Chapter 7 Environmental and Social Considerations

Chapter 7 Environmental and Social Considerations

7-1 Legal and Regulatory Requirements

7-1-1 Environmental Component

7-1-1-1 Relevant Policies

(1) National Environment Policy

Launched by Government in November 1989, this document prescribed guidelines for achieving sustainable development in fourteen vital sectors of the nation's economy, namely: Human Population; Land Use and Soil Conservation; Water Resources Management; Forestry, Wildlife and Protected Natural Areas; Marine and Coastal Area Resources; Sanitation and Waste Management; Toxic and Hazardous Substances; Mining and Mineral Resources; Agricultural Chemicals; Energy Production; Air Pollution; Noise in the Working Environment; Settlements; Recreational Spaces, Green Belts, Monuments, and Cultural Property.

The project will have effects on biophysical and human environment; as a result, it shall comply with the relevant provisions of this policy.

7-1-1-2 Major Laws and regulations

Major laws and regulations relating environment issues are as shown in Table 7-1.

Table 7-1 Major Laws and Regulations relating environment issues

Name of Laws and Regulations	Year
The Environmental Impact Assessment (EIA) Act 2004	2004
The Nigerian Urban and regional Planning Act	1992
Harmful Waste（Special Criminal Provisions）Act	1988
Forest Act	1958
Labour Act	2004
Endangered Species Act	1985

Although under the Constitution of the Federal Republic of Nigeria it is recognized that the importance of improving and protecting the environment, comprehensive law for conservation, protection and management of environment was not established and regulations are mostly set up for specific issue in Nigeria.

Among the laws and regulations mentioned above, Forestry Act, 1958 provides for the preservation of forest and the setting up Forest Reserves. In order to cope with this, in addition of acts prohibited in the Forest Reserves, Ministry of Forestry gave caveat that even in the Free Area such as community/natural forests, watersheds or areas close to it, private/individual plantations, roadside trees, home stead trees, felling any tree is required proper permission from the State Government.

Federal Ministry of Environment (FMEnv) is wholly responsible to all the environmental management and planning environmental policy.

7-1-1-3 Environmental Regulation and Management

The National Environmental Standards and Regulations Enforcement Agency (NESREA) was established as para-state organization from the FMEnv in 2007 and is the institution responsible in Nigeria for the elaboration of Environmental Standards and Regulations and its enforcement at country level. Besides, NESREA is to enforce compliance with provisions of international agreements, protocols, conventions and treaties on the environment.

More than 20 kinds of regulations were enacted and among them, those related to the project are as follows:

- National Environmental (Permitting and Licensing Systems) Regulations, 2009
- National Environmental (Sanitation and Waste Control) Regulations, 2009
- National Environmental (Surface and Groundwater Quality Control) Regulations, 2011
- National Environmental (Noise Standards and Control) Regulations, 2009
- National Environmental (Wetlands, River Banks and Lake Shores Protection) Regulations, 2009
- National Environmental (Coastal and Marine Area Protection) Regulations, 2011
- National Environmental (Watershed, Hilly, Mountainous and Catchment Areas) Regulations, 2009

7-1-1-4 Environmental Impact Assessment in Nigeria

(1) Outline of EIA regulations

Laws and regulations related to Environmental Impact Assessment in Nigeria are as follows:

Environment Impact Assessment Decree 86, 1992 (EIA Decree)

According to the EIA Decree EIA is mandatory for any major development project likely to have adverse impacts on the environment.

EIA Procedural Guidelines, 1992

It indicates the steps to be followed in the EIA process from the project conception to commissioning. It assists to project proponents in conforming to the requirements of Decree 86, 1992 and to obtain certification from the Federal Government of Nigeria through the FMEnv.

EIA Sectoral Guidelines for Transmission Lines

For major sectors EIA guidelines specific to the sector is established including grid development. According to the sectoral guidelines for transmission line development, in general expected negative impacts are indicated to environmental items such as land acquisition /resettlement and way-leave, landscape, ecological impact including vegetation removal, noise and vibration.

(2) Categorization of the Projects

According to the Decree 86 of 1992 that governs EIA, exists three categories of projects as follows:

Category I for which EIA is mandatory;
Category II for which a partial EIA will be required and,
Category III for which EIA is not required.

Regarding electric power development, following projects are as mandatory activities required EIA study in the EIA Decree (Schedule 13. Power Generation and Transmission):

(a) Construction of steam generated power stations burning fossil fuels and having a capacity of more than 10MW.
(b) Dams and hydroelectric power schemes with either or both of the following.
- dams over 15 meters high and ancillary structures covering a total area in excess of 40 hectares;
- reservoirs with a surface area in excess of 400 hectares;

(c) Construction of combined cycle power stations.
(d) Construction of nuclear-fuelled power stations.

However, as for transmission line development there is no clear description of the project, which is required EIA study. Categorization of the project will be determined through screening by FMEnv after submission of the project plan to FMEnv. The proposed project was classified as Category I which require EIA based on the screening by FMEnv.

In addition, according to EIA Procedural Guidelines 1995, the project in the following environmentally sensitive areas is mandatory to obtain EIA approval, but the project area is considered not being the sensitive areas listed below :

S-1 Coral reefs
S-2 Mangrove swamps
S-3 Small islands, S-4 Tropical rainforest
S-5 Areas with erosion prone soils
S-6 Mountain slopes
S-7 Areas prone to desertification (and semi-arid zones)
S-8 Natural conservation areas
S-9 Wetland of national or international importance
S-10 Areas with harbour protected and or endangered species
S-11 Areas of unique scenery
S-12 Areas of particular scientific interest
S-13 Areas of history or archaeological interest
S-14 Areas of importance to threatened ethnic groups

In case of 58 km 330 kV Qit – Ikot Abasi Transmission Line Project financed by World Bank in 2012, the EIA study report was prepared.

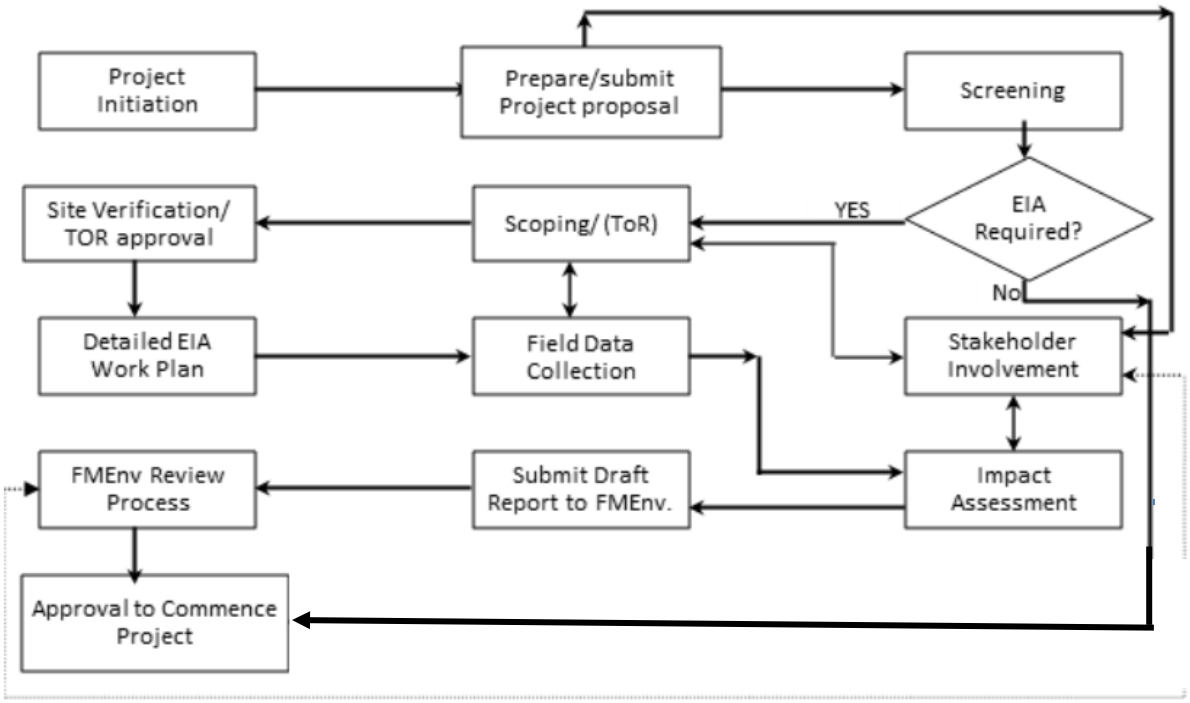
(3) Procedures of EIA Approval

According to the EIA Procedural Guideline (1995) procedures of EIA in Nigeria are shown in Table 7-2 and Figure 7-1

Table 7-2 Procedures of EIA Approval in Nigeria

Procedures		Concerned Organization		
		Proponent//EIA Consultant	Federal ministry of Environment (FMEnv)	Local Government
1	The proponent makes registration to FMEnv by submission of the project plan (brief) and payment of 50,000 Naira.	X		
2	Environmental Assessment Department of FMEnv after the site verification conducts screening by Initial Environmental Examination (IEE) and determines categorization of the project as follows: (a) Category I for which EIA is mandatory; (b) Category II for which a partial EIA will be required and, (c) Category III for which EIA is not required.		X	
3	Because of the screening, if EIA study is required, the proponent submits provisional environmental scoping and TOR for EIA study to FMEnv.	X		
4	FMEnv gives approval to the proponent after reviewing the scoping and TOR.		X	
5	The proponent selects EIA consultants certified by FMEnv, who can conduct EIA study to meet requirement with TOR.	X		
6	The proponent pays 500,000 Naira to FMEnv and contracts out EIA study to selected EIA consultant.	X		
7	The EIA consultant conducts EIA study.	X		
8	Proponent submits draft EIA report prepared by the EIA consultant to FMEnv.	X		
9	FMEnv reviews draft EIA report.		X	
	(1) In-house Review (Environmental Assessment Department)		X	
	(2) Public Review (21 days display)		X	
	(3) Panel Review (Panellists include experts, local government council, FMEnv)		X	
10	FMEnv furnish the Review Report with some conditions and an Approval to the proponent.		X	
11	The proponent prepares final EIA report.	X		
12	FME provides EIA approval to the proponent.		X	

Source: JICA （2014） "The Project for Review and Update of Nigeria National Water Resources Master Plan", EIA Procedural Guidelines 1995 and hearing from TCN.



Source: FMEnv

Figure 7-1 The EIA Process of FMEnv.

(4) Information disclosure and stakeholder meetings

In Term of "stakeholder" or "public participation" is not found in the EIA Decree. However, subjects relating public involvement are described from screening process to reviewing draft final report of EIA study for EIA approval in the EIA Decree as follows:.

(a) In general: Article 7 - The Agency (FMEnv) shall give opportunity to government agencies, members of the public, experts in any relevant discipline and interested groups to make comment.

