups, including women-headed households and youth.
- Cumulative pressures from existing and planned developments (Dangote Refinery, Lekki Port, Free Trade Zone) are acknowledged and addressed in impact assessment and management.

9.2.3 Impact Assessment Summary

- Construction impacts are primarily short-term and localised, with high-significance risks related to dust, noise, and economic displacement.
- Operational impacts are dominated by traffic emissions, noise, and induced development, which are manageable through design and mitigation.
- Cumulative impacts—particularly on air quality, traffic, and social services—require coordinated management across the Lekki corridor.

9.2.4 Mitigation and Management Framework

- A robust mitigation hierarchy has been applied, with emphasis on avoidance, minimisation, and restoration/rehabilitation.
- The Environmental and Social Management Plan (ESMP) provides a clear, budgeted, and monitorable framework for implementation.
- Stakeholder engagement and grievance mechanisms are institutionalised to ensure accountability and responsiveness.

9.3 Recommendations

9.3.1 Technical and Environmental Recommendations

Table 9.1 summarises the ESIA technical and environmental recommendations.

Table 0.1: Lot 2 Technical and Environmental Recommendations

No.	Recommendation	Rationale	Responsible Party
1	Adopt climate-resilient design standards for all drainage structures (1-in-100-year flood + 20% climate allowance).	Ensures long-term functionality under climate change.	CHEC, AEC
2	Implement real-time air and noise monitoring with public dashboards accessible to communities.	Enhances transparency and compliance.	IESM, CHEC
3	Enforce 50m ecological buffers from all wetlands and watercourses; no construction ingress.	Protects aquatic ecosystems and maintains hydrology.	CHEC EO, IESM
4	Achieve ≥85% recycling rate for construction and demolition waste.	Supports circular economy and reduces landfill burden.	CHEC HSE
5	Activate the Biodiversity Rehabilitation Plan within 12 months of construction commencement.	Ensures no net loss of natural habitat.	Ecologist, LASEPA

9.3.2 Social and Livelihood Recommendations

Social and livelihood recommendations are presented in Table 9.2.

Table 0.2: Lot 2Social and Livelihood Recommendations

No.	Recommendation	Rationale	Responsible Party
1	Complete compensation and livelihood restoration for all 32 Project-Affected Persons before site clearance.	Complies with IFC PS5 and national law.	FMW, CLO
2	Implement GBV/SEA/SH Action Plan with mandatory training, confidential reporting, and zero-tolerance enforcement.	Mitigates high-risk social impact.	CHEC HR, IESM
3	Reserve 30% of unskilled and semi-skilled jobs for local hires, with tracking and reporting.	Promotes inclusive growth and social license.	CHEC, CLO
4	Establish a Community Development Committee to oversee local procurement, training, and small enterprise support.	Ensures meaningful benefit sharing.	FMW, LGA, CLO
5	Maintain and upgrade local access routes throughout construction to minimise disruption.	Upholds mobility and economic access.	CHEC, AEC

9.3.3 Institutional and Governance Recommendations

Table 9.3 provides an overview of institutional governance recommendations for ESMP implementation.

Table 0.3: Project Institutional and Governance Recommendations

No.	Recommendation	Rationale	Responsible Party
1	Formalise a Lekki Corridor Environmental Committee (LCEC) with representatives from key projects, regulators, and communities.	Enables cumulative impact management.	FMEnv, LASEPA
2	Integrate ESMP obligations into CHEC's contract with clear performance indicators and penalty clauses.	Ensures contractor accountability.	FMW, AEC
3	Conduct annual third-party audits of ESMP implementation, with reports disclosed to lenders and the public.	Strengthens oversight and credibility.	IESM, Lenders
4	Develop a Corridor-wide Traffic Management Plan in coordination with Lagos State Ministry of Transportation.	Addresses cumulative traffic impacts.	MOT, CHEC, Dangote, Lekki Port

9.3.4 Lender and Compliance Recommendations

Table 9.4 summarises the lender and compliance recommendations.

Table 0.4: Lender and Compliance Recommendations

No.	Recommendation	Rationale	Responsible Party
1	Ring-fence ESMP and decommissioning funds within financial agreements and ensure timely disbursement.	Provides financial assurance for safeguards.	Lenders, FMW
2	Require independent verification of key performance indicators before milestone payments are released.	Aligns finance with ESG performance.	Lenders, IESM
3	Adopt a dynamic risk registry updated quarterly to reflect changing site and community conditions.	Enables proactive risk management.	CHEC, IESM
4	Ensure all project documentation is publicly accessible in English and local languages via the project website and community centres.	Meets Equator Principles disclosure requirements.	FMW, CLO

9.4 Overall Conclusion

Lot 2 of the 7th Axial Road (Lekki Port Access Road) is a strategically essential, environmentally manageable, and socially responsive infrastructure project that will deliver significant economic and mobility benefits to Lagos State and Nigeria. The ESIA confirms that:

- No fatal flaws have been identified; all impacts can be mitigated to acceptable levels.
- The project has been designed to comply with applicable Nigerian environmental and social regulations.
- The ESMP and supporting plans are aligned with IFC Performance Standards and Equator Principles requirements.
- Stakeholder engagement has been meaningful and will continue through construction and operation.
- Financial and institutional arrangements are in place to ensure effective implementation, monitoring, and accountability.

9.5 Final Approval and Implementation Pathway

It is recommended that the **Federal Ministry of Environment (FMEnv)** grant conditional approval of this ESIA, subject to:

- Finalisation of the Livelihood Restoration Plan (LRP) and compensation disbursement.
- Confirmation of ESMP budget allocation within project financing.
- Signing of the CHEC Environmental and Social Commitment Plan.

Upon approval, the project will proceed according to the following pathway, presented in Table 9.5.

Table 0.5: Recommended Implementation Pathway for Lot 2 project

Phase	**Timeline**	**Key Activities**
Preconstruction	Months 1-3	Compensation, ESMP mobilisation, stakeholder briefing
Construction	Months 4-21	Civil works with full ESMP implementation
Operation	From Month 22	Tolling, maintenance, monitoring, reporting
Long-term	2027 onward	Adaptive management, periodic review, eventual decommissioning

9.6 Closing Statement

Through rigorous implementation of this ESIA and its associated management plans, Lot 2 of the 7th Axial Road has the potential to deliver transformative connectivity for the Lekki-Epe corridor whilst demonstrating that major infrastructure can be developed responsibly, with full accountability to affected communities and the environment.

REFERENCES

Adekanmbi, O. H., & Ogundipe, O. T. (2009). Mangrove biodiversity in the restoration and sustainability of the Nigerian natural environment. *Journal of Ecology and Natural Environment*, 1(3), 64-72. https://academicjournals.org/journa/JENE/article-abstract/AB754F12902.

APHA (American Public Health Association) (2017). *Standard methods for the examination of water and wastewater* (23rd ed.) American Public Health Association.

Barbour, M. T., Gerritsen, J., Snyder, B. D., & Stribling, J. B. (1999). *Rapid bioassessment protocols for use in streams and wadeable rivers: Periphyton, benthic macroinvertebrates and fish* (2nd ed., EPA 841-B-99-002). U.S. Environmental Protection Agency; Office of Water.

Dash, M. C., & Dash, S. P. (2009). *Fundamentals of ecology*. Tata McGraw-Hill Education.

Ekanem, S. (2026, January 19). Nigeria emerges top Belt and Road beneficiary with China-backed $24.6bn GRIP megaproject. Business Insider Africa. Accessed 9 February 2026 from Nigeria emerges top Belt and Road beneficiary with China-backed $24.6bn GRIP megaproject | Business Insider Africa.

Equator Principles Association. (2020). The Equator Principles: EP4 July 2020. https://equator-principles.com/app/uploads/The-Equator-Principles_EP4_July2020.pdf

Federal Ministry of Environment. (2021). National climate change policy for Nigeria 2021-2030. https://climatechange.gov.ng/wp-content/uploads/2021/08/NCCP_NIGERIA_REVISED_2-JUNE-2021.pdf.

Federal Ministry of Works. (2013). Highway manual: Part 1: Design: Vol. I: Geometric design. Code of procedure. Federal Republic of Nigeria.

Federal Ministry of Works. (2024). *Environmental and social impact assessment (ESIA) for the proposed Lagos-Calabar coastal highway section 2 (47.5km-104km).* Federal Ministry of Environment; Environmental Assessment Department.

Federal Ministry of Works. (2026). 7th Axial Road (Lekki Port Access Road): Lot 1 (CH 0+000 - CH 8+700). Federal Republic of Nigeria.

Gayanilo, F. C., Jr., Sparre, P., & Pauly, D. (1996). *The FAO-ICLARM Stock Assessment Tools (FiSAT) user's guide* (FAO Computerized Information Series No. 8). Food and Agriculture Organization of the United Nations.

International Finance Corporation. (2012). *Performance standards on environmental and social sustainability*. IFC. https://www.ifc.org/en/insights-reports/2012/ifc-performance-standards.

IPCC (Intergovernmental Panel on Climate Change). (2021). *Climate change 2021: The physical science basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, & B. Zhou (Eds.)]. Cambridge University Press. https://dx.doi.org/10.1017/9781009157896.

Kumolu-Johnson, C. A., & Ndimele, P. E. (2010). Length-weight relationships and condition factors of twenty-one fish species in Ologe Lagoon, Lagos, Nigeria. *African Journal of Biotechnology*, 9(35), 5841-5847.

Olaosebikan, B.D. and Raji, A. (1998) *Field Guide to Nigerian Freshwater Fishes*. Federal College of Freshwater Fisheries Technology, New Bussa, Nigeria, 47 p.

Pauly, D. (1979). Theory and management of tropical multispecies stocks: A review, with emphasis on the Southeast Asian demersal fisheries. *ICLARM Studies and Reviews*, 1, 1-35.

Pauly, D. (1980). On the interrelationships between natural mortality, growth parameters, and mean environmental temperature in 175 fish stocks. *Journal du Conseil International pour l'Exploration de la Mer* 39(2), 175-192.

Pauly, D., & Munro, J. L. (1984). Once more on the comparison of growth in fish and invertebrates. *Fishbyte, The WorldFish Centre* 2(1),1-21.

Rosenberg, D. M. & Resh, V. H. (1993). *Freshwater Biomonitoring and Benthic Macroinvertebrates*. Chapman & Hall.

Sparre, P., & Venema, S. C. (1998). Introduction to tropical fish stock assessment. Part 1: Manual (FAO Fisheries Technical Paper No. 306/1, Rev. 2). Food and Agriculture Organization of the United Nations.

Utermöhl, H. (1958). Zur Vervollkommnung der quantitativen Phytoplankton-Methodik: Mit 1 Tabelle und 15 abbildungen im Text und auf 1 Tafel. *Internationale Vereinigung Für Theoretische Und Angewandte Limnologie: Mitteilungen*, 9(1), 1-38. https://doi.org/10.1080/05384680.1958.11904091.

Vitt, L. J., & Caldwell, J. P. (2014). *Herpetology: An introductory biology of amphibians and reptiles* (4th ed.). Academic Press.

WHO (World Health Organisation) (2021). *WHO global air quality guidelines: Particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide*. Geneva: WHO. https://www.who.int/publications/i/item/9789240034228.

WHO (2024). *Compendium of WHO and other UN guidance in health and environment*, 2024 update. Geneva. Licence: CC BY-NC-SA 3.0 IGO

World Bank Group (2007). *Environmental, health, and safety (EHS) guidelines: General EHS guidelines*. https://www.ifc.org/en/insights-reports/general-environmental-health-and-safety-guidelines

World Bank Group (2017). *The World Bank environmental and social framework*. World Bank Group.

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.

APPENDIX 1: CROSS-REFERENCE AND COORDINATION

Appendix 1.1: Regional Corridor Cross-Reference & Linkage Matrix (Lot 2)

Validation Pillar	Lot 2 Alignment Detail & Integrated Data	Regional Infrastructure Implications
Geographic & Spatial Overlap	• Coordinates: 6°25′N–6°45′N; 3°35′E–4°10′E (Feasibility Study, 2025, p. 24) • Southern Terminus: CH 8+700 (continuous with Lot 1 lagoon crossing) • Northern Terminus: CH 24+932 (Epe-Ijebu Ode Road) (Feasibility Study, 2025, p. 24) • Shared Stations: CH 15, 16, 17 (wetland crossings), CH 20, 22, 24 (Eredo/Noforija) (Inception Report, 2025, p. 6) • Hydrological Connection: Marsh lake zone (CH 14+655–CH 16+710) feeds into same Lekki Lagoon system assessed in Lot 1	Establishes a continuous 24.9 km development spine. Validates the Area of Influence (AoI) and ensures shared environmental receptors (wetlands, freshwater systems) are managed as regionally significant features.
Environmental Baseline Validation	• Hydrology: Shared catchment with Lot 1; marsh lake zone (CH 14+655–CH 16+710) hydrologically connected to Lekki Lagoon system; flood modelling for 1-in-100-year events consistent with Lot 1 methodology (Feasibility Study, 2025, p. 144). • Biodiversity: Modified Natural Habitats confirmed; wetland-associated species (Nile crocodile juveniles documented at CH 15-17); avifauna inventories consistent with regional patterns (Lot 2 ESIA, Section 4.4.4). • Air/Noise: $PM_{2.5}$ exceedances (22.5–39.3 µg/m³) at all Lot 2 locations; Epe Town noise levels (74.5 dB(A)) exceed NESREA limits—consistent with regional industrial-transport corridor stress (Lot 2 ESIA, Table 4.8).	Strengthens technical justification for 20% climate allowance on all drainage structures. Supports a corridor-wide biodiversity management approach with targeted wetland protection at CH 15-17.
Socioeconomic & RAP Continuity	• Communities: Overlapping PAP profiles in Odo-Noforija, Iraye, Akodo (consistent with Lot 1 engagement). • Livelihoods: Agriculture (45%), petty trading (25%), fishing (10%)—consistent with regional patterns (Lot 2 ESIA, Section 4.5.4.3). • Social Risks: 32 PAPs identified (crop loss only); vulnerable groups include women-headed households (18%), elderly (8%), unemployed youth (30%) (Lot 2 ESIA, Section 4.5.5.1).	Ensures consistent full replacement cost valuation methodology across the corridor. Validates Lot 2's standalone GBV/SEA/SH Action Plan with mandatory training targets.
Engineering & Cumulative Impact	• Logistics: Both lots serve Lekki Deep Sea Port, Dangote Refinery, and Lekki Free Trade Zone. • Capacity: Combined CAGR of 4.0% projecting >5 million vehicle movements annually by 2030; Lot 2 HDV share projected at 60.05% of opening-year traffic (Feasibility Study, 2025, p. 55). • Structures: 2 interchanges (CH10+900, CH24+932), 2 major bridges (CH8+760, CH15+750), 27 culverts, 11	Drives the need for the Lekki Industrial Corridor Coordination Framework extended to include Epe interchange. Focuses on synchronized construction to

	passages—integrated with Lot 1 geometry (Feasibility Study, 2025, p. 25).	avoid peak traffic gridlock at Epe-Ijebu Ode Road (A121).
Compliance & Credibility	• Regulatory: Builds on FMEnv-approved Lot 1 precedent; utilizes harmonised compliance architecture. • Safeguards: Dual-compliance with Nigerian EIA Act and IFC PS1–PS8/Equator Principles IV; explicit Critical Habitat Assessment (PS6) for marsh lake zone (Lot 2 ESIA, Section 3.1).	Enhances bankability and scientific credibility for international lenders by utilizing independently verified regional datasets and demonstrating corridor-wide consistency.

Appendix 1.2: Nigerian Regulatory Compliance Matrix – 7th Axial Road (Lot 2)

The project operates under a **Harmonisation Principle**, adopting the most stringent requirements across Nigerian law, international safeguards (IFC/Equator Principles), and contractor standards. Implementation of the Livelihood Restoration Plan (LRP), including full compensation for the 32 PAPs, is a mandatory **Condition Precedent** before any ground disturbance occurs.

Regulatory Area	Applicable Law/Standard	Key Requirements	Project Compliance Mechanism	Verification Evidence
ESIA Approval	EIA Act (CAP E12 LFN 2004); FMEnv EIA Procedures (2021)	• Mandatory ESIA approval before construction • Public disclosure and stakeholder consultation • Terms of Reference (ToR) approved by FMEnv	• Full ESIA prepared and submitted to FMEnv • Scoping workshop held (November 2025) • Public consultations across 15 communities • ToR approved prior to baseline studies	FMEnv ESIA Approval Certificate; Scoping Workshop Report; Consultation Records
Land Acquisition & Resettlement	Land Use Act (CAP L5 LFN 2004); IFC PS5	• Compensation at full replacement cost • Livelihood restoration for economically displaced persons • Consultation with affected communities	• Standalone Resettlement Action Plan (RAP) for 32 PAPs • Professional valuation using Income Capitalisation Approach • Livelihood Restoration Plan (LRP) with 40% targeting women	Signed compensation receipts; Valuation Report (Appendix 7.5); LRP implementation records
Air Quality	NESREA National Ambient Air Quality Standards; WHO Guidelines	• $PM_{2.5} \leq 25$ µg/m³ (24-hr WHO guideline) • $PM_{10} \leq 50$ µg/m³ (24-hr WHO guideline) • $NO_2 \leq 0.04$ ppm (annual)	• Continuous monitoring at 5 fixed stations (Lot 2 ESIA, Table 4.5) • Dust suppression (water spraying, covered trucks) • EURO IV/V compliant machinery • Real-time PM_{10} alerts at settlement interfaces (Lot 2 ESIA, Section 3.6.2.2)	Monthly air quality monitoring reports; Equipment maintenance logs
Noise Control	NESREA Noise Regulations; LASEPA Noise Control Regulations	• Residential: 55 dB(A) day / 45 dB(A) night • Construction site: 75 dB(A) day / 65 dB(A) night	• Weekly noise monitoring at 5 locations (Lot 2 ESIA, Table 4.5) • Acoustic barriers at settlement interfaces • Restricted piling hours (07:00–18:00) • Community notification 48 hours before high-noise	Quarterly noise monitoring reports; Barrier installation records; Complaint logs

			activities (Lot 2 ESIA, Section 3.6.2.2)	
Effluent Discharge	FMEnv National Effluent Limitations Regulations	• BOD ≤ 30 mg/L • COD ≤ 80 mg/L • Suspended Solids ≤ 30 mg/L • Oil & Grease ≤ 10 mg/L	• Silt fences and sediment basins on all slopes >5% • Concrete washout pits lined with HDPE (min 200m from drainage) • Oil-water separators at maintenance areas • Monthly water quality sampling at CH 15, 16, 17 (Lot 2 ESIA, Section 3.6.2.2)	Bi-monthly effluent analysis reports; Inspection records
Waste Management	NESREA Waste Regulations; LAWMA Guidelines	• Segregation at source • Licensed waste contractors only • Hazardous waste manifest system	• Site-wide waste segregation (5 categories) • E-waste protocol for all electrical waste (Lot 2 ESIA, Section 3.6.2.2) • Licensed contractors for hazardous waste • Monthly waste audits with ≥60% diversion target	Waste manifests; Contractor licenses; Monthly audit reports
Climate Change	Climate Change Act (2021); NDC 3.0; LT-LEDS 2060	• Climate resilience integration • GHG accounting and reporting • Paris Agreement alignment	• 1-in-100-year flood design with 20% climate allowance for all culverts (Feasibility Study, 2025, p. 144) • Annual GHG inventory (Scope 1, 2, 3) • 30% reduction target for construction-phase emissions	Climate Resilience Plan (Appendix 7.12); Annual GHG reports
Occupational Health & Safety	Factories Act (2004); ILO Conventions 155 & 167; IFC PS2	• Safe working conditions • PPE provision • Hazard assessments • Emergency preparedness	• ISO 45001-aligned HSE Management System • Mandatory PPE and training • Weekly toolbox talks • Emergency drills bi-annually	Training records; Incident reports; Drill logs
Community Health & Safety	IFC PS4; FRSC requirements	• Traffic safety management • Community protection measures • GBV/SEA/SH prevention	• Traffic Management Plan with 30 km/h speed limits in settlements (Lot 2 ESIA, Section 3.6.2) • Dedicated community access routes maintained • 24/7 Community Liaison Officer • GBV/SEA/SH Action	Monthly traffic safety reports; GRM logs; GBV incident records (confidential)

			Plan with zero-tolerance policy	
Biodiversity	IFC PS6; Endangered Species Act (2004, amended 2016); CBD	• No net loss of biodiversity • Net gain for natural habitat • Invasive species control	• Critical Habitat Assessment completed (Not Applicable) (Lot 2 ESIA, Section 3.1) • 50m buffers from all wetlands (CH 14+655–CH 16+710) (Lot 2 ESIA, Section 3.6.2.2) • Biodiversity monitoring framework (Lot 2 ESIA, Table 3.17) • Invasive species protocol	Quarterly biodiversity monitoring reports; Buffer inspection records
Cultural Heritage	IFC PS8; NCMM Act	• Chance finds procedure • Protection of known heritage sites	• Chance Finds Procedure operationalized (Lot 2 ESIA, Section 4.8.3.7) • Worker training on heritage recognition • Consultation with traditional authorities	Training records; Chance finds log

Appendix 1.3: Comprehensive Compliance & Assurance Matrix (Lot 2)

Strategic dashboard harmonising Nigerian regulations, international lender standards (IFC/Equator Principles), and contractor obligations.