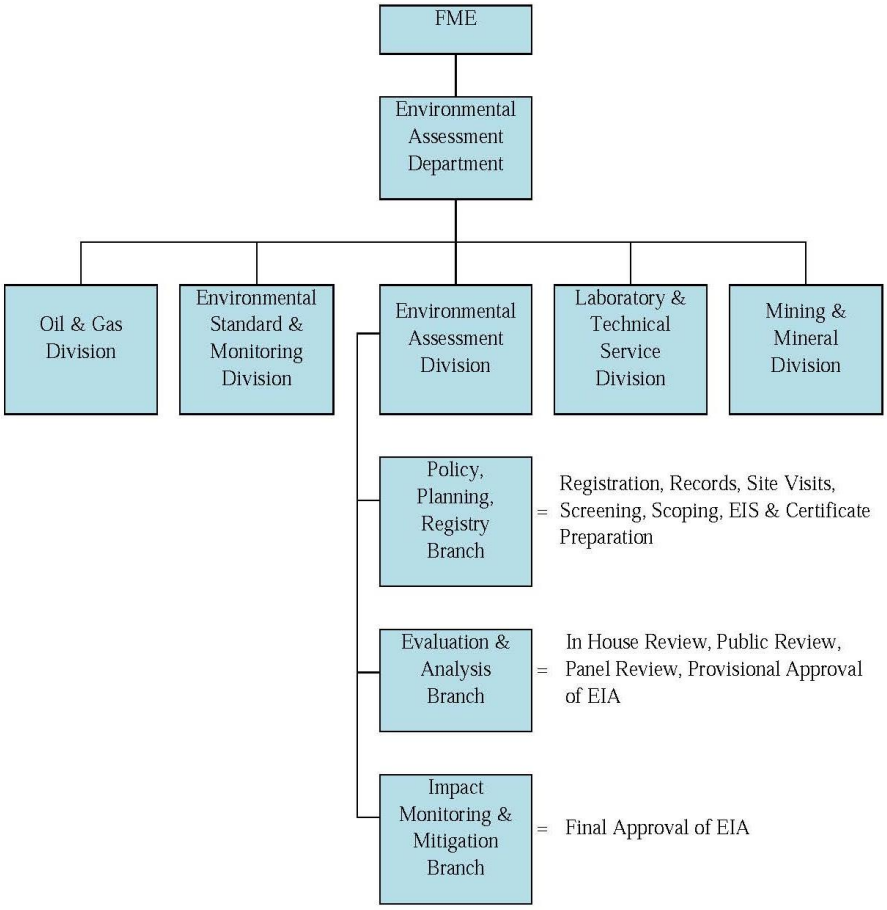
(b) Screening process: Article 17 - Every screening shall include a consideration of comments concerning environmental effects received from the public.

(c) Public hearing: Article 37 - A review panel the review panel shall hold hearing in a manner that offers the public an opportunity to participate in the assessment.

(d) Public comments: Article 25 - After receiving an EIA study report FMEnv shall publish in a notice for filing comments on the conclusions and recommendations of the report. Any person may file comments with the FMEnv relating to the conclusions and recommendations of the EIA study report.

(5) Organization in Charge of EIA

In FMEnv Environmental Assessment Division of Environmental Assessment Department is in charge of EIA issues.



Source: JICA (2014) "The Project for Review and Update of Nigeria National Water Resources Master Plan"

Figure 7-2 Organization Chart of FMEnv

7-1-2 Social Component

7-1-2-1 Relevant Policies

(1) National Land Policy

The legal basis for land acquisition and resettlement in Nigeria is the Land Use Act of 1978, modified in 1990. The act was revised as Cap L5 Laws of the Federation of Nigeria 2004 in 2004. According to the act, all land in Nigeria is vested in the Governor of each State, to be held in trust for the use and common benefit of all people.

The Land Act gives State government (and local government) the right to revoke statutory and customary rights to land for the overriding public interest.

In doing so, the act specifies that the state or local government should pay compensation to the current holder or occupier with equal value.

The need for an integrated approach towards land use planning is highlighted. The coordination of activities of all stakeholders in land use planning is emphasized. In particular, the involvement of land owners, community groups, women, youth and the less privileged in making

land use related decisions that affect them is regarded as being critical in the successful implementation of the policy.

The project will involve land take for the line route and the new substation sites. Hence, the process for the land acquisition shall comply with the national land policy.

7-1-2-2 Relevant Laws

(1) Land Use Act

The Land Use Act is the key legislation that has direct relevance to this project. The Land Use Act is the applicable law regarding ownership, transfer, acquisition and all such dealings on Land. As mentioned above, the provisions of the Act vest every parcel of Land in every State of the Federation. At any rate, all land irrespective of the category belongs to the State while individuals only enjoy a right of occupancy as contained in the Certificate of Occupancy (C of O), or where the grants are "deemed".

The concept of ownership of land as known in the western context is varied by the Act. The Governor administers the land for the common good and benefits of all Nigerians. The law makes it lawful for the Governor to grant statutory rights of occupancy for all purposes; grant easements appurtenant to statutory rights of occupancy and to demand rent. The Statutory Rights of Occupancy are for a definite time (the limit is 99 years) and may be granted subject to the terms of any contract made between the state Governor and the Holder.

The Act may grant Customary Rights of Occupancy (CR of O) for agricultural (including grazing and ancillary activities), residential and other purposes.

The State is required to establish an administrative system for the revocation of the rights of occupancy, and payment of compensation for the affected parties. So, the Land Use Act provides for the establishment of a Land Use and Allocation Committee in each State that determines disputes as to compensation payable for improvements on the land (Section 2 (2) (c)).

In addition, each Local Government is required to set up a Land Allocation Advisory Committee, to advise the Local Government on matters related to the management of land. Where land subject to customary rights of Occupancy and used for agricultural purposes is revoked under the Land Use Act, the local government can allocate alternative land for the same purposes (section 6) (6). It is noted that a Land Allocation Advisory Committee is not established for a land acquisition of any specific project, but exist in each State as part of internal mechanism for land management and allocation.

Where a right of occupancy is revoked on the ground either that the land is required by the Local, State or Federal Government for public purpose or for the extraction of building materials, the holder and the occupier shall be entitled to compensation for the value at the date of revocation of their unexhausted improvements. Unexhausted improvement has been defined by the Act as:

- Anything of any quality permanently attached to the land directly resulting from the expenditure of capital or labour by any occupier or any person acting on his behalf, and increasing the productive capacity the utility or the amenity thereof and includes buildings plantations of long-lived crops or trees, fencing walls, roads and irrigation or reclamation works, but does not include the result of ordinary cultivation other than growing produce.

Where a right of occupancy is revoked for public purposes within the state of the Federation; or on the ground of requirement of the land for the extraction of building materials, the quantum of compensation shall be as follows:

- In respect of the land, an amount equal to the rent, if any, paid by the occupier during the year in which the right of occupancy was revoked.
- In respect of the building, installation, or improvements therein, for the amount of the replacement cost of the building, installation or improvements to be assessed on the basis of prescribed method of assessment as determined by the appropriate officer less any depreciation, together with interest at the bank rate for delayed payment of compensation. With regards to reclamation works, the quantum of compensation is such cost as may be substantiated by documentary evidence and proof to the satisfaction of the appropriate officer.
- In respect of crops on land, the quantum of compensation is an amount equal to the value as prescribed and determined by the appropriate officer.

This project will require acquisitions of land for the substation sites and ROW for the transmission lines. Hence, will comply with the requirements of this law.

In accordance with the Act, once state government confirm the completion of proper compensation to all PAPs and the result is gazetted to the public, the lands will be entitled to the project owner such as the TCN this time.

7-1-3 JICA Guidelines for Environmental and Social Consideration

The objectives of "JICA Guidelines for Environmental and Social Consideration" (April, 2010) (hereinafter referred as "JICA Guidelines") are to encourage Project proponents etc. to have appropriate consideration for environmental and social impacts, as well as to ensure that JICA's support for and examination of environmental and social considerations are conducted accordingly.

7-1-4 Gap Analysis between JICA Guidelines and Nigerian Laws

7-1-4-1 Gap on Environmental Impact Assessment

Regarding legislative and institutional arrangement for EIA, in general there is no difference in categorization, details of EIA study and EIA report, public participation, and information disclosure between the JICA Guidelines and Nigerian laws and regulations as shown in Table 7-3.

Table 7-3 Gap Analysis between the JICA Guidelines and EIA Legislation in Nigeria

Item	JICA Guidelines	Outline of EIA Legislation in Nigeria	Differences/ Measures
Category	According to the JICA Guidelines, JICA classifies projects into four categories, (A, B, C FI) according to the extent of environmental and social impacts, taking into account an outline of project, scale, site condition, etc (a) Category A: The Projects are likely to have significant adverse impacts on the environment and society. These impacts may affect an area broader than the sites or facilities subject to physical construction. Category A, in principle, includes projects in sensitive sectors, projects that have characteristics that are liable to cause adverse environmental impacts, and projects located in or near sensitive areas. Project Proponents must submit EIA reports for Category A projects to JICA, which will be disclosed prior to JICA's environmental review. And JICA conducts environmental and social surveys at the EIA level for Category A projects and prepares drafts of mitigation measures—including avoidance, minimization, and compensation—as well as drafts of monitoring plans and of institutional arrangements for environmental and social considerations. (b) Category B: The potential adverse impacts of the Projects on the environment and society are less adverse than those of Category A projects. Generally, they are site-specific; few if any are irreversible; and in most cases, normal mitigation measures can be designed more readily. When an EIA procedure has been conducted, the EIA report may be referred to, but this is not a mandatory requirement. JICA undertakes its environmental reviews based on information provided by project proponents etc. and others. Environmental reviews for Category B, at the IEE level. (c) Category C: The Projects are likely to have minimal or little adverse impact on the environment and society. Environmental review will not proceed after categorization. (d) Category FI: JICA's funding of projects is provided to a financial intermediary or executing agency; the selection and appraisal of the sub-projects is substantially undertaken by such an institution only after JICA's approval of the funding, so that the sub-projects cannot be specified prior to JICA's approval of funding (or project appraisal); and those sub-projects are	According to the EIA Decree and EIA Procedural Guidelines 1995, all the proposed projects are classified into three categories considering extent, nature and location of the projects. (a) Category I for which EIA is mandatory; the project is likely to significantly affect the environment (almost same as the category A of JICA Guidelines) (b) Category II for which a partial EIA will be required; the project is likely to not significantly but somewhat affect the environment (almost same as the category B of the JICA Guidelines).and (c) Category III for which EIA is not required; the project is unlikely to affect the environment (almost same as the category C of the JICA Guidelines) In addition, the proposed projects in Sensitive Areas as shown in 3.1.1.3 2) are also classified as category I.	No difference in general