1. Core Compliance Pillars

Pillar	Key Requirements	Project Commitment	Verification Mechanism
Environmental & Climate	• NESREA ambient standards • Climate Change Act (2021) • IFC PS3 • World Bank EHS Guidelines • ISO 14001 (EMS)	• 1-in-100-year flood design with 20% climate allowance (Feasibility Study, 2025, p. 144) • Annual GHG inventory • 30% construction emission reduction target • ISO 14001-certified ESMS	Quarterly environmental reports; Annual GHG inventory; Third-party EMS audit
Biodiversity	• IFC PS6 • Endangered Species Act • CBD • NESREA regulations	• Critical Habitat Assessment completed (Lot 2 ESIA, Section 3.1) • 50m wetland buffers enforced • Biodiversity monitoring framework (Lot 2 ESIA, Table 3.17) • Invasive species control protocol	Quarterly biodiversity surveys; Buffer inspection records; Annual net gain tracking
Social & Labour	• IFC PS2, PS5 • Nigerian Labour Act • ILO Core Conventions • Land Use Act	• 32 PAPs compensated at full replacement cost (Lot 2 ESIA, Section 4.5.5.1) • 30% local hiring target • Labour Management Plan • Worker grievance mechanism	Monthly payroll audits; RAP implementation reports; GRM logs
Gender & Inclusion	• IFC PS1, PS4 • CEDAW • VAPP Act (2015) • National Gender Policy	• GBV/SEA/SH Action Plan • 40% of LRP benefits targeting women-headed households • Confidential reporting channels • 24/7 Community Liaison Officer (Lot 2 ESIA, Section 3.6.2)	Quarterly training records; Confidential incident logs; Community perception surveys

2. Critical Risk & Mitigation Hierarchy

Critical Risk	Key Commitment / Target	Monitoring & Verification
Wetland Encroachment (CH 14+655–CH 16+710)	• 50m buffer zones strictly enforced • 2.255 km elevated Lagoon Grand Bridge eliminates 5.85 million m³ of fill (Lot 2 ESIA, Section 3.1) • Achieve **No Net Loss** with binding target of **Net Gain** where critical habitat criteria confirmed	• Weekly buffer inspections • Quarterly biodiversity monitoring (BMWP scores, fish species richness) • Annual wetland vegetation assessment
Livelihood Displacement	• 32 PAPs compensated at full replacement cost before site entry (Lot 2 ESIA, Section 4.5.5.1) • Livelihood Restoration Plan with 40% targeting women-headed households • Restore 70% of affected livelihoods within 24 months	• Monthly RAP progress reports • Post-resettlement surveys at 6, 18, and 36 months • Independent audit at Year 2
Community Health & Safety	• Zero traffic fatalities in construction zones • 30 km/h speed limit enforced in all settlements (Lot 2 ESIA, Section 3.6.2) • 24/7 Community Liaison Officer with independent grievance logging authority	• Weekly traffic safety audits • Monthly incident reports • Quarterly community perception surveys
GBV/SEA/SH	• Zero-tolerance policy contractually binding on all contractors • 100% workforce trained within 30 days of mobilisation • Confidential, survivor-centred reporting channels	• Training records (quarterly) • GRM data disaggregated by gender • Confidential annual perception survey
E-Waste Mismanagement	• 100% e-waste disposed via FMEnv-licensed recyclers • Chain-of-custody maintained for all e-waste streams • Annual e-waste audit (Lot 2 ESIA, Section 3.6.2.2)	• Monthly inventory reconciliation • Quarterly chain-of-custody audits • Annual e-waste report to FMEnv and lenders

3. Oversight & Financial Assurance

Mechanism	Description	Amount / Allocation	Responsible Party
Ring-Fenced ESMP Budget	Dedicated funding for all ESMP activities	USD 1.895 million (0.48% of contract value) (Lot 2 ESIA, Section 3.3.1)	Project Proponent / FMW
Contingency Fund	Adaptive management, corrective actions, unforeseen interventions	15% of ESMP budget	Project Proponent / FMW
Performance Bond	Guarantees CHEC compliance with ESMP commitments	As per agreement with FMW	FMW (held)
Decommissioning Bond	Environmental restoration, site rehabilitation	USD 3.5 million (Lot 2 ESIA, Section 3.6.4)	Project Proponent / FMW

4. Pre-Disturbance Compliance Checklist (Condition Precedent)

1. Permits & Documentation Control

- ESIA Approval Certificate from FMEnv received and on-site
- Contractor ESMS activated and aligned with ISO 14001
- Decommissioning Bond established (USD 3.5 million)

2. Social & Resettlement Safeguards

- 32 PAPs identified and verified (Lot 2 ESIA, Section 4.5.5.1)
- 100% of verified claimants paid at Full Replacement Cost
- Signed compensation receipts on file
- Community Liaison Officers (CLOs) deployed in Odo-Noforija, Igando-Oloja, Akodo
- 24-hour grievance hotline operational and disclosed

3. Labour & Human Rights

- 100% of workforce signed Code of Conduct (including GBV/SEA/SH clauses)
- Minimum 30% local hiring target verified
- Worker accommodation inspected and certified (IFC PS2 standards)
- GBV/SEA/SH training providers contracted

4. Environmental & Technical Preparation

- 50m wetland buffers demarcated at CH 14+655–CH 16+710
- Silt curtains and turbidity meters ready for deployment at CH 15+750
- Fuel storage areas bunded (110% capacity)
- Spill kits stationed at all work fronts
- Pre-construction flora surveys completed (IUCN-listed species screening)

5. Traffic & Community Safety

- 30 km/h speed limit signage installed in all settlements
- Community access routes demarcated and physically segregated
- Traffic Management Plan approved
- Emergency response protocols coordinated with Epe General Hospital

STOP WORK AUTHORITY: If any "Condition Precedent" item above is marked incomplete, the Independent Environmental & Social Monitor (IESM) is authorized to halt mobilization in the affected chainage until the breach is rectified.

Appendix 1.4: Environmental and Social Management System (ESMS) Framework – Lot 2

1.4.1 Introduction

The 7th Axial Road (Lot 2) Project will implement a project-specific Environmental and Social Management System (ESMS) to ensure systematic management of environmental and social risks throughout the project lifecycle. The ESMS aligns with the Nigerian EIA Act, IFC Performance Standard 1, and the Equator Principles IV, and provides the operational structure for implementing the Environmental and Social Management Plan (ESMP) as detailed in Lot 2 ESIA Chapter 7.

1.4.2 Objectives

The ESMS is designed to:

- Ensure compliance with all applicable environmental and social regulations and standards
- Implement mitigation and monitoring measures effectively
- Establish clear roles, responsibilities, and resources for environmental and social management
- Facilitate stakeholder engagement and grievance resolution
- Enable adaptive management through regular review and improvement

1.4.3 Core Components

The ESMS consists of eight interconnected components:

1. Policy and Commitment

A formal Environmental and Social Policy Statement endorsed by the Federal Ministry of Works and China Harbour Engineering Company (CHEC), committing to legal compliance, the mitigation hierarchy, and protection of worker and community welfare.

2. Risk and Impact Management

Operationalization of the ESIA findings through a live Environmental and Social Risk Register, regularly updated and reviewed by the project management team. Key risks for Lot 2 include:

- Wetland encroachment (CH 14+655–CH 16+710) (Lot 2 ESIA, Section 3.2.1)
- Community safety during construction (Odo-Noforija, Igando-Oloja, Akodo) (Lot 2 ESIA, Section 3.6.2)
- E-waste management (Lot 2 ESIA, Section 3.6.2.2)
- Organic soil excavation (USD 2.1 million treatment cost) (Lot 2 ESIA, Section 3.10.4)
- Livelihood displacement (32 PAPs) (Lot 2 ESIA, Section 4.5.5.1)

3. Management Programs

Implementation of the Environmental and Social Management Plan (ESMP) and supporting sub-plans including:

- Biodiversity Management Plan (with Critical Habitat Assessment)
- Livelihood Restoration Plan (32 PAPs)
- Community Health and Safety Plan

- Waste Management Plan (including E-Waste Protocol)
- GBV/SEA/SH Action Plan
- Traffic Management Plan
- Spill Prevention & Response Plan
- Emergency Response Plan
- Climate Resilience Plan

4. Organizational Structure and Resources

Role	Responsibility	Reporting Line
Federal Ministry of Works (FMW)	Project proponent; overall accountability	FMEnv and Lenders
CHEC (Contractor)	Day-to-day ESMP implementation	Supervising Consultant (AEC)
Advanced Engineering Company (AEC)	Supervision, quality assurance	FMW and Lenders
Independent Environmental & Social Monitor (IESM) – NEC/MAISA	Third-party monitoring, audit, validation	Lenders and FMEnv
Environmental Officer (EO) – CHEC	On-site ESMP implementation, daily inspections	CHEC Site Manager and IESM
Community Liaison Officer (CLO)	Stakeholder engagement, grievance intake	IESM and CHEC HSE Manager
Lagos State Agencies (LASEPA, MOE)	Regulatory oversight, spot checks	FMEnv (coordinated)

5. Emergency Preparedness

Integrated Emergency Preparedness and Response Plan covering spills, accidents, fires, flooding, and community incidents, with defined reporting and escalation protocols. Emergency drills conducted bi-annually as specified in Lot 2 ESIA Section 3.6.2.2.

6. Stakeholder Engagement

Implementation of the Stakeholder Engagement Plan through Community Liaison Officers and a functional Grievance Redress Mechanism (24/7 hotline, community help desks at 5 locations) as detailed in Lot 2 ESIA Section 3.6.2.

7. Monitoring and Reporting

Structured monitoring program with defined indicators, frequencies, and reporting requirements:

- Weekly site environmental reports (CHEC EO → AEC, IESM)
- Monthly compliance reports (AEC → FMW, LASEPA, IESM)
- Quarterly monitoring summaries (IESM → Lenders, FMEnv, Public Portal)
- Annual ESMP performance report (IESM + CHEC → FMEnv, LASEPA, Lenders)

- Incident reports (within 24 hours – CHEC HSE → AEC, IESM, LASEPA)
- GRM log & resolution report (monthly – CLO → IESM, Community Noticeboards)

8. Review and Improvement

- Quarterly ESMP review meetings (CHEC, AEC, IESM, CLO)
- Annual ESMP audit by lender's E&S advisor
- Trigger-based reviews (KPI exceedance >7 days; major complaints; regulatory sanctions; major incidents)
- ESMS updated annually based on monitoring results and audit findings

1.4.4 Governance and Integration

The ESMS is integrated into project governance through:

- Contractual obligations linking contractor payments to ESMP compliance
- Direct reporting lines to project senior management and lenders
- Authority for the Independent Monitor to recommend work stoppages for critical non-compliance

1.4.5 Documentation

All ESMS documents are managed under a controlled document management system to ensure proper version control, approval, storage, and disclosure in accordance with regulatory and stakeholder requirements.

APPENDIX 2: ALIGNMENT, DESIGN & TECHNICAL ANALYSIS

Appendix 2.1: Proposed 7th Axial Road and Connectivity to Other Networks (Lot 2)

Key Integration Points:

Connection	Chainage	Description	Design Feature
Lot 1 Continuity	CH 8+700	Physical and geometric continuity with Lot 1 lagoon crossing (Feasibility Study, 2025, p. 24)	Matching subgrade width (24.6 m), pavement type (CRCP), design speed (100 km/h)
Lekki Peninsula Planning Road	CH10+900	Diamond interchange providing access to Lekki Free Trade Zone and Dangote Refinery (Feasibility Study, 2025, p. 153)	4 ramps, 50 m clearance span, 60 km/h ramp design speed
Epe-Ijebu Ode Road (A121)	CH24+932	Single-trumpet interchange connecting to Ogun State and Lagos-Ibadan Expressway (Feasibility Study, 2025, p. 153)	Loop ramp (120 m radius), 40 km/h ramp speed, single toll gantry
Future Lot 3 Extension	CH24+932+	Designed for future northward extension to create fully closed toll system (Feasibility Study, 2025, p. 127)	Geometric provisions for future ramp connections

Appendix 2.2: Alternative Alignment Considerations (Lot 2)

2.2.1 Introduction

Two primary alignment options were evaluated for Lot 2 to determine the most technically feasible, environmentally responsible, and socially acceptable configuration. The alternatives assessment was guided by the mitigation hierarchy (Avoid, Minimise, Restore, Offset) and the following evaluation criteria:

- **Social Impact:** Minimising displacement of communities and disturbance to livelihoods
- **Environmental Sensitivity:** Avoiding and minimising impacts on wetlands, forests, and sensitive habitats
- **Engineering Feasibility:** Ensuring constructability within acceptable cost, time, and risk parameters
- **Climate Resilience:** Incorporating future-proof design for increased rainfall intensity and flooding

2.2.2 Description of Alignment Alternatives

Option 1 – Eastern Alignment

Characteristic	Description
Route	Inland route through predominantly agricultural and sparsely settled areas
Length	17.8 km (1.6 km longer than selected alignment)
Key Impacts	• Lower social displacement • Higher earthwork volumes • Potentially higher biodiversity sensitivity due to freshwater wetlands • Reduced connectivity with Epe
Decision	**Rejected** due to increased cost, reduced connectivity, and wetland sensitivity

Option 2 – Western Alignment (Selected)

Characteristic	Description
Route	Coastal-proximal route, connecting directly to Epe and the existing road network
Length	16.232 km (Feasibility Study, 2025, p. 24)
Key Impacts	• Minimal community displacement (32 PAPs, crop loss only) (Lot 2 ESIA, Section 4.5.5.1) • Optimal integration with regional transport plans • Avoids sensitive wetland clusters identified in preliminary screening • Marsh lake zone (CH 14+655–CH 16+710) requires 2.255 km bridge (Lot 2 ESIA, Section 3.1)
Decision	Selected – balances social, environmental, and engineering objectives

2.2.3 Comparative Assessment Matrix

Criteria	Eastern Alignment	Western Alignment (Selected)
Social Impact	Low displacement	**Low displacement** (32 PAPs, crop loss only)
Environmental Impact	Moderate (longer route, wetland sensitivity)	**Moderate** (optimised; marsh lake zone addressed via bridge)
Economic Viability	Moderate (higher CAPEX)	**High** (optimal benefit-cost)
Engineering Feasibility	Challenging (soft soils in sections)	**Feasible** with standard treatments
Climate Resilience	Moderate	**High** (designed for future climate)
Strategic Fit	Partial	**Full alignment** with Ibeju-Lekki Model City Plan

Appendix 2.3: Greenhouse Gas (GHG) Inventory and Climate Resilience Analysis – Lot 2

2.3.1 Introduction

In alignment with Nigeria's Climate Change Act (2021), the Long-Term Low Emission Development Strategy (LT-LEDS 2060), and the Task Force on Climate-related Financial Disclosures (TCFD), this appendix provides a quantitative analysis of the Lot 2 project's greenhouse gas (GHG) footprint and details the integrated climate resilience measures embedded in the design.

2.3.2 Methodology and Boundaries

The GHG assessment follows the **GHG Protocol Corporate Standard** and **ISO 14064-1** framework. The analysis covers **Scope 1 (direct)** and **Scope 2 (indirect, energy-related)** emissions during construction and operation, with a qualitative assessment of **Scope 3 (other indirect)** emissions.

- **Temporal Boundary:** Construction (2026–2029) and 30-year operational period (2029–2058)
- **GHG Gases:** Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), reported in tonnes of CO_2 equivalent (tCO_2e) using IPCC AR6 GWP-100 values

2.3.3 Construction Phase GHG Inventory

Emission Source	Category	Key Activities	Estimated Total (tCO_2e)	Primary Data Source / Assumption
Mobile Combustion	Scope 1	Fuel use for earthmoving equipment (excavators, compactors, haul trucks, cranes, piling rigs)	42,500	Contractor equipment fleet list; projected fuel consumption rates; DEFRA emission factors
Material Transport	Scope 3	Inbound transport of aggregates, cement, steel, precast elements	10,800	Material quantities from Bill of Quantities; average haul distances; transport emission factors
Stationary Combustion & Energy	Scope 2	Electricity use for site offices, camps, workshops; diesel generators	3,400	Projected energy demand for temporary facilities; generator usage estimates
Process Emissions	Scope 1	Concrete production (calcination process) for C40 CRCP, culverts, structures	13,200	Concrete volume (approx. 98,000 m³); cement content in C40 concrete; emission factors
Fugitive Emissions	Scope 1	Refrigerant leaks from site HVAC units and vehicle air conditioning	180	Estimated based on fleet size and standard leakage rates
TOTAL CONSTRUCTION EMISSIONS			~70,080 tCO_2e	

2.3.4 Operational Phase Carbon Footprint Forecast

Operational emissions are driven by traffic using the new roadway. The project's net impact is evaluated by comparing the "With Project" scenario against a "Without Project" (baseline) scenario, where traffic would use longer, more congested existing routes (Lekki-Epe Expressway, local roads).

Scenario	Description	Key Assumption	Estimated Annual Emissions (tCO_2e/year)	30-Year Cumulative (tCO_2e)
Baseline (Without Project)	Traffic remains on congested Lekki-Epe Expressway and local roads	Higher congestion factor, lower average speed, increased idling	38,500	1,155,000
With Project	Traffic uses new 7th Axial Road (Lot 2)	Free-flow conditions (100 km/h design), reduced idling, optimized routes (Feasibility Study, 2025, p. 97)	26,200	786,000
NET IMPACT (Reduction)			-12,300 tCO_2e/year	-369,000 tCO_2e

Conclusion: The project is forecast to generate a **net reduction of approximately 369,000 tCO_2e over 30 years of operation** by improving traffic flow and reducing vehicle operating time, directly supporting Nigeria's NDC 3.0 targets.

2.3.5 Embedded Carbon and Mitigation Strategy

Mitigation Hierarchy	Action	Target
Avoid	Optimised alignment to minimise earthworks; design for longevity (CRCP 30+ year design life) (Feasibility Study, 2025, p. 142)	Avoid premature reconstruction
Minimize	Specification of low-carbon concrete (C40 with supplementary cementitious materials); local material sourcing (laterite within 50 km, CNC quarry at 95 km); use of EURO IV/V compliant machinery; 30% local hiring reduces worker transport emissions	30% reduction in construction-phase emissions
Offset (Unavoidable Residual)	Investment in verified carbon offset projects within Nigeria equivalent to **20% of net construction emissions (~14,000 tCO_2e)**	Subject to lender approval; potential projects include mangrove restoration in Lekki corridor or distributed solar installations

2.3.6 TCFD-Aligned Climate Resilience and Risk Management

TCFD Pillar	Project Application & Commitment
Governance	The Project Steering Committee oversees climate risk. The ESMS Manager monitors climate-related commitments and performance.
Strategy	Climate resilience integrated into core design: 1-in-100-year flood capacity with 20% climate allowance for all culverts (Feasibility Study, 2025, p. 144); elevated Lagoon Grand Bridge (CH15+750) designed for 55 m spans to accommodate future hydrological conditions. The project supports Nigeria's low-carbon transition by enabling efficient, lower-emission logistics.
Risk Management	Physical climate risks (increased rainfall intensity, flooding, heat stress) integrated into engineering design and ESMP. Transition risks (future carbon pricing, regulation) mitigated through low-carbon design and operational efficiency.
Metrics & Targets	Targets: Achieve net operational emissions reduction; offset 20% of net construction emissions. Metrics: Annual GHG inventory; monitoring of pavement and structure performance under extreme weather; tracking of flood events and drainage performance.

APPENDIX 3: ENGINEERING, LOGISTICS & ENVIRONMENTAL MANAGEMENT

Appendix 3.1: Interchange Design Details (Lot 2)

3.1.1 Peninsula Interchange (CH10+900) – Diamond Configuration

Parameter	Specification	Rationale
Interchange Type	Diamond interchange with four on/off ramps (Feasibility Study, 2025, p. 153)	Segregates Lekki Free Trade Zone traffic from through-freight movements
Design Speed (Ramps)	60 km/h	Accommodates projected 60% HGV traffic accessing industrial corridor
Ramp Width	Single-lane (9.45 m) (Feasibility Study, 2025, p. 97)	Standard for expressway interchanges
Acceleration/Deceleration Tapers	150 m	Sufficient for HGV manoeuvring
Clearance Span over Mainline	50 m	Eliminates at-grade conflicts
Daily Traffic Served	8,500 vehicles (estimated)	Serves LFTZ, Dangote Refinery access
Hydraulic Design	1-in-50-year storm events (Feasibility Study, 2025, p. 144)	Climate-resilient drainage

3.1.2 Epe Interchange (CH24+932) – Single-Trumpet Configuration

Parameter	Specification	Rationale
Interchange Type	Single-trumpet with loop ramp (Feasibility Study, 2025, p. 153)	Terminates Lot 2 at Epe-Ijebu Ode Road (A121)
Loop Ramp Radius	120 m	Designed for 40 km/h operational speed
Superelevation	5%	Ensures HGV stability on loop
Ramp Width	Single-lane (9.45 m) (Feasibility Study, 2025, p. 97)	Standard configuration
Design Speed (Ramps)	40 km/h	Appropriate for loop geometry
Traffic Capacity	Accommodates 47,168 pcu/day by 2058 (Feasibility Study, 2025, p. 88)	Maintains mainline design speed (100 km/h) through terminal section
Toll Gantry	Single gantry for all toll-bound traffic (Feasibility Study, 2025, p. 160)	Concentrates toll collection for revenue integrity
Structure Design	HA loading + 45 units HB (BS5400) (Feasibility Study, 2025, p. 145)	Accommodates heavy freight vehicles
Safety Features	1.8 m high containment barriers	Prevents HGV rollover at interface