Item	JICA Guidelines	Outline of EIA Legislation in Nigeria	Differences/ Measures
	expected to have a potential impact on the environment. JICA examines the related financial intermediary or executing agency to see whether appropriate environmental and social considerations as stated in the guidelines are ensured for projects in this category. JICA also examines institutional capacity. (2.2 Categorization, JICA GL)		
Screening	JICA conducts screening by classifying proposed projects into four categories: A, B, C, and FI. (2.2 Categorization, JICA GL)	Screening should be conducted by FMEnv. after site survey.	No difference in general
Scoping and preparation of TOR	JICA Guidelines define scoping as choosing alternatives for analysis, a range of significant and potentially significant impacts, and study methods. Items to be addressed in the specific project are narrowed down to the needed ones through the scoping process. (2.3 Impacts to be Assessed, JICA GL)	Proponent should make environmental scoping and TOR for EIA study and submit to FMEnv.	No difference in general
Environmental Items	The impacts to be assessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety. (3. Scope of Impacts to Be Assessed, Appendix 1 of the JICA GL)	Environmental items, on which impacts due to the project to be identified and evaluated are not described in the EIA Decree. However, items of major negative impacts due to power transmission line project are indicated to such items as land acquisition/resettlement and way-leave, landscape, ecological system, noise and vibration are indicated as major negative impacts due to power transmission line project according to EIA Sectoral Guidelines for Transmission Line.	No difference in general
Contents of EIA report	Illustrative EIA Report for Category A projects are explained in the JICA Guideline's Appendix 2. (a) Executive summary (b) Policy, legal, and administrative framework (c) Project description (d) Baseline data	Mentioned in Article 4 of the EIA Decree - An Environmental Impact Assessment shall include at least the following minimum matters: (a) Proposed activities (b)Potential affected environment including specific information necessary to identify	No difference in general

Item	JICA Guidelines	Outline of EIA Legislation in Nigeria	Differences/ Measures
	(e) Environmental impacts (f) Analysis of alternatives (g) Environmental Management Plan (h) Consultation (Illustrative EIA Report, Appendix 2 of the JICA GL)	and assess the environmental effects of the proposed activities (c) Practical activities, as appropriate (d)An assessment of the likely or potential environmental impacts on the proposed activity and the alternatives, including the direct or indirect cumulative, short-term and long-term effects (e) An identification and description of measures available to mitigate adverse environmental impacts of proposed activity and assessment of those measures (f)An indication of gaps in knowledge and uncertainly which may be encountered in computing the required information (g)An indication of whether the environment of any other State, Local Government Area or areas outside Nigeria is likely to be affected by the proposed activity or its alternatives (h)A brief and non-technical summary of the information provided under paragraph (a) to (g).	
Environmental Management Plan (EMP) and Environmental Monitoring Plan	(a) Appropriate follow-up plans and systems, such as monitoring plans and environmental management plans, must be prepared; the costs of implementing such plans and systems, and the financial methods to fund such costs, must be determined. Plans for projects with particularly large potential adverse impacts must be accompanied by detailed environmental management plans. (2. Examination of Measures, Appendix 1 of the JICA GL) (b) In cases where sufficient monitoring is deemed essential for appropriate environmental and social considerations, such as projects for which mitigation measures should be implemented while monitoring their effectiveness, project proponents etc. must ensure that project plans include feasible monitoring plans (8. Monitoring, Appendix 1 of the JICA GL) (c) Environmental Management Plan describes mitigation, monitoring, and institutional measures to be taken during construction and operation in order to eliminate adverse impacts, offset them, or reduce them to acceptable levels. (Illustrative EIA Report, Appendix 2 of the JICA GL)	Although the term of "environmental management plan" is not found in the EIA Decree, it is used in the EIA Sectoral Guidelines (Transmission Line). Although the term of "environmental monitoring" is not found in the EIA Decree, the term of "follow-up program" is used as follows: (a) Article 16 - the design and implementation of a follow-up program, (b) Article 17 –mandatory study must include a discussion of the need for and the requirements of any follow-up program.	No difference in general

Item	JICA Guidelines	Outline of EIA Legislation in Nigeria	Differences/ Measures
Information disclosure and public participation	Information disclosure (a) EIA reports (which may be referred to differently in different systems) must be written in the official language or in a language widely used in the country in which the project is to be implemented. When explaining projects to local residents, written materials must be provided in a language and form understandable to them; (b) EIA reports are required to be made available to the local residents of the country in which the project is to be implemented. The EIA reports are required to be available at all times for perusal by project stakeholders such as local residents and copying must be permitted; (Preambles, Appendix 2 of the JICA GL) Public participation (a) Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project plans. (5. Social Acceptability (1), Appendix 1 of the JICA GL) (b) In preparing EIA reports, consultations with stakeholders, such as local residents, must take place after sufficient information has been disclosed. Records of such consultations must be prepared; (c) Consultations with relevant stakeholders, such as local residents, should take place if necessary throughout the preparation and implementation stages of a project. Holding consultations is highly desirable, especially when the items to be considered in the EIA are being selected, and when the draft report is being prepared (Preambles, Appendix 2 of the JICA GL)	Term of "stakeholder" or "public participation" is not found in the EIA Decree. However, subjects relating to public involvement are described from screening process to reviewing draft final report of EIA study for EIA approval in the EIA Decree. In general: Article 7 - FMEnv shall give opportunity to government agencies, members of the public, experts in any relevant discipline and interested groups to make comment. (b) Screening process. (c) Public hearing. (d) Public comments.	No difference in general
Comparison of alternatives	Analysis of alternatives systematically compares feasible alternatives to the proposed project site, technology, design, and operation including the "without project" situation in	Mentioned in the EIA Decree. For example: (a) Article 4 - an EIA shall include an assessment of the likely or potential environmental impacts on the proposed activity and the alternatives,	No difference in general

Item	JICA Guidelines	Outline of EIA Legislation in Nigeria	Differences/ Measures
	terms of the following: the potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, it quantifies the environmental impacts to the extent possible, and attaches economic values where feasible. It also states the basis for selecting the particular proposed project design, and offers justification for recommended emission levels and approaches to pollution prevention and abatement. (Illustrative EIA Report, Appendix 2 of the JICA GL)	including the direct or indirect cumulative, short-term and tong-term effects. (b) Article 17 - every mandatory study of a project by review panel shall include a consideration of alternative means of carrying out the project.	But, there is no clear description about the comparison against “Do Nothing Option”, therefore, this comparison shall be carried out in this study

Source: EIA Decree、EIA Procedural Guidelines 1995、e-Law Environmental Law Alliance Worldwide, "EIA Country Report for Nigeria"（URL:http://eialaws.elaw.org/eialaw/nigeria）

7-1-4-2 Gap on Land Acquisition

Table 7-4 Gap Analysis between the JICA Guidelines/WB OP 4.12 and Land Use Act

Item	JICA Guidelines/WB OP4.12	Land Use Act	Gaps	Recommended Policies
Avoidance or minimization of involuntary resettlement.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible effective measures to minimize impact and to compensate for losses must be agreed upon with people who will be affected. (JICA Guidelines)	Not mentioned	The local law does not have policy to avoid or minimize land acquisition and involuntary resettlement.	During implementation EIA, all alternatives will be explored, impacts of land acquisition and resettlement will be avoided, or if avoidance is not feasible, will be minimized.
Level of livelihood restoration of PAPs	Project owning countries must make efforts to enable PAPs and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. (JICA Guidelines)	Not mentioned	The local law does not indicate target level of livelihood restoration of PAPs.	Abiding the WB policies and JICA Guidelines, livelihood levels of PAPs will be monitored before and after resettlement in order to confirm their restoration or improvement. Also PAPs will be financially/technically supported to recover livelihood levels.
Calculation of compensation	PAPs must be compensated at full replacement cost as much as possible. (JICA Guidelines)	Compensation is at market price. Normally, depreciation will be deducted.	Market price with deduction of depreciation will be less than full replacement cost.	There is no article prohibiting not deducting depreciation, nor adding necessary costs (e.g. administrative fees), hence compensation should be calculated at full replacement cost.
Commencement of relocation	Physical resettlement should not take place before providing land and monetary compensation and other supports. (JICA Guidelines)	The timing is not clearly mentioned (Article 6 (7) ”within a reasonable time”)	There is no clear description to indicate the timing of payment of compensation and commencement of resettlement.	Abiding the WB policies and JICA Guidelines, payment of compensation should be completed and any other assistances should be provided prior to the commencement of physical resettlement
Preparation and disclosure of RAP	In case of large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA Guidelines)	Not mentioned	The local law does not provide disclosure of documents corresponding to RAPs.	Abiding the WB policies and JICA Guidelines, a RAP will be prepared. It will be disclosed in an appropriate language and placed where accessible by PAPs and local NGOs (e.g. Local Government Offices, etc.).

Item	JICA Guidelines/WB OP4.12	Land Use Act	Gaps	Recommended Policies
Stakeholder meeting	Consultations must be held with the PAPs and their communities. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the PAPs. (JICA Guidelines)	Not mentioned	The local law does not provide consultation with PAPs for land acquisition and resettlement.	The land acquisition process practiced by TCN includes stakeholder consultation. The methods will be confirmed to abide the WB policies and JICA Guidelines.
Participation of PAPs	Appropriate participation by PAPs and their communities must be prompted in the planning, implementation, and monitoring of RAPs. (JICA Guidelines)	Not mentioned	The local law does not provide participation of PAPs in the process of land acquisition and resettlement.	Abiding the WB policies and JICA Guidelines, during the preparation of a RAP, participation of PAPs will be promoted through consultations and socioeconomic survey, and appropriate methods of their participation during implementation and monitoring will be examined.
Grievance redress	Appropriate and accessible grievance mechanisms must be established for PAPs and their communities. (JICA Guidelines)	Grievance redress is not mentioned, but State Land Use and Allocation Committee will accept dispute and if not settled, the matter may be taken to courts.	The local law does not provide establishment of grievance mechanism regarding land acquisition and resettlement.	Abiding the WB policies and JICA Guidelines, grievance committee will be established and informed to PAPs.
PAPs without legal titles	By WB OP4.12, the definition of eligible DPs for resettlement entitlements includes: “those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets…;and Those who have no recognizable legal right or claim to the land they are occupying.”(WB OP4.12)	Not mentioned	The local law does not provide policies for PAPs without legal entitlement.	Since there is no provision to prohibit assisting or compensating nontitle holders, abiding the WB policies and JICA Guidelines, the nontitle holders are also eligible to be supported or compensated.
Vulnerable groups	Particular attention is paid to the needs of vulnerable groups among those displaced, especially those below the poverty line, the landless, the elderly, women and children, etc.. (WB OP4.12)	Not mentioned	The local law does not provide considerations for vulnerable groups among PAPs.	Abiding the WB policies and JICA Guidelines, if there are vulnerable groups among PAPs, considerations appropriate for each group will be made.

7-2 Analysis of Alternatives

7-2-1 Study area

The project area is located in Lagos and Ogun State. The entire project consists of about 203km high voltage transmission lines and 6 high voltage substations. For the purpose of Environmental and Social Consideration and preparation of Resettlement Action Plan, the entire project is divided into 3 sections, Lot 1, Lot 2 and Lot3 as shown in below Figure 7-3 and Figure 7-4. It should be noted that these 3 Lots are different from 4 Packages of the project component mentioned in previous chapters.

(1) Lot 1 :

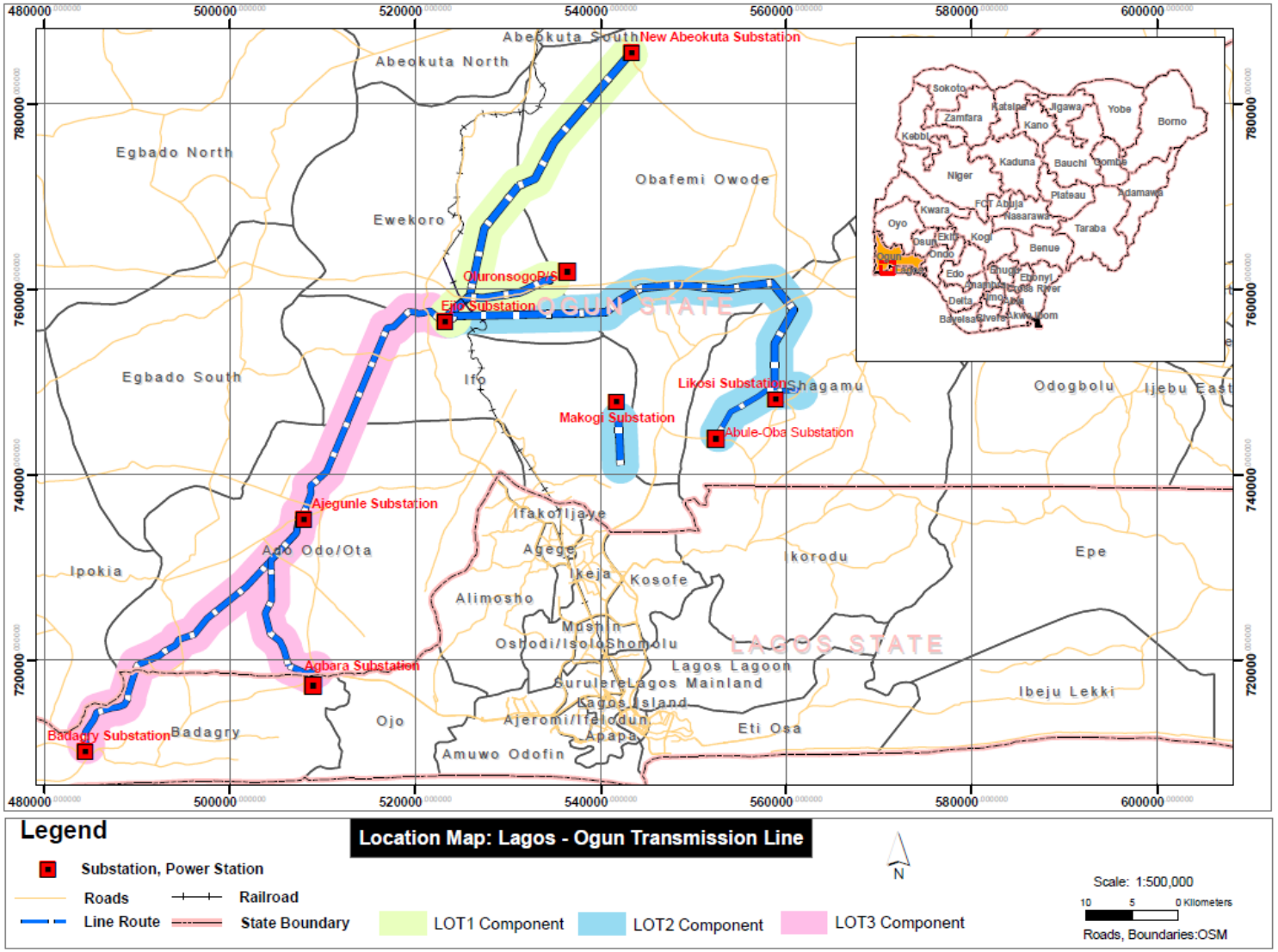
- Ejio (Arigbajo) – Ikeja West /Osogbo 330kV D/C Turn in-out (EJ-NA) (7.34km) at Sojuol132kV D/C Transmission line Ejio (Arigbajo) S/S-New Abeokuta S/S line (AJ-BA) (35.5km).
- 330kV D/C Transmission line Ejio (Arigbajo) S/S-Olorunsogo P/S line (EJ-OL) (13.9km).
- 330 kV D/C Transmission line Ejio (Arigbajo)-Ikeja West /Osogbo 330kV D/C Turn in-out (EJ-NA) (7.34km) at Sojuolu.

(2) Lot 2 :

- Likosi (Ogijo) Substation
- Abule Oba (Redeem) Substation
- Makogi (MFM) Substation
- 330 kV D/C Transmission line Ejio (Arigbajo) S/S-Likosi (Ogijo) S/S (EJ-LI) (48.8 km)
- 132 kV 4-circuit transmission line Likosi (Ogijo) S/S-turn in/out Ikorodu S/S-Shagamu S/S (LI-(IK-SH)) (2.41 km in 4-circuit transmission tower)
- 330 kV D/C Transmission line Makogi (MFM) S/S-turn in/out Likosi (Ogijo) S/S-Ikeja West S/S (MA-(IK-LI)) (10.81 km in Double circuit transmission tower, Parallel Double circuit tower length 5.405 km)

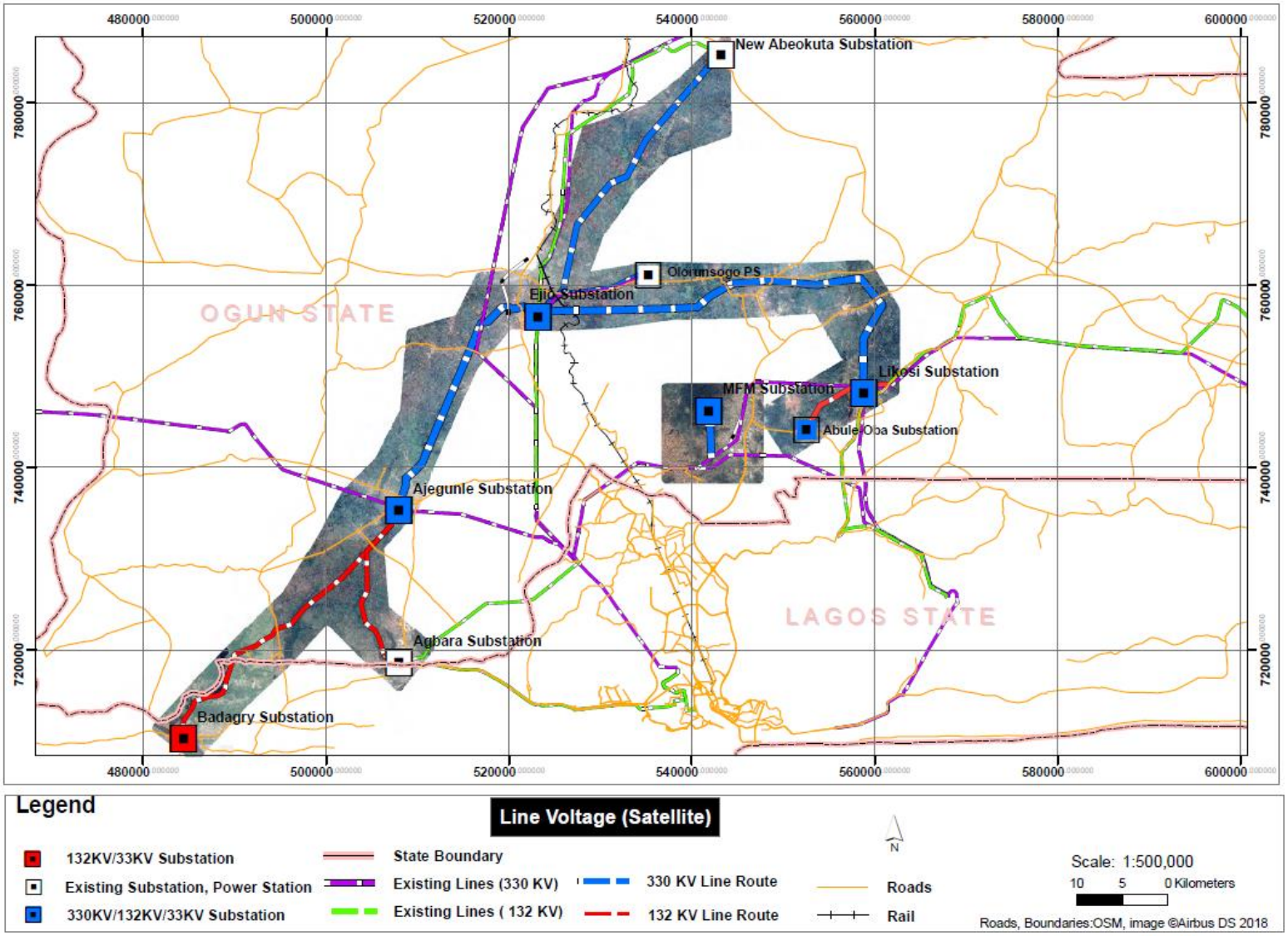
(3) Lot 3:

- 330kV D/C Transmission line Ejio (Arigbajo) S/S-Ajegunle (New Agbara) S/S (EJ-NA) (29.6 km)
- 132kV D/C Transmission line Ajegunle (New Agbara) S/S-Agbara S/S (AJ-AG) (21.7km)
- 132kV D/C Transmission line Ajegunle (New Agbara) S/S-Badagry S/S line (AJ-BA) (36.2km）
- New substation at Ejio (Arigbajo) (2x150MVA, 330/132kV + 2x60MVA 132/33kV)
- New substation at Ajegunle (New Agbara) (2x150MVA, 330/132kV + 2x60MVA 132/33kV)
- New substation at Badagry (2x60MVA, 132/33kV).
- Temporary Access road around Badagry area (approximately 16km)



Source: JICA study team

Figure 7-3 Project Area and Project Component (by Lot)



Source: JICA study team, Airbus Defence and Space

Figure 7-4 Project Area and Project Component (by Voltage)

7-2-2 Project Options

7-2-2-1 Do-Nothing' Option

The first project option considered was the 'do-nothing' option. This option will not require land acquisitions, physical resettlement and forest cutting, but would result in the continuation of shortage of electricity supply, which has also been inefficient, inadequate, and unreliable. In case that transmission line will not be constructed in this project, the use of domestic and industrial generators to power homes, offices and industries will escalate. This will result in increased air emissions, which have corresponding health impacts and may exacerbate global warming due to increased greenhouse gas emissions. Furthermore, economic growth will be stifled. Therefore, this option was not recommended.