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Appendix 3.2: Location and Environmental & Social Management Plan for Construction Camps and Ancillary Sites – Lot 2

3.2.1 Location and Description of Ancillary Sites

Facility Type	Proposed Location	Purpose & Capacity	Area (Approx.)	Status
Main Construction Camp	CH11+700 (near Peninsula Interchange)	Accommodation for 500 workers; offices, mess, clinic, recreation, warehouses, repair workshops (Feasibility Study, 2025, p. 206)	20,000 m²	To be established Q2 2026
Secondary Construction Camp	CH18+300 (near Akodo)	Accommodation for 300 workers; support for southern works	20,000 m²	To be established Q2 2026
Precast Beam Yard 1	Adjacent to Main Camp (CH11+700)	Fabrication of 48 units of 50m U-beams and 258 units of 40m U-beams (Feasibility Study, 2025, p. 207)	15,000 m²	To be established Q2 2026

Precast Beam Yard 2	Near CH18+300	Support for Lagoon Grand Bridge construction	10,000 m²	To be established Q3 2026
Borrow Pit – Laterite	Five identified sites (Figure 3.7)	Source of lateritic gravel (>3 million m³ reserves) (Lot 2 ESIA, Section 3.2.2)	Variable	Licensed; operation Q2 2026–Q1 2028
Sand Quarry	Lagoon sources (Orimedu, Alaro, Akodo)	Source of lagoon sand for subgrade filling	N/A	Licensed; operation Q2 2026–Q1 2028
Stone Quarry	CNC Quarry, Ijebu Ode (approx. 95 km)	Source of crushed stone for CRCP, structures (Lot 2 ESIA, Section 3.2.2)	N/A	Licensed; designated sole approved source
Equipment Yard & Workshop	Adjacent to Main Camp (CH11+700)	Storage, maintenance, fueling station	5,000 m²	To be established Q2 2026
Concrete Batching Plant	Adjacent to Main Camp (CH11+700)	Supply of concrete for pavement and structures	3,000 m²	To be established Q2 2026
Temporary Haul Roads	Linking borrow pits, camps to main alignment	Transport of materials	Variable width	To be developed as needed

3.2.2 Environmental & Social Management Plan for Camps & Ancillary Sites

Aspect	Mitigation & Control Measures	Monitoring Indicator	Responsibility
Water Management	• Septic tanks and soakaways for sewage • Stormwater drains with oil interceptors • Groundwater monitoring wells near borrow pits	• Effluent quality (BOD, TSS, Oil & Grease) within NESREA limits • Groundwater level & quality quarterly	CHEC HSE Officer
Waste Management	• Segregated bins (5 categories: organic, recyclable, hazardous, e-waste, general) • Licensed waste contractors • Spill kits at fueling stations & workshops • E-waste protocol with chain-of-custody (Lot 2 ESIA, Section 3.6.2.2)	• Monthly waste audit with ≥60% diversion target • Zero dumping in wetlands or open land • 100% e-waste to licensed recyclers	CHEC Site Supervisor
Air Quality & Noise	• Water spraying on unpaved haul roads (minimum 3x	• PM_{10} levels at camp boundaries (≤50 µg/m³ 24-	Independent Monitor

	daily) • Equipment meeting EURO III/IV standards • Acoustic fencing near camps close to communities • 30 km/h speed limit on haul roads	hr mean) • Noise levels ≤55 dB(A) daytime at receptor points	
Erosion & Sediment Control	• Silt fences and sediment traps at all active areas • Stabilisation of disturbed areas within 14 days • Revegetation after use	• Erosion incidents reported & rectified within 24 hrs • Sediment control devices inspected weekly	CHEC Environmental Officer
Ecological Protection	• Borrow pits located outside wetland buffers (≥100m from CH 14+655–CH 16+710) • No lighting directed at wetlands • Invasive species protocol	• No encroachment into designated buffer zones • Weekly buffer inspections	CHEC / NEC Monitor

3.2.3 Social & Community Management

Aspect	Mitigation & Control Measures	Monitoring Indicator	Responsibility
Community Health & Safety	• Medical clinic in main camp for workers and emergency community cases • Fenced camps with controlled access • Security personnel trained on human rights (annual) • 30 km/h speed limit in all settlements (Lot 2 ESIA, Section 3.6.2)	• Clinic attendance log • Zero community complaints about trespassing or harassment • Quarterly community perception surveys	CHEC Community Liaison Officer (CLO)
Labour & Working Conditions	• Compliance with Nigerian labour laws and IFC PS2 • Written contracts for all workers • Gender-segregated accommodation with adequate facilities • Grievance boxes in camps and community centres	• Worker satisfaction surveys quarterly • Grievance resolution within 30 days • 100% workers with signed contracts	CHEC HR / CLO
GBV/SEA/SH Prevention	• GBV/SEA/SH Action Plan implemented across all camps (Lot 2 ESIA, Section 3.6.2) • Confidential reporting channels (24/7 hotline, dedicated female-staffed mechanism)	• Zero reported incidents linked to project workers • 100% workforce trained within 30 days of mobilisation	CHEC Gender Focal Person

	• Mandatory training for all workers and supervisors • Awareness sessions for communities	• Quarterly community perception surveys	
Traffic & Access	• Designated haul routes avoiding community centres • Flagmen at all community crossing points • Advance notice (48 hours) for any access disruptions • Two all-weather community access routes maintained at all times (Lot 2 ESIA, Section 3.6.2)	• Community feedback on traffic disruptions • No accidents involving community members • Weekly traffic safety audits	CHEC Traffic Manager

3.2.4 Decommissioning & Restoration

Facility	Restoration Commitment	Timeline	Verification
Construction Camps	• Structures dismantled; materials recycled • Site regraded; topsoil replaced • Handover to landowner/community for agreed use	Within 3 months of project completion	LASEPA / FMEnv sign-off; Community representative witness
Borrow Pits	• Backfilling and contouring to blend with surroundings • Revegetation with native species • Conversion to community pond or agricultural use if agreed	Within 6 months of end of use	Community representative witness; IESM verification
Precast Yards	• All structures removed; foundations broken out • Soil remediation if contaminated • Revegetation	Within 3 months of project completion	Independent Monitor
Haul Roads	• Stabilisation or reversion to original use • Drainage channels maintained to prevent erosion	Prior to project closure	Supervising Consultant

Appendix 3.3: Lagoon Grand Bridge (CH15+750) – Engineering Design and Strategic Optimisation

3.3.1 Project and Structure Overview

Parameter	Specification
Location	CH 15+750, crossing marsh lake zone (CH 14+655–CH 16+710) (Feasibility Study, 2025, p. 151)
Classification	Major Bridge (2# Lagoon Grand Bridge)
Total Length	2.255 km (Feasibility Study, 2025, p. 151)
Total Width	24.1 m (dual carriageways, barriers, shoulders) (Feasibility Study, 2025, p. 153)
Main Span	55 m (Feasibility Study, 2025, p. 151)
Typical Spans	40 m (Feasibility Study, 2025, p. 151)
Vertical Clearance	Optimised for urban integration; maintains hydrological connectivity

3.3.2 Technical Specifications

Component	Specification
Superstructure	Precast prestressed concrete U-shaped beams (48 units of 50m, 258 units of 40m) (Feasibility Study, 2025, p. 207)
Beam Dimensions (40m U-beam)	Web depth: 2.4 m; Top flange: 600 mm; Bottom flange: 400 mm; Web thickness: 300 mm (Feasibility Study, 2025, p. 151)
Self-Weight Reduction	18% compared to solid box girders (enables 55 m spans) (Lot 2 ESIA, Section 3.4.5)
Substructure	Column piers with pile caps
Foundations	Bored piles, 1.2 m diameter, 35–45 m depth, socketed minimum 5 m into competent sandstone (Feasibility Study, 2025, p. 151)
Pile Design Load	8,500 kN working load (Factor of Safety: 2.5)
Negative Skin Friction	2,800 kN per pile (from consolidating marsh sediments)
Design Standards	BS5400 (HA/45 unit HB loading); Nigerian Highway Manuals; JTG codes (Feasibility Study, 2025, p. 145)
Environmental Context	Freshwater wetland crossing; 19.5 m deep compressible marsh sediments (Inception Report, 2025, p. 6)

3.3.3 Strategic Design Optimizations

Optimization	Description	Benefit
U-Shaped Beam Geometry	Reduces self-weight by 18% compared to solid box girders	Enables 55 m main spans over marsh lake zone
Deep Pile Foundation	35–45 m depth with 5 m minimum socket into sandstone	Transfers loads through 19.5 m compressible alluvium; limits total settlement to <25 mm over 100-year design life
Elimination of Embankment Fill	Bridge replaces 5.85 million m^3 of ecologically destructive fill (Lot 2 ESIA, Section 3.1)	Preserves hydrological connectivity; eliminates need for dredging; achieves IFC PS6 biodiversity net gain
Ecological Hydrological Regulator	Maintains water exchange between eastern and western water areas	Prevents "damming effect"; provides passage for aquatic organisms

3.3.4 Foundation Design Parameters (HEC-18 Scour Analysis)

Parameter	Value
Design Flow Velocity (combined current + wave)	0.53 m/s
Near-Bed Wave Orbital Velocity (RMS)	0.47 m/s
General Scour Depth	0.30 m (over 100-year design life)
Local Scour Depth (pile groups)	Up to 2.1 m
Total Scour Depth	Up to 2.4 m
Foundation Embedment	Below combined scour depth; no reliance on permanent riprap

3.3.5 Project Cost

Cost Component	Estimated Cost (USD)
Lagoon Grand Bridge (CH15+750)	~119 million (bridge works only)
CH8+760 Bridge (120m)	~8 million
Total Lot 2 Bridge Works	~127 million (included in total contract value of USD 402.5 million) (Feasibility Study, 2025, p. 166)

Appendix 3.4: Material Source & Supply Chain Management Plan – Lot 2

3.4.1 Material Demand Summary

Material	Estimated Demand	Source	Key Requirements
Lateritic Gravel	>3 million m^3 (across 5 borrow pits)	Five identified quarries along corridor (Figure 3.7) (Lot 2 ESIA, Section 3.2.2)	• All pits tested (Lot 2 ESIA, Table 3.2) • MDD 1.98–2.10 g/cm^3 • CBR 16–27%
Lagoon Sand	Subgrade filling (200 mm subbase layer)	Lagoon sources along Lagos-Epe Expressway	• Strictly prohibited from structural concrete • For subgrade only (3.5% cement stabilization)
Sea Sand	Not used	Atlantic coast	• Prohibited for all applications without freshwater washing • Economically non-viable (USD 4.20/m^3 washing cost)
Crushed Stone	CRCP aggregate, base layers	CNC Quarry, Ijebu Ode (approx. 95 km) (Lot 2 ESIA, Section 3.2.2)	• Sole approved source • All 10 tests meet/exceed specifications • Wet Dynamic Crushing Value: 5.07% (49% below limit) • Los Angeles Abrasion: 22.14% (26% below limit)
Cement	C40 grade for CRCP, structures	Dangote Cement / BUA Cement	• Minimum 3.5% cement for stabilized layers • Quality control testing mandated
Steel Reinforcement	For CRCP, bridges, culverts	Nigerian steel manufacturers	• Compliance with BS and ASTM standards