7-2-2-2 Project Implementation Option

The second option considered was the execution of the proposed project as planned. This option was accepted because it will de-bottleneck the grid around the largest demand centre along Lagos- Ibadan Expressway. The project will provide a more secure and reliable energy supply with all the benefits listed as below;

- Improved and more reliable electric power supply;
- Enhances productivity and efficiency in both public and private organizations;
- It helps to develop and promote small, medium, and large-scale enterprises thereby creating direct and indirect employment opportunities;
- It helps to improve the security of lives and properties;
- General contribution to climate change through overall reduction of the used of personal power generating sets; and
- General improvement of the standard of living for the populace.

7-2-3 Site & Line Route Alternatives

The general characteristics of the line route considered are:

- length, to minimize cost and the impact on the environment,
- rectilinear, to minimize the angles and the footprint,
- accessible, near roads, to facilitate maintenance,
- surrounding towns and villages, to facilitate electrification, and
- bypassing towns and villages, to minimize the demolition of built structures and relocation of populations.

The factors to avoid are:

- exclusion zones of airports and airfields
- soils with low load-bearing capacity, thus, far from wetlands and floodplains
- hills and ridges
- protected areas, forest reserves, classified forests, Ramsar sites and other sites, which aim to protect natural areas and species
- physical cultural resources (PCR), archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites) and aesthetic or other cultural significance.

7-2-3-1 Analysis of line route alternatives

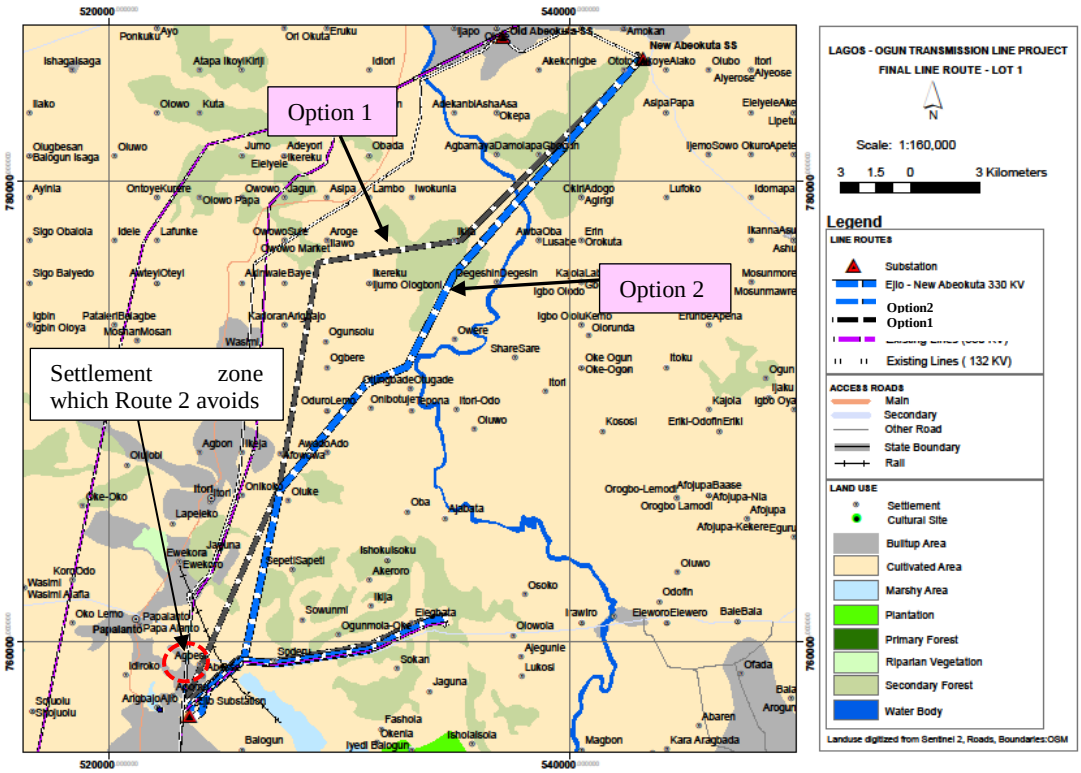
Route alternative analysis was carried out for each section and summary of the result is shown as below.

A. Lot 1 Section

Section of route analysis	
Starting Point	Ejio Substation
Ending Point	New Abeokuta Substation

Table 7-5 Line route alternative analysis: Ejio S/S – New Abeokuta S/S

The route		Option 1	Option 2
Description		The route avoids the river and runs along the existing road.	The route is shorter than JICA options because it maintained a straight line towards Abeokuta, it bypassed all built up areas.
Distance (km)		37.5	35.15
Social Aspect	Number of Buildings in Way Leave (Estimated)	50	4
Natural Aspect	Access Road	Some existing roads, including the main road, are present by substations, but construction of access roads may be necessary in some areas.	Require construction of access roads in some areas, Existing road are present but less than proposed JICA option
	Land Use	Farmlands, vegetation, small settlements	Farmlands, vegetation, small settlements
	Impacts on Natural Environment	Some vegetation needs to be cleared	Some vegetation needs to be cleared but reduced environmental impact compared to JICA proposed route
Geographical Conditions (Topography, ground stability, etc.)		None in particular	Few Marshy areas along the line. Foundation design and access road strengthening in this areas.
Natural Disaster Risk		None	None
Technical Aspect		No difference	Easier due to few Marshy areas.
Cost		More expensive due to longer distance	Cheaper due to shorter distance
Recommended Route		△	○ Recommended since the social impact is less and cost is cheaper



Source: JICA study team

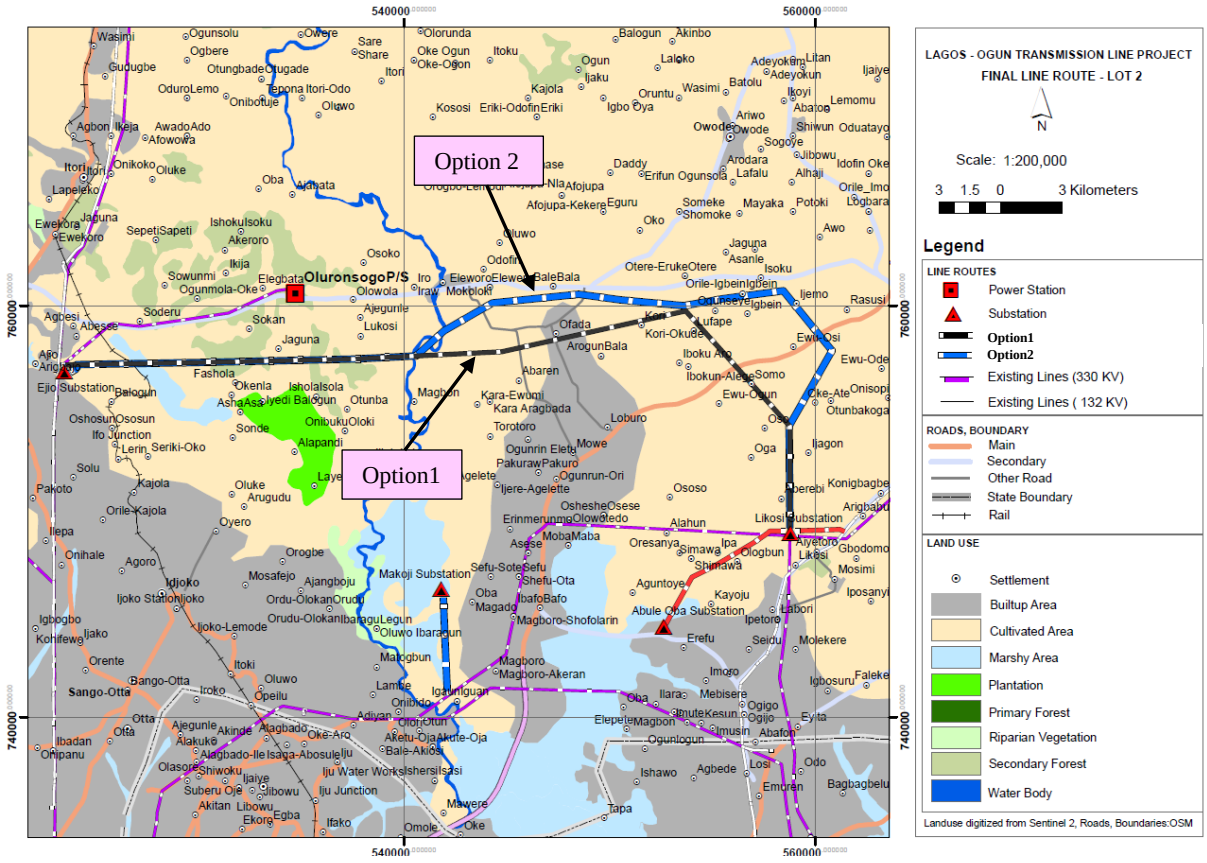
Figure 7-5 Line route alternative analysis: Ejio S/S – New Abeokuta S/S

B. Lot 2 Section

Section of route analysis	
Starting Point	Ejio Substation
Ending Point	Likosi Substation

Table 7-6 Line route alternative analysis: Ejio S/S – Likosi S/S

The route		Option 1	Option 2
Description		To reduce and avoid impact by land acquisition, it avoids settlements and built-up areas	It avoids crossing an existing Ejio-Olorunsogo 330kV line. It avoids build-up areas and settlement to minimize land acquisition. It avoids Ofada town, OPIC residential/ industrial estate and crosses Lagos-Ibadan expressway into Likosi/Dejuwogbo substation where there are minimal built-up areas.
Distance (km)		43.7	48.74
Social Aspect	Number of Buildings in Way Leave (Estimated)	>400	355 These routes avoids build-up areas and settlement to minimize land acquisition.
Natural Aspect	Access Road	Some existing roads are present but upgrading of existing access roads may be necessary in some areas.	Some existing roads are present but upgrading of existing access roads may be necessary in some areas.
	Land Use	Farmlands, vegetation, settlements, river, swampy forest	Farmlands, vegetation, settlements, river, swampy forest
	Impacts on Natural Environment	Some vegetation needs to be cleared. No difference from the other route.	Some vegetation needs to be cleared. No difference from the other route.
Geographical Conditions (Topography, ground stability, etc.)		None in particular	None in particular
Natural Disaster Risk		None	None
Technical Aspect		No difference	No difference
Cost		Cheaper due to shorter distance	More expensive due to longer distance
Recommended Route		△	○ Recommended since this route avoids build-up areas and settlement to minimize land acquisition.



Source: JICA study team

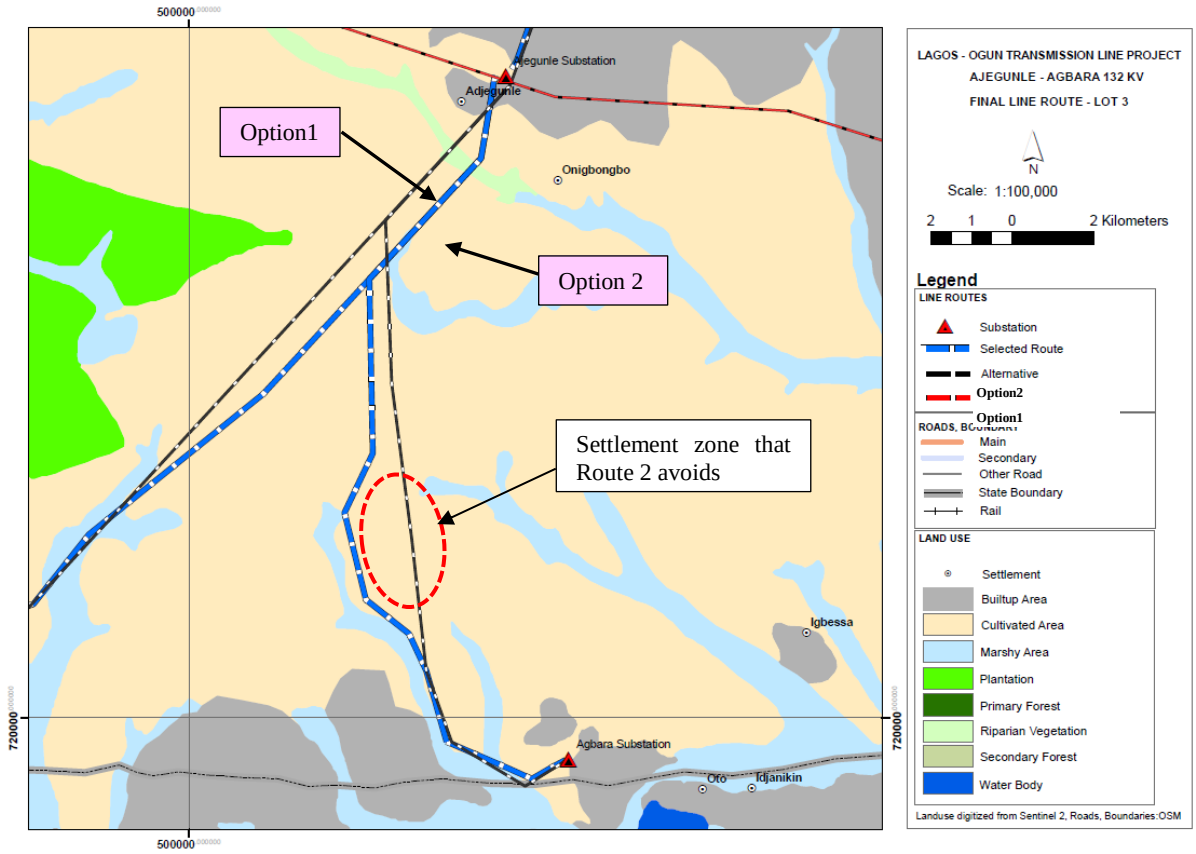
Figure 7-6 Line route alternative analysis: Ejio S/S – Likosi S/S

C. Lot 3 Section

Section of route analysis	
Starting Point	Ajegunle Substation
Ending Point	Agbara Substation

Table 7-7 Line route alternative analysis: Ajegunle S/S – Agbara S/S

The route		Option 1	Option 2
Description		Most straight route with the lowest construction cost	It avoids build-up areas and settlement to minimize land acquisition.
Distance (km)		20.8	21.6
Social Aspect	Number of Buildings in Way Leave (Estimated)	400	300 (Out of which, 80 is within the shared Way Leave)
Natural Aspect	Access Road	No difference	No difference
	Land Use	Built-up areas along the expressway, farmlands, vegetation	Less built-up areas, farmlands, and vegetation.
	Impacts on Natural Environment	Some vegetation needs to be cleared. No difference from the other routes.	Some vegetation needs to be cleared. No difference from the other routes.
Geographical Conditions (Topography, ground stability, etc.)		No difference	No difference
Natural Disaster Risk		No difference	No difference
Technical Aspect		No difference	No difference
Cost		Cheaper due to shorter distance	More expensive due to longer distance
Recommended Route		△	○ Recommended since this route avoids build-up areas and settlement to minimize land acquisition.



Source: JICA study team

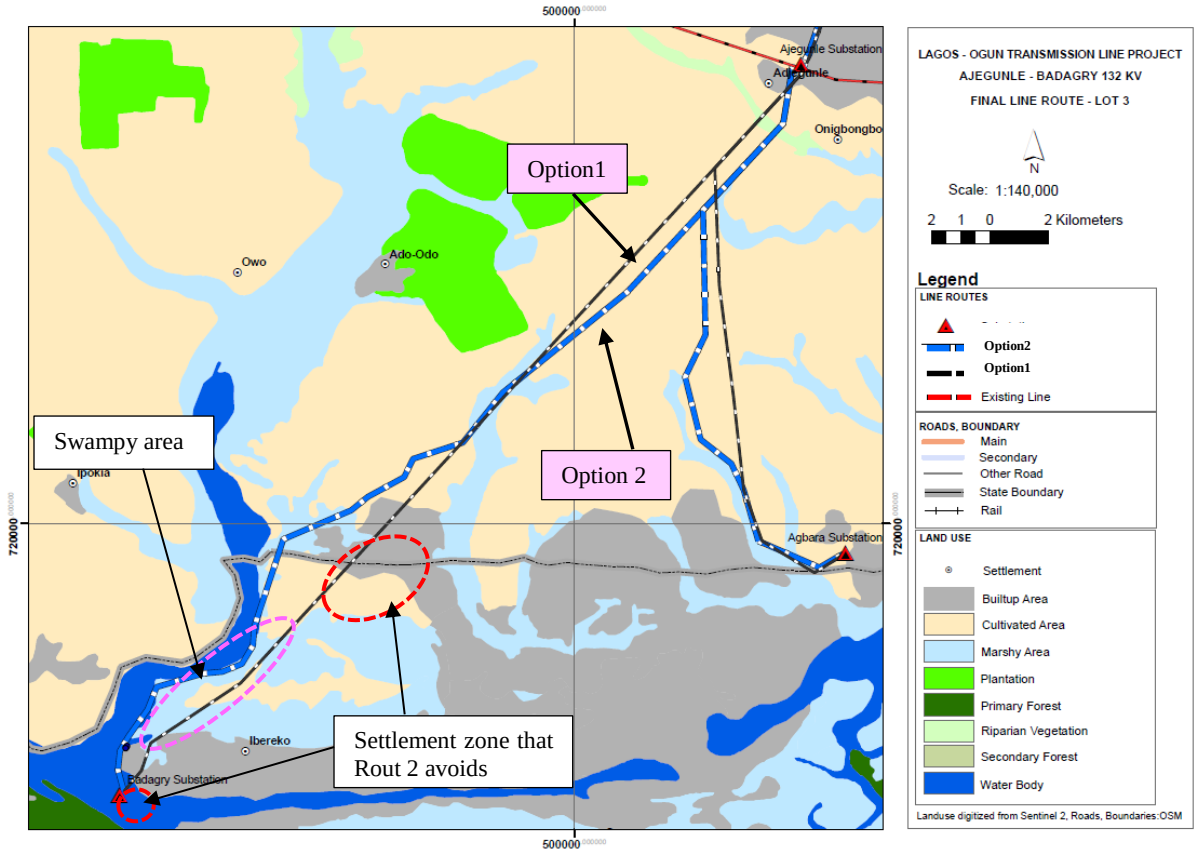
Figure 7-7 Line route alternative analysis: Ajegunle S/S – Agbara S/S

Section of route analysis	
Starting Point	Ajegunle Substation
Ending Point	Badagry Substation

Table 7-8 Line route alternative analysis: Ajegunle S/S – Badagry S/S

The route		Option 1	Option 2
Description		Most straight route with the lowest construction cost	It avoids build-up areas and settlement to minimize land acquisition. In addition, it avoids forest area.
Distance (km)		34.2	36
Social Aspect	Number of Buildings in Way Leave (Estimated)	250	120
Natural Aspect	Access Road	Many existing roads are present along the route and Construction of access roads is unnecessary most likely.	Although existing roads are present along the route, construction of access roads may be necessary in few areas, mostly towards the Badagry substation
	Land Use	Built-up areas along the expressway, farmlands, vegetation	Few builtup areas, farmlands, and vegetation.
	Impacts on Natural Environment	Some vegetation needs to be cleared.	Some vegetation needs to be cleared. Less forest area is impacted.
Geographical Conditions (Topography, ground stability, etc.)		None in particular	The route cross more swampy area
Natural Disaster Risk		There is a risk for flood impact but less than route 2.	There is more risk for flood impact compare to route 1 since the route is closer to the river
Technical Aspect		Pile foundation may be necessary for few towers on swampy area.	Pile foundation may be necessary for few towers on swampy area. More pile foundations may be required compared to route1.
Cost		Cheaper	The construction cost is higher since the route is longer as well as the more pile foundations (which is more expensive than standard one) would be required.
Recommended Route		△	○ Recommended since this route avoids build-up areas and settlement to minimize land acquisition although the construction cost would be higher.