3.4.2 Contractor Compliance Protocols

To satisfy **IFC PS1** and **PS3**, all material sourcing contractors must adhere to the following mandatory protocols:

Protocol	Requirement
Borrow Pit Operations	• Progressive rehabilitation of all borrow pits • No excavation within 100m of drainage lines • Dust suppression during dry season • Topsoil stripping and stockpiling for later use
Sand Dredging	• Installation of silt curtains around all in-water suction points • Real-time turbidity monitoring with alerts at TSS ≥50 mg/L above baseline (Lot 2 ESIA, Section 3.6.2.2) • Prohibition of dredging during peak fish spawning (May–July)
Quarry Operations (CNC)	• Monthly environmental compliance audits • Dust control measures (water spraying, covered conveyors) • Blast vibration monitoring within 500m of sensitive receptors
Transportation	• Covered trucks for all loose materials • 30 km/h speed limit on unpaved haul roads • Designated haul routes avoiding settlements where possible • Wheel wash stations at all site exit points

3.4.3 Supply Chain Code of Conduct

All subcontractors and material suppliers shall sign and comply with the **Sustainable Supply Chain Code of Conduct**, which includes:

- Compliance with ILO Core Labour Standards
- Minimum wage, working hours, and fair employment conditions
- Prohibition of forced labour, child labour, and discriminatory practices
- Environmental management obligations (waste, emissions, spill prevention)
- Anti-corruption and anti-bribery provisions
- Requirements for safe working conditions and worker welfare

3.4.4 Supply Chain Due Diligence Process

Stage	Action
Pre-Qualification	• ESG screening questionnaire • Site visits for high-risk suppliers (quarries, sand dredging) • Verification of licences, certifications, labour practices
Contractual Requirements	• Mandatory ESG clauses in all contracts • Penalties for non-compliance • Obligation to cascade ESG requirements to lower tiers
Monitoring & Audits	• Monthly audits for high-risk suppliers (sand dredging, quarry) • Quarterly audits for medium-risk suppliers (cement, steel) • Annual ESG performance review for all suppliers
Capacity Building	• Quarterly ESG training for subcontractors • Toolbox talks on labour rights, safety, environmental controls

Appendix 3.5: Project Schedule & Duration – Lot 2

Phase	Timeline	Key Activities
ESIA and RAP Preparation	Q4 2025 – Q1 2026	• ESIA finalization • RAP census and compensation (32 PAPs) (Lot 2 ESIA, Section 4.5.5.1) • Stakeholder consultations
Mobilisation & Site Setup	Q2 2026	• Establish construction camps (CH11+700, CH18+300) (Feasibility Study, 2025, p. 206) • Precast beam yards set up • Site access roads prepared • 50m wetland buffers demarcated
Earthworks & Drainage	Q3–Q4 2026	• Vegetation clearance (18,500 tonnes vegetal waste) (Lot 2 ESIA, Section 3.6.1) • Earthworks (2.09 million m³) (Feasibility Study, 2025, p. 25) • Soft soil treatment (marsh sediments up to 19.5m deep) • 27 culverts installed (Feasibility Study, 2025, p. 25)
Lagoon Bridge Works	Q3 2026 – Q3 2027	• Piling for Lagoon Grand Bridge (CH15+750) (Feasibility Study, 2025, p. 216) • Piling for CH8+760 Bridge • Erection of precast U and I-beams • Continuous turbidity monitoring (Lot 2 ESIA, Section 3.6.2.2)
Pavement & Surfacing	Q1–Q3 2027	• Sub-base, base, and CRCP slab placement (Feasibility Study, 2025, p. 142) • Quality control testing • Curing management
Toll Plaza & Ancillary	Q4 2027 – Q1 2028	• Toll plaza construction (CH11+900, CH10+900) (Feasibility Study, 2025, p. 160) • Service area (CH22+300) • Signage, lighting, barriers
Commissioning & Handover	Q1 2028	• Final safety audits • Formal handover • Commercial operation commences

APPENDIX 4: BASELINE STUDIES & FIELD DATA

Appendix 4.1: Field Sampling Protocol and Locations – Lot 2

4.1.1 Sampling Locations and Coordinates

S/N	Chainage	Latitude (N)	Longitude (E)	Parameters
1	Epe Town	6.590117	3.981367	Air / Noise
2	Chainage 17	6.582371	4.014338	Air / Noise
3	Chainage 20	6.609438	4.013829	Air / Noise, Soil, BIO
4	Chainage 22	6.626870	4.010137	Air / Noise, Soil, BIO
5	Chainage 24	6.639458	3.987661	Air / Noise, Soil, BIO
6	Chainage 15	6.566353	4.006137	GW, SW, SED
7	Chainage 16	6.574127	4.010750	GW, SW, SED
8	Chainage 17	6.582371	4.014338	GW, SW, SED

GW: Groundwater; SW: Surface water; SED: Sediment; BIO: Biodiversity

4.1.2 Sample Summary

Parameter	Number of Samples
Air Quality	5 locations
Noise	5 locations
Groundwater	3 samples
Surface water	3 samples
Sediment	3 samples
Phytoplankton	3 samples
Benthic Macroinvertebrates	3 samples
Soil	6 samples (3 locations × 2 depths)
Vegetation	3 transects (50m × 20m each)
Wildlife	3 forest transects (1 km) + 5 riparian transects (100 m)
Socioeconomic questionnaires	103 (80 household + 23 stakeholder)

4.1.3 Field Equipment

Equipment	Purpose
Garmin Map62 GPS (±3 m accuracy, WGS84)	Spatial referencing of all sampling locations
Kestrel 5000 Series Weather Meter	Temperature and relative humidity measurement
Aeroqual Series 500 Air Quality Monitor	In-situ measurement of $PM_{2.5}$, PM_{10}, NOx, CO_2, VOCs, HCHO
Extech 407730 Sound Level Meter (±2 dB, A-weighting)	Ambient noise monitoring
Calibrated multi-parameter water quality meter	In-situ pH, EC, DO
Soil auger	Soil sampling at 0–15 cm and 15–30 cm
Heckman sediment grab (25 kg)	Benthic sediment and macroinvertebrate collection
Standard plankton net (20–55 µm mesh)	Phytoplankton collection
50-metre measuring tape	Biodiversity plot demarcation
Digital camera	Photographic documentation

Appendix 4.2: Laboratory Analysis Results – Lot 2

4.2.1 Surface Water Quality

Parameter	Unit	CH 15	CH 16	CH 17	FMEnv Limit	Status
pH (at 25°C)	---	7.1	7.3	7.3	6.5–8.5	Compliant
Electrical Conductivity	µmhos/cm	192.3	177.6	174.5	NS	–
Turbidity	NTU	5.0	2.5	15.9	NS (natural baseline)	–
Total Dissolved Solids	mg/L	164.2	133.2	130.8	2000	Compliant
Ammoniacal Nitrogen	mg/L	1.6	3.7	2.2	NS	–
Chloride	mg/L	32.5	24.5	24.5	250	Compliant
Nitrate	mg/L	0.14	0.08	0.14	50	Compliant
Phosphate (Total)	mg/L	0.45	0.56	0.46	NS	–
Dissolved Oxygen	mg/L	7.6	7.4	8.7	≥5	Compliant
BOD	mg/L	2.0	5.0	2.0	30	Compliant
COD	mg/L	4.0	8.0	4.0	250	Compliant
Total Petroleum HC	mg/L	<0.01	<0.01	<0.01	0.01	Compliant
Pesticides Residue	mg/L	<0.01	<0.01	<0.01	0.01	Compliant
Coliforms	CFU/ml	5	4	0	0	–
Total Plate Count	CFU/ml	292	135	34	NS	–

4.2.2 Groundwater Quality

Parameter	Unit	CH 15	CH 16	CH 17	NIS Limit	Status
pH (at 25°C)	---	6.8	6.5	2.1	6.5–8.5	Critical – CH 17 only
Electrical Conductivity	µmhos/cm	226	231	2020	1000	Critical – CH 17 only
TDS	mg/L	179	193.2	1515	500	Critical – CH 17 only
Dissolved Oxygen	mg/L	7.7	8.0	7.6	NS	–
Chloride	mg/L	49.1	46.8	222.7	250	Elevated – CH 17 only
Total Petroleum HC	mg/L	<0.01	<0.01	<0.01	0.01	Compliant

Pesticides Residue	mg/L	<0.01	<0.01	<0.01	0.01	Compliant
Coliforms	CFU/ml	10	7	0	0	–

4.2.3 Sediment Quality

Parameter	Unit	CH 15	CH 16	CH 17	Risk Status
Moisture Content	%	71.4	76.4	90.6	Handling Risk
pH	---	6.4	6.1	5.6	Slightly Acidic
Ammoniacal Nitrogen	mg/kg	380.5	357.8	1,811.7	Nutrient Rich
Total Iron (as Fe_2O_3)	mg/kg	14,814.5	21,166.9	5,597.3	Geogenic Iron
Zinc	mg/kg	75.0	29.3	14.0	Lender Alert (CH 15)
TPH (Oil/Fat)	%	<0.01	<0.01	<0.01	Non-Detect
Total Plate Count	CFU/g	120,000	127,000	110,000	Bio-Active

4.2.4 Soil Quality

Parameter	Unit	CH 20	CH 22	CH 24	NIS Limit	Risk Status
pH	---	5.8	5.2	5.8	6.5–8.5	Mildly Acidic
Moisture Content	%	6.8	27.0	5.3	NS	Instability Risk (CH 22)
Total Organic Matter	%	5.6	10.7	5.4	NS	High Organic (CH 22)
Total Iron (as Fe_2O_3)	mg/kg	4,270.3	3,387.5	10,659.0	NS	Geogenic Iron
Zinc	mg/kg	43.9	7.5	2.9	50 (screen)	Compliant
TPH (Oil/Fat)	%	<0.01	<0.01	<0.01	0.01	Pristine
Coliforms	CFU/g	70	80	90	0	Natural Background

Appendix 4.3: Biodiversity Assessment – Lot 2

4.3.1 Flora Inventory

S/N	Species Name	Family	Growth Form	IUCN Status
1	*Gomphrena celosiodes*	Amaranthaceae	Herb	Not Assessed
2	*Peltandra virginica*	Araceae	Herb	Not Assessed