The route	Option 1	Option 2



Source: JICA study team

Figure 7-8 Line route alternative analysis: Ajegunle S/S – Badagry S/S

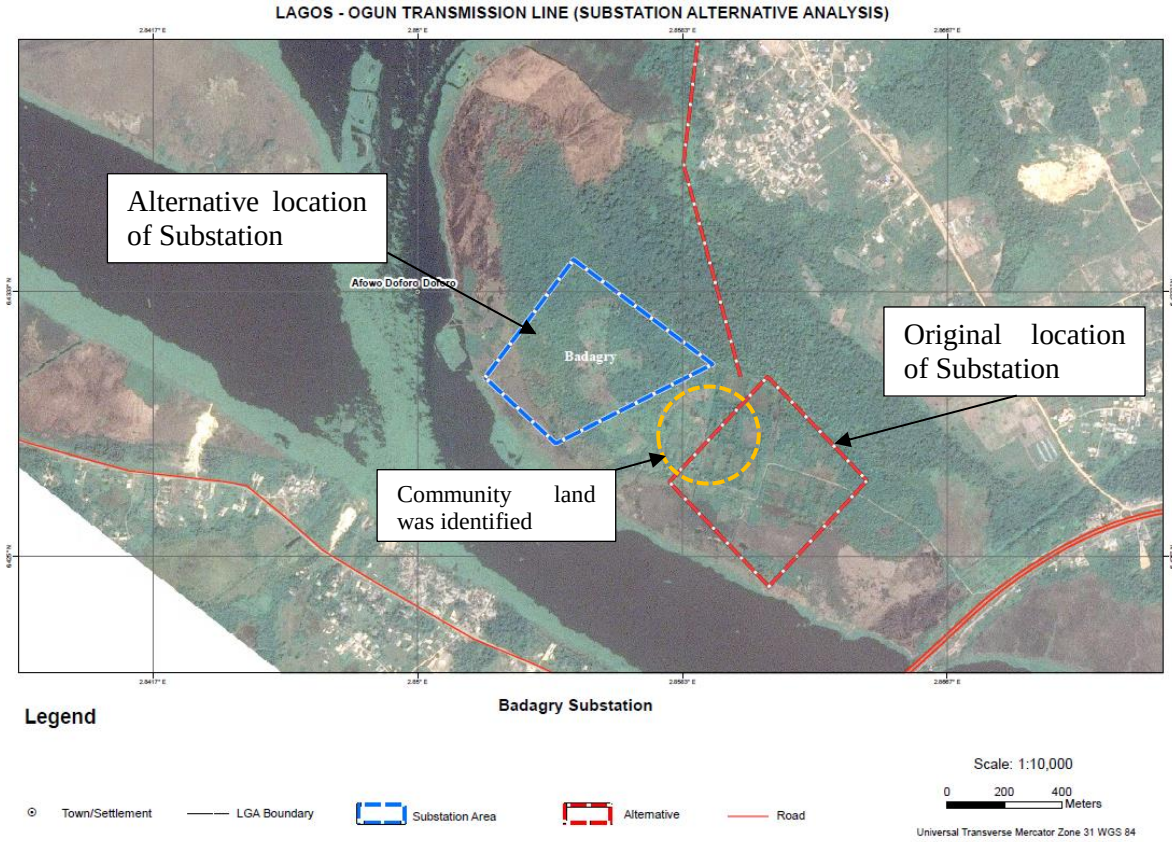
7-2-3-2 Analysis of location of substation

A. Ajegunle (New Agbara) Substation

The location of Ajegunle (New Agbara) Substation had been decided by TCN and survey was conducted in 2013. The location was selected because a new substation was needed to be constructed along the existing transmission line. TCN conducted preliminary site selection study and selected the area where less residential structures are located to minimize social impact.

B. Badagry Substation

Badagry Substation was planned to be constructed around the current location in order to supply stable electricity to the western Lagos area. TCN requested Lagos State to provide a land for the Substation. At the beginning of the planning stage, Lagos State allocated the land from state owned land at the location shown in Figure 7-9, however through verification process by Lagos state, a community land was identified within the land. To minimize social impacts to the community land, another alternative land was proposed.



Source: EEMS 2018, Airbus Defence and Space

Figure 7-9 Substation alternative analysis: Badagry Substation

C. Ejio (Arigbajo) Substation

The location of Ejio (Arigbajo) Substation had been decided by TCN by 2013. The location

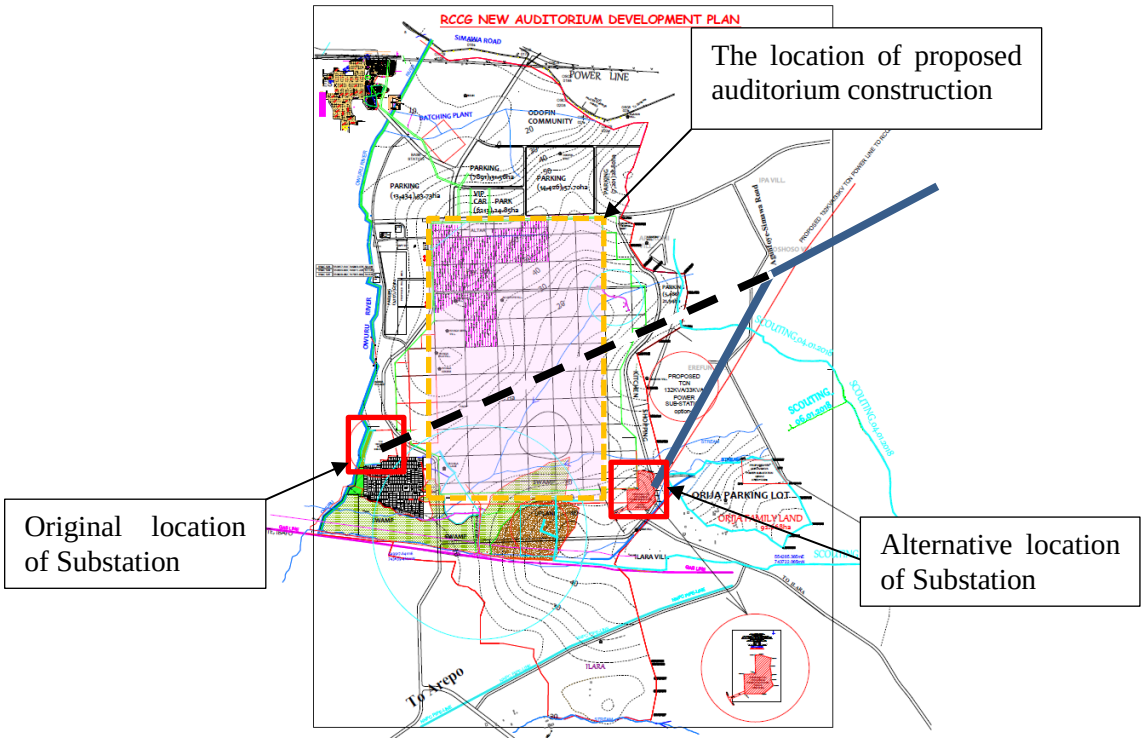
was selected because a new substation was needed to be constructed at the crossing point of two existing transmission lines. Around the two transmission line crossing point, TCN selected the area where less residential structures are located to minimize social impact.

D. Likosi (Ogijo) Substation

The location of Likosi (Ogijo) Substation was acquired by TCN in 2008 and obtained Certificate of Occupancy of the land. The location was selected because a new substation was needed to be constructed at the crossing point of two existing transmission lines.

E. Abule Oba (Redeem) Substation

Abule Oba (Redeem) Substation was planned to construct around the current area in order to supply stable electricity to the area including the religious society (Redeem) approximately 10 years ago. Originally, the substation was planned to be constructed at the south-western portion of the land owned by the Redeem. Through the consultation meetings with the Redeem in 2017, TCN was informed that a new auditorium construction was planned at the centre of the Redeem's land. To avoid impacts by transmission line including tower construction over the auditorium, alternative substation land was selected at South-eastern portion of Redeem's land as shown in Figure 7-10.



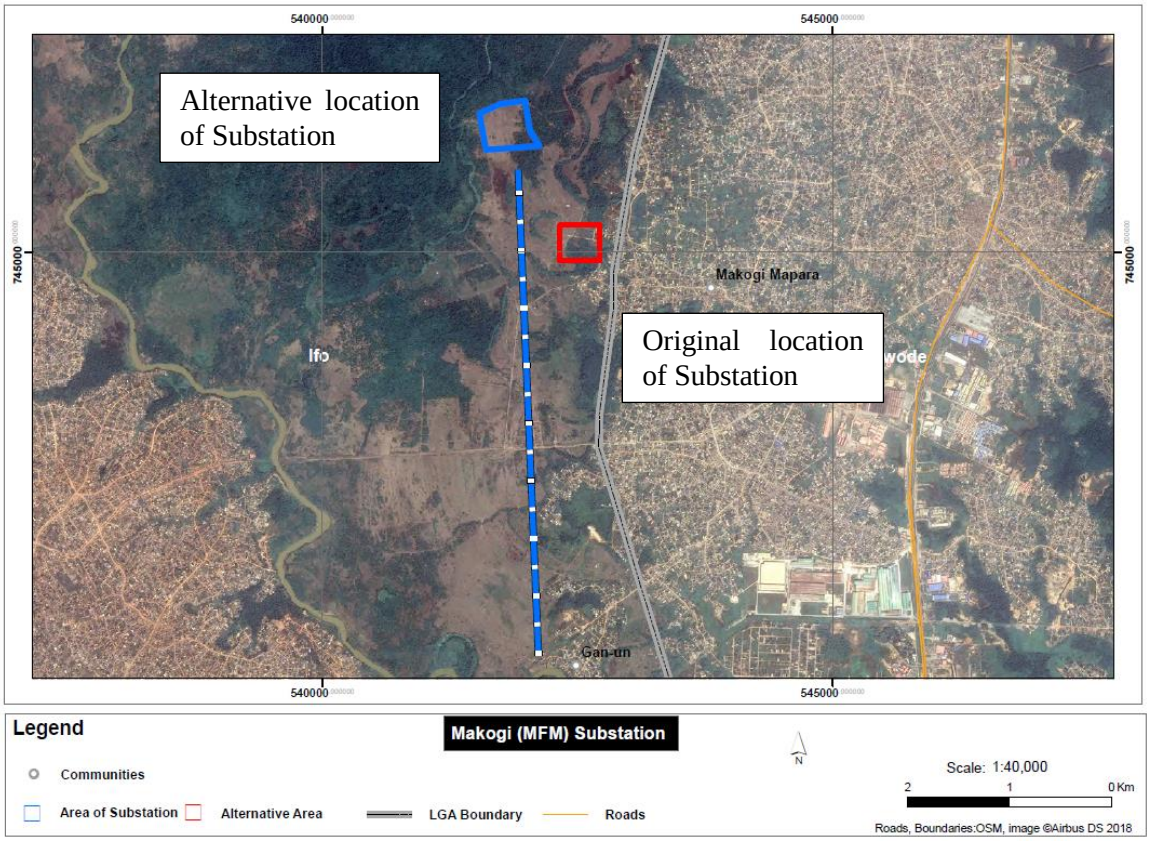
Source: SEEMS 2018

Figure 7-10 Substation alternative analysis: Abule Oba (Redeem) Substation

F. Makogi (MFM) Substation

Makogi (MFM) Substation was planned to construct around the current area in 2013 in order to supply stable electricity to the area including the religious group. Originally the substation

was planned to be constructed near residential area as shown in Figure 7-11. Through the consultation meetings with the religious group, miracle fire mountain (MFM), in 2017, TCN was informed that a new university construction was planned around the originally proposed location. To avoid impacts by the new substation construction to university and residential area, TCN selected the alternative location far enough from residential area. During the alternative analysis, flood risk was also assessed. The elevation of the area between original location and alternative location is lower than the surrounding area, and the land is tend to be wet. The alternative location located at comparatively higher elevation, which is dry land, was selected to avoid the flood risk.



Source: JICA study team, Airbus Defence and Space

Figure 7-11 Line route alternative analysis: Makogi (MFM) Substation

7-3 Scoping

7-3-1 Expected Activities due to Grid Strengthening Project

Expected activities due to the project implementation are shown for three stages, namely, Planning Stage (Pre-Construction Stage), Construction Stage and Operation Stage in Table 7-9.