3	*Raphia taedigera*	Arecaceae	Woody herb	Not Assessed
4	*Chromolaena odorata*	Asteraceae	Shrub	Not Assessed (Invasive)
5	*Cleome viscosa*	Cleomaceae	Herb	Not Assessed
6	*Cyperus ligularis*	Cyperaceae	Sedge	Not Assessed
7	*Mariscus alternifolius*	Cyperaceae	Sedge	Not Assessed
8	*Dryopteris fili-max*	Dryopteridaceae	Herb	Not Assessed
9	*Alchornia cordiflora*	Euphorbiaceae	Shrub	Not Assessed
10	*Ricinus communis*	Euphorbiaceae	Shrub	Not Assessed
11	*Senna obtusifolia*	Fabaceae	Shrub	Not Assessed
12	*Crotalaria retusa*	Fabaceae	Herb	Not Assessed
13	*Mimosa pudica*	Fabaceae	Herb	Not Assessed
14	*Calopogonium mucunoides*	Fabaceae	Herb	Not Assessed
15	*Hyptis suaveolens*	Lamiaceae	Herb	Not Assessed
16	*Spigelia anthelmia*	Loganiaceae	Herb	Not Assessed
17	*Sida acuta*	Malvaceae	Shrub	Not Assessed
18	*Musa paradisiaca*	Musaceae	Herb	Not Assessed
19	*Pennisetum polystachion*	Poaceae	Grass	Not Assessed
20	*Cynodon dactylon*	Poaceae	Grass	Not Assessed
21	*Phragmites australis*	Poaceae	Grass	Not Assessed
22	*Leersia hexandra*	Poaceae	Grass	Not Assessed
23	*Eichhornia crassipes*	Pontederiaceae	Herb	Not Assessed (Invasive)
24	*Lantana camara*	Verbenaceae	Shrub	Not Assessed

4.3.2 Fauna Inventory

Class	Species	Common Name	IUCN Status	Habitat
Reptiles	*Crocodylus niloticus*	Nile crocodile	Least Concern	Wetlands (CH 15-17)
	Varanus niloticus	Nile monitor	Not Assessed	Wetlands, riparian
	Agama agama	Common agama	Not Assessed	Disturbed areas

Mammals	Various small mammals	Squirrels, rodents	Not Assessed	Terrestrial
Amphibians	*Ptychadena mascareniensis*	Mascarene frog	Least Concern	Wetlands
Avifauna	*Psittacus erithacus*	African grey parrot	Endangered	Forest patches
	Egretta garzetta	Little egret	Least Concern	Wetlands
	Pandion haliaetus	Osprey	Least Concern	Lagoon
	Haliaeetus vocifer	African fish eagle	Least Concern	Lagoon margins
	Merops albicollis	White-throated bee-eater	Least Concern	Migratory

4.3.3 Critical Habitat Assessment Summary (IFC PS6)

Criterion	Assessment	Key Evidence
Criterion 1: CR/EN Species	Not Applicable	IUCN screening: 0 CR/EN species recorded (Lot 2 ESIA, Section 4.4.4)
Criterion 2: Endemic/Restricted-Range	Not Applicable	GBIF analysis: all species >500,000 km² range
Criterion 3: Migratory/Congregatory	Not Applicable	No globally significant concentrations documented
Criterion 4: Threatened Ecosystems	Not Applicable	No true mangroves; secondary vegetation only
Criterion 5: Evolutionary Processes	Not Applicable	No key evolutionary processes identified

Conclusion: Lot 2 corridor classified as **Modified Habitat** under IFC PS6 (Lot 2 ESIA, Section 4.4.4). Management obligations include application of mitigation hierarchy, invasive species control, biodiversity restoration where feasible, and long-term monitoring.

APPENDIX 5: STAKEHOLDER ENGAGEMENT

Appendix 5.1: Stakeholder Engagement Plan (SEP) – Lot 2

5.1.1 Objectives

- Ensure early, continuous, and meaningful consultation with stakeholders
- Provide timely disclosure of project information in accessible formats
- Establish grievance redress mechanisms (GRM) that are transparent and culturally appropriate
- Strengthen community ownership of mitigation and monitoring measures
- Align engagement with international lender safeguards and national regulatory frameworks

5.1.2 Stakeholder Identification and Categorisation

Category	Stakeholders	Role / Interest
Regulators	FMEnv, NESREA, LASEPA, Lagos State Ministry of Environment	Oversight, compliance, enforcement
Project Proponents	FMW, CHEC, AEC, NEC, MAISA	Implementation, reporting
Lenders	Standard Chartered, Afreximbank	ESG compliance, due diligence
Local Communities	Odo-Noforija, Igando-Oloja, Akodo, Epe, plus 12 other settlements	Directly affected by displacement, traffic, noise, dust
Vulnerable Groups	Women-headed households (18%), elderly (8%), unemployed youth (30%), low-income tenants (Lot 2 ESIA, Section 4.5.4.3)	Require tailored support in RAP/LRP
Industry Stakeholders	Dangote Refinery, Lekki Port, Lekki Free Trade Zone	Cumulative impacts, logistics coordination
Civil Society	NGOs, CBOs, academic institutions	Independent monitoring, advocacy
Traditional Leaders	Baales, Obas, shrine custodians	Cultural heritage preservation

5.1.3 Engagement Methods

Method	Description	Target Stakeholders	Frequency
Public Consultations	Town hall meetings in Odo-Noforija, Igando-Oloja, Akodo, Epe	All community members	Quarterly (pre-construction & construction)
Focus Group Discussions (FGDs)	Women, youth, farmers, traders, transport unions	Specific stakeholder groups	Bi-monthly

Information Disclosure	ESIA summaries translated into Yoruba; posters, radio broadcasts	General public	At key milestones
Participatory Monitoring	Community committees involved in biodiversity and traffic monitoring	Community representatives	Quarterly
Digital Platforms	Project website, SMS alerts, WhatsApp groups	Stakeholder representatives	Real-time updates
One-on-One Consultations	Tailored support for vulnerable groups	Vulnerable individuals	As needed
Formal Letters/Emails	Compliance and coordination	MDAs, NGOs, lenders	As required

5.1.4 Communication Channels

Channel	Target Stakeholders	Purpose
Community meetings/town halls	PAPs, CDAs, youth, women	Project updates, feedback
Traditional institutions	Community elders, chiefs	Consent, dispute resolution
Notice boards (community & LG offices)	General public	Information disclosure
Radio announcements (local language)	Wider community	Awareness and updates
One-on-one consultations	Vulnerable groups	Tailored support
Phone calls/SMS/WhatsApp	Stakeholder representatives	Rapid communication
Grievance Redress Desk	All stakeholders	Complaint resolution

Appendix 5.2: Grievance Redress Mechanism (GRM) – Lot 2

5.2.1 GRM Structure

Component	Description
Toll-Free Hotline	0800-7TH-AXIAL (24/7) (Lot 2 ESIA, Section 3.6.2)
GRM Officer	Trained officer based in Epe; manages intake, logging, follow-up, escalation
Community Help Desks	5 strategically located desks along corridor
Digital Database	Secure system with unique case IDs; tracks intake, actions, resolution

5.2.2 GRM Process

Stage	Description	Timeframe
1. Grievance Submission	Verbal or written through designated access points (hotline, help desk, email)	Anytime
2. Acknowledgement & Registration	Formal registration in grievance logbook; unique reference number assigned	Within 48 hours (Lot 2 ESIA, Section 3.6.2)
3. Screening & Categorisation	Eligibility confirmed; categorised (land, compensation, livelihood, safety, etc.)	Within 7 working days
4. Assessment & Investigation	Grievance Redress Committee (GRC) investigates	Within 14 working days
5. Resolution & Decision	Proposed resolution discussed with complainant; corrective actions implemented	Within 30 days total
6. Implementation & Closure	Actions implemented; grievance formally closed	Within 7 days after agreement
7. Appeal & Escalation	If dissatisfied, case escalated to higher authorities (Project Steering Committee, FMEnv, judicial system)	Within 14–30 working days

5.2.3 GRM Performance Indicators

Indicator	Target
Grievance acknowledgement	≤48 hours
Grievance resolution	≤30 calendar days
Resolution rate	≥90% within 30 days
Appeal resolution	≤30 days

5.2.4 Confidentiality and Protection

All grievances will be handled with confidentiality, particularly those related to GBV/SEA/SH, harassment, or sensitive social issues. No complainant shall face retaliation, discrimination, or disadvantage for using the GRM.

APPENDIX 6: ENVIRONMENTAL & SOCIAL MANAGEMENT PLANS (ESMP)

Appendix 6.1: Labour Management and Worker Welfare Plan – Lot 2

6.1.1 Core Principles and Alignment with IFC PS2

This Labour Management Plan (LMP) formalizes the project's commitment to fair and safe working conditions for all personnel, in full alignment with **IFC Performance Standard 2 (Labour and Working Conditions)** , Nigerian labour law, and fundamental International Labour Organization (ILO) conventions.

6.1.2 Local Hiring Implementation Plan

Category	Total Positions	Local Hire Target	Verification Method
Skilled Labour	350	105 (30%)	Trade certification + residency (LGA confirmation)
Unskilled Labour	800	320 (40%)	Residency confirmation
Supervisory	150	30 (20%)	Experience + local address
TOTAL	**1,300**	**455 (35%)**	Monthly payroll audits

6.1.3 Key Commitments and Procedures

Commitment	Procedure
Freedom of Association	Respect right of all workers to form and join workers' organizations; no discrimination or retaliation
Non-Discrimination & Equal Opportunity	Employment decisions based on skills and performance, not personal characteristics; active promotion of 30% local hiring quota
Worker Grievance Mechanism	Confidential, accessible mechanism separate from community GRM; anonymous hotline; tripartite review committee with worker representation
Occupational Health & Safety	ISO 45001-aligned OHS Management System; hazard identification and risk assessment; mandatory PPE; safety induction and task-specific training; bi-annual emergency drills (Lot 2 ESIA, Section 3.6.2.2)
Terms of Employment	Written contracts in language understood by worker; wages meeting or exceeding legal minimum; working hours not exceeding ILO standards; overtime voluntary and compensated
Child Labour & Forced Labour	Zero tolerance; mandatory age verification; quarterly subcontractor audits

6.1.4 Worker Accommodation (IFC PS2/EBRD Standards)

Standard	Requirement
Living Space	Max 8 persons/room; 4 m²/person minimum
Sanitation	Gender-segregated toilets and washing facilities; ratio 1 toilet per 10 workers
Water Supply	Potable water available 24/7
Medical Clinic	24-hour service; 2 nurses + doctor on call
Dining	3 meals/day, culturally appropriate
Recreation	TV room, sports facilities
Prayer Rooms	Separate Christian and Muslim facilities
Security	Proportionate, respecting freedom of movement

6.1.5 Community Interaction Protocol

Requirement	Description
Worker Code of Conduct	Signed by all workers; includes GBV/SEA/SH zero-tolerance, respect for local customs, 10 pm curfew, visible project ID (Lot 2 ESIA, Section 3.6.2.2)
Community Liaison Officers	2 CLOs (local hires); monthly community meetings; 24-hour grievance hotline
Skills Transfer Program	200 apprenticeship positions for local youth; on-site training centre (5 vocational programs); certification via Lagos State Ministry of Labour

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APPENDIX 7: ASSURANCE, MONITORING & REPORTING

Appendix 7.1: ESMP Implementation Budget – Lot 2

Category	Mitigation / Monitoring Activity	Budget (USD)	Implementation Timeline	Responsible Party	Performance Indicator
Air Quality Management	Water spraying systems, dust suppression on haul roads, EURO IV/V equipment, real-time PM_{10} monitoring	180,000	Construction Phase	CHEC HSE Officer	$PM_{2.5} \leq 25$ µg/m³; $PM_{10} \leq 50$ µg/m³
Noise & Vibration Control	Acoustic barriers, restricted work	120,000	Construction Phase	CHEC Site Supervisor	Noise ≤55 dB(A) day /

	hours (7am–7pm), machinery maintenance, vibration monitoring				45 dB(A) night
Erosion & Sediment Control	Silt fences, sediment basins, geotextiles, riprap installation, slope stabilisation	200,000	Construction Phase	CHEC Environmental Officer	Zero sediment discharge into wetlands
Hydrology & Drainage	Climate-resilient culverts (+20% capacity), scour protection, drainage maintenance	2,050,000	Design & Construction	CHEC Engineering Team	1-in-100-year flood resilience
Waste Management	Segregated waste collection, licensed disposal, spill response kits, e-waste protocol	75,000	Full Project Lifecycle	CHEC Waste Officer	100% proper disposal; ≥60% diversion
Biodiversity Protection	50m wetland buffer zones, habitat restoration, biodiversity monitoring framework	350,000	Construction & Post-Construction	NEC / CHEC Biodiversity Team	≥80% survival of replanted vegetation; invasive species cover ≤5%
Community Health & Safety	Traffic management, pedestrian crossings, safety signage, community awareness	150,000	Construction Phase	CHEC Community Liaison Officer	Zero community traffic fatalities
Livelihoods (RAP/LRP)	Implement Livelihood Restoration Plan prior to	250,000	Pre-Construction & Construction	CHEC RAP Officer	100% PAP compensation before displacement

	site entry; 40% benefits targeting women				
GBV/SEA/SH Action Plan	Workforce training, confidential reporting, community awareness campaigns	120,000	Full Project Lifecycle	CHEC Gender Focal Person	100% workforce trained; zero reported incidents
Cultural Heritage	Chance-finds procedure, site demarcation, consultation with custodians	55,000	Construction Phase	CHEC Heritage Officer	Zero disturbance to identified heritage sites
Occupational Health & Safety	PPE provision, safety training, emergency medical services, bi-annual drills	100,000	Construction Phase	CHEC OHS Officer	Zero fatalities; LTIFR <1.0
Environmental & Social Monitoring	Air/water/noise sampling, ecological surveys, community feedback collection	150,000	Full Project Lifecycle	Independent Monitor (NEC)	Monthly monitoring reports submitted
Climate Adaptation Measures	Heat-resilient pavement, reinforced embankments, early-warning systems	6,595,000	Design & Construction	CHEC Engineering Team	Infrastructure withstands projected 2050 climate scenarios
Stakeholder Engagement	Community meetings, grievance redress, quarterly multi-stakeholder forums	90,000	Full Project Lifecycle	CHEC CLO / NEC	≥90% grievance resolution within 30 days
Auditing & Reporting	Independent third-party audits, lender	150,000	Annual (Years 1–3)	Accredited Auditor	Annual audit reports to

	reporting, regulatory submissions				lenders & FMEnv
Decommissioning Fund	Site restoration, material recycling, post-closure monitoring	3,500,000	Post-Operational (Year 40+)	Project Proponent (FMW)	Full site restoration per DRP
TOTAL		14,135,000			

Appendix 7.2: Monitoring Framework & Responsibilities – Lot 2

Monitoring Parameter	Frequency	Threshold / Standard	Responsible Party	Reporting Recipient
Air Quality ($PM_{2.5}$, PM_{10}, NOx)	Continuous (real-time sensors)	WHO / NESREA limits	Independent Monitor	FMEnv, LASEPA, Lenders
Noise Levels	Weekly at sensitive receptors	≤55 dB(A) day / 45 dB(A) night	CHEC HSE Officer	LASEPA, Community Reps
Water Quality (Lagoon, marsh lake)	Monthly	DO ≥5 mg/L; TSS ≤50 mg/L; TPH <0.01 mg/L	NEC Lab Team	FMEnv, LASEPA
Turbidity (CH 15-17)	Continuous during in-water works	≤50 mg/L above baseline (Lot 2 ESIA, Section 3.6.2.2)	CHEC Environmental Officer	IESM, LASEPA
Soil Erosion & Stability	After major rainfall events	Zero sedimentation in wetlands	CHEC Environmental Officer	Supervising Consultant
Biodiversity Health	Quarterly (wet/dry seasons)	Species presence; habitat recovery	NEC Ecologists	FMEnv, Lenders
Wetland Buffer Compliance	Weekly	50m buffer enforced; zero encroachment	CHEC Environmental Officer	IESM
PAP Satisfaction & Grievances	Monthly	≥90% resolution within 30 days	CHEC CLO	Lenders, Community Leaders

Traffic & Safety Incidents	Daily log	Zero fatalities; accident log	CHEC Traffic Manager	FRSC, Lenders
GBV/SEA/SH Incidents	Confidential reporting	Zero incidents linked to project	Gender Focal Person	CHEC Management, Lenders
Labour Compliance	Monthly audits	IFC PS2; Nigerian Labour Act	CHEC HR / Independent Auditor	Lenders, Ministry of Labour
E-Waste Management	Monthly inventory	100% licensed recycler chain-of-custody (Lot 2 ESIA, Section 3.6.2.2)	CHEC Waste Officer	IESM, Lenders
Climate Resilience Performance	Annual inspection	No flood damage; pavement integrity	CHEC Engineering Team	FMEnv, Lenders

Appendix 7.3: Contingency & Adaptive Management Fund – Lot 2

Contingency Item	Allocated Budget (USD)	Trigger Condition
Unforeseen community compensation	250,000	Additional PAPs identified beyond initial 32
Emergency spill response	100,000	Hydrocarbon or chemical spill >20 L (Lot 2 ESIA, Section 3.6.2.2)
Additional biodiversity measures	300,000	Unexpected impact on wetland habitat
Climate event damage repair	500,000	Extreme weather damage to infrastructure
Adaptive management revisions	200,000	Monitoring indicates mitigation ineffective

Appendix 7.4: Independent Environmental & Social Monitor (IESM) Terms of Reference

7.4.1 Objective

The Independent Environmental & Social Monitor (IESM) provides third-party oversight to verify the project's compliance with the ESMP, IFC Performance Standards, and lender requirements throughout construction and early operation.

7.4.2 Key Responsibilities

Responsibility	Description
Monthly Site Inspections	Unannounced inspections of all project areas, personnel, monitoring records, and documentation
Quarterly Compliance Reporting	Reports to lenders, FMEnv, and Project Steering Committee on ESMP implementation status
Annual Environmental and Social Performance Audits	Independent verification of compliance with ESMP commitments and IFC PS
Verification of Corrective Actions	Track closure of non-compliances and incidents
Independent Review of Monitoring Data	Validate accuracy of air, water, noise, biodiversity, and social monitoring data

7.4.3 Access Rights

- **Unannounced Site Access:** The IESM shall have unrestricted, unannounced access to all project areas, personnel, monitoring records, and documentation.
- **Reporting Lines:** The IESM will report directly to:
    1. Federal Ministry of Environment (FMEnv) – Primary regulator
    2. Standard Chartered Bank / Afreximbank ESG Departments – Parallel reporting
    3. Project Steering Committee – For information sharing and oversight

7.4.4 Escalation Protocol for Non-Compliance

Level	Issue	Action Timeline	Escalation Path
Minor	Procedural deviation	7 days	Contractor → CHEC Site Manager
Moderate	Regulatory non-compliance	48 hours	IESM → FMW → FMEnv
Major	Environmental incident or safety breach	Immediate	IESM → Lenders → FMEnv + LASEPA
Critical	Systemic failure or human rights violation	Immediate	IESM → SCB/Afreximbank → Board-Level Notification

Appendix 7.5: PAP Consent Records – Lot 2

7.5.1 Summary of Project-Affected Persons

Category	Number
Total PAPs (crop loss only)	32 (Lot 2 ESIA, Section 4.5.5.1)
Individual households	30
Community leadership claimants	2
Women-headed households	6 (18%)
Elderly claimants	3 (8%)

7.5.2 Compensation Framework

Parameter	Commitment
Compensation Standard	Full Replacement Cost (FRC) based on professional valuation (Lot 2 ESIA, Section 3.6.1)
Valuation Method	Income Capitalisation and Replacement Cost Approach
Compensation Timeline	100% disbursement before any site clearance (Condition Precedent)
Livelihood Restoration	Agricultural input support, vocational training, microcredit access (40% targeting women)
Grievance Mechanism	Dedicated community desk; 30-day resolution target; escalation to FMEnv

Appendix 7.6: ESG Dashboard Specifications – Lot 2

Dashboard Module	Data Input Parameter	Coordinate Source	Reporting Standard
Water Quality	DO, pH, Salinity, TSS, TPH	CH 15, 16, 17 (marsh lake zone)	FMEnv Effluent Limits; IFC PS3
Air & Emissions	$PM_{2.5}$, PM_{10}, NOx, VOC	CH 8+700, CH15+750, CH24+932	WHO 2021; NESREA
Noise	dB(A) Leq	Odo-Noforija, Igando-Oloja, Akodo	NESREA; IFC PS4
Biodiversity	BMWP score; fish species richness; invasive species cover	Marsh lake zone (CH 14+655–CH 16+710)	IFC PS6; Net Gain tracking
Livelihood	Income recovery rate; grievance resolution	Odo-Noforija, Igando-Oloja, Akodo	IFC PS5 (LRP)
Hydrology	Water surface elevation; flood events	CH15+750 (Lagoon Grand Bridge)	1-in-100-year design standard
Traffic	Vehicle counts by category; HDV share	CH11+900 (toll plaza), CH24+932	FRSC; Lagos State Transport Policy
Waste Management	E-waste disposal volume; recycling rate	All sites	FMEnv; IFC PS3