Table 7-9 Activities due to Grid Strengthening Project

Stage	Activities
I Planning Stage (Pre-construction Stage)	Securing land for grid related facilities (transmission line and sub-station)
	Securing construction yard including storage of construction materials
	Change in land use and utilization of local resources
II Construction Stage	Procurement of construction materials and securing water supply
	Earth moving work such as excavation, cutting and mounting
	Construction work for grid related facilities and approach roads
	Operation of construction machines, vehicles and plants and installation of workers' camp
	Residence of construction workers and their working activities
III Operation Stage	Operation of grid related facilities
	Spatial occupancy of grid related facilities

7-3-2 Preparation of Impact Matrix

By taking into consideration the JICA Guidelines, and relevant laws and regulations of Nigerian Government, together with characteristics of the proposed project and project area, following items are selected as indicators expressing existing environmental and social conditions and affected impacts.

Possible impacts are identified and the extent of the impacts is also evaluated one by one with rating against the above mentioned 37 environmental items.

As for the rating following criteria were adopted with respect to the extent of impacts:

A (+/-) - Significant positive/negative impact is expected,
B (+/-) - Positive/negative impact is expected to some extent,
C - Extent of positive/negative impact is unknown or not clear (Further examination is needed. It should be taken into consideration that impacts may become clear as study progresses),
D - Negligible or No impact is expected.

Results of rating and details of expected impacts due to the project in each stage are shown in Table 7-10.

Table 7-10 Ratings and Reasons of expected impacts due to the Project

Environmental Item		Planning Stage	Construction Stage	Operation Stage	Reasons
Social Environment	1) Land acquisition/Involuntary Resettlement	A-	D	D	**Planning Stage:** For the propose project it is necessary to secure land for transmission tower and sub-station and to get easement (way-leave) of land under new construction and rehabilitation of transmission line. This may result in a large-scale involuntary resettlement. In addition, temporary resettlement of structures and peoples is expected in order to construct and use access roads to the project site during Construction Stage. **Construction and Operation Stage:** No negative impact is expected.
	2) Local economy such as employment and livelihood etc.	D	B-/B+	B+	**Planning Stage:** No negative impact is expected. **Construction Stage:** Negative impacts such as restriction of land use for agriculture and shops are expected. On the other hand, positive impacts such as creation of new employment are also expected. **Operation Stage:** Positive impacts such as stabilization of electric power supply to the project area and surrounding area may enhance local economy. In addition, temporary road for construction work and new road construction for maintenance of transmission line may give rise to positive impact on employment and livelihood.
	3) Utilization of land and local resources	B-	B-	C	**Planning Stage:** There is some possibility that existing residential and agricultural land use may be changed for land under transmission line and sub-station. **Construction Stage:** To secure water use for construction work including workers' camp, local water resources (surface water and groundwater) is required. **Operation Stage:** Enhancement of local economy as a result of stabilization of electric power supply may change land use in the project area. In addition, temporary road for construction work and new road construction for maintenance of transmission line may give rise to change in land use and local resources, although feature of the impact is not clear.
	4) Social institutions such as social infrastructure and local decision-making institutions	C	C	C	**All Stages:** At scoping stage it is unknown. However, it should be considered that there are co-existing two types of administrative system, i.e., administrative division (State and Local government level etc.) and traditional community and (kingdom and chiefdom) and their roles. **Construction Stage:** If information disclosure about procedures and schedules for operation of construction vehicles and machines and staying of construction workers at the project site to local residents and social institutions is not sufficient, it may generate their anxiety and discontent to the project. Thus, it is necessary to make them in advance.
	5) Existing social infrastructures and services	B-	B-	B+	**Planning Stage:** There is some possibility for relocation of existing social infrastructures and services. **Construction Stage:** Construction work may cause inconvenience to access to existing social infrastructures and services. **Operation Stage:** Positive impacts such as maintaining stability of electric power supply is expected. In addition, construction of new road and improvement of road condition for road construction work and operation and maintenance may cause positive impacts.
	6) Vulnerable group such as the poor, women, children, elderly, disabled etc.	C	C	C	**All Stages:** At scoping stage it is unknown but there is a possibility for existence of the poor.
	7) Ethnic minority	D	D	D	There is no ethnic minority that is benchmarked by the JICA Guidelines and defined by World Bank Safeguard Policies.

Environmental Item		Planning Stage	Construction Stage	Operation Stage	Reasons
	8) Misdistribution of benefit and damage	C	C	C	**All Stages:** There is, however, some possibility of misdistribution of benefit and damage, if TCN as the proponent do not make information disclosure appropriately to concerned peoples and other stakeholders about project plan including land acquisition/resettlement matters, procedures and schedules of construction work such as operation of construction machines and vehicles, and staying of construction workers, and benefits after operation.
	9) Local conflict of interests	C	C	C	**All Stage:** There is, however, some possibility of local conflict of interests, if TCN as the proponent do not make information disclosure appropriately to concerned peoples and other stakeholders about project plan including land acquisition/resettlement matters, procedures and schedules of construction work such as operation of construction machines and vehicles, and staying of construction workers, and benefits after operation.
	10) Gender	B-	B-	C	**Planning Stage:** There is a possibility that householder of PAUs is women or household is composed of women only may affected adversely. There is also a possibility that male householders do not share compensation fee with female living together. **Construction Stage:** There is a possibility that employment chance would not be shared equally to women. **Operation Stage:** Expected impact is unknown.
	11) Children's rights	D	B-	D	**Planning Stage:** No negative impact is expected. **Construction Stage:** There is a possibility that children may engage in labour of construction work. **Operation Stage:** No negative impact is expected.
	12) Cultural and historical, heritage site	C	C	C	**Planning and Construction Stage:** At present, distribution data of cemeteries, churches, mosques etc. in the affected area is not clear. Thus, expected impacts are unknown. In addition, UNESCO Cultural or Heritage sites are not distributed. **Operation Stage:** If proper considerations are not taken at the Planning Stage, there is a possibility of some negative impact.
	13) Water rights, fishing rights and rights of common	D	C	C	**Planning Stage:** No negative impact is expected. **Construction Stage:** At present fishery activities are found in lagoons and rivers of the project area. However, expected impact is unknown. **Operation Stage:** If proper considerations are not taken at the Planning Stage, there is a possibility of some negative impact.
	14) Public health and Sanitation	D	B-	D	**Construction Stage:** Air pollutants emitted from construction vehicles, machines and plants may cause some adverse effect to respiratory organs of local residents and construction workers, although temporarily. **Planning and Operation Stage:** No negative impact is expected.
	15) Infectious diseases such as HIV/AIDS	D	B-	D	**Construction Stage:** Influx of construction workers may cause outbreak of infectious deceases such as HIV/AIDS. **Planning and Operation Stage:** No negative impact is expected.
	16) Working condition (including occupational health)	D	B-	B-	**Planning:** No negative impact is expected. **Construction Stage:** There is a possibility that outside construction workers may lose their health and safe condition depending upon details of construction work and working environment. **Operation Stage:** There is a risk of H&S issue.

Environmental Item		Planning Stage	Construction Stage	Operation Stage	Reasons
	17） Hazards/security risks	D	B-	B-	**Planning Stage:** No negative impact is expected. **Construction Stage:** Although the project activities will not enhance hazard and risks, migration of outside workers from other areas may increase in number of crimes in the project area. **Operation Stage:** There is a risk of a fire from transmission line and tower, and sub-station facilities.
	18） Accidents (Construction work and traffic)	D	B-	B-	**Planning Stage:** No negative impact is expected. **Construction Stage:** Occurrence of accidents may increase due to construction work deploying machines and plants as well as occurrence of traffic accidents due to construction vehicles. **Operation Stage:** Operation and maintenance work for transmission line and sub-station in the height or with high voltage is likely to occur accidents such as falling down and electrocution.
Natural environment	1） Topography and Geology	D	B-	D	**Construction Stage:** Topographical change, a large-scale excavation, cutting soil and/or improvement of foundation is not required. However, there is a possibility of negative impact on topographical features due to installation of transmission line and sub-station in a definite scale. **Planning and Operation Stage:** No negative impact is expected.
	2） Soil erosion	D	B-	B-	**Planning Stage:** No negative impact is expected. **Construction Stage:** Soil run-off from filling and cutting of soil surface with earth moving work, dumpsite and borrow pits may cause soil erosion. Although large-scale reclamation is not expected, soil erosion is one of nationwide concerns in Nigeria. **Construction and Operation Stage:** If neither measures against soil run-off from filling/cutting soil surface nor recovering vegetation after tree cutting is carried out, there is a possibility of soil erosion.
	3） Groundwater	D	B-	C	**Planning Stage:** No negative impact is expected. **Construction Stage:** To secure water supply for construction work, there is a possibility of pumping up of groundwater. In addition, some topographical change, cutting and filling work etc. may cause negative impacts on functions about subsurface infiltration and water circulation. **Operation Stage:** In order to keep subsurface infiltration and water circulation function of groundwater, proper measures should be taken to shape of foundation with reflecting the results of geological survey to be conducted at Planning Stage.
	4） Hydrological situation	D	C	C	**Planning Stage:** No negative impact is expected. **Construction Stage:** Although along transmission line and sub-station rivers, wetland and lagoons are distributed, expected impact is unknown at present. In addition, some topographical change, cutting and filling work etc. may cause negative impacts on functions about subsurface infiltration and water circulation. **Operation Stage:** Impact is unknown at present. However, in order to keep subsurface infiltration and water circulation function of groundwater, proper measures should be taken to shape of foundation with reflecting the results of geological survey to be conducted at Planning Stage.
	5） Protected Area	C	C	D	**Planning and Construction Stage:** A Protected Area is distributed around proposed Badagry sub-station. Although at present it is not clear whether the proposed sub-station may cause impact on the protected area or not, it is avoidable by proper selection of the site. **Operation Stage:** No negative impact is expected.

Environmental Item		Planning Stage	Construction Stage	Operation Stage	Reasons
	6) Flora, Fauna, Biodiversity and Ecosystem	D	B-	B-	**Planning Stage:** No negative impact is expected. **Construction Stage:** Negative impacts on change of vegetation due to felling, rare animal and plant species, fishes living in rivers, wetlands and lagoons, and animals and plants necessary to life of peoples **Operation Stage:** There is some possibility of accidental striking and electrocution of birds to transmission line and tower.
	7) Landscape	D	C	C	**Planning Stage:** No specific negative impact is expected. **Construction Stage:** Transmission tower and line under construction may cause some change of existing landscape. **Operation Stage:** Existing transmission tower and line in the project area are fitted into present scenery. However, appearance of new transmission tower and line may cause some change of the landscape.
	8) Local climate	D	D	D	**All Stages:** No specific negative impact is expected.
	9) Global warming/climate change	D	B-	D	**Planning Stage:** No negative impact is expected. **Construction Stage:** Greenhouse gas emissions such as CO_2 is somewhat expected due to operation of construction vehicles, machines and plants. However, it can be solved by applying measures such as stopping idling mode and use of vehicles with lower pollutants emission. On the other hand, CO2 absorption function of forest is expected to reduce due to deforestation and tree cutting. **Operation Stage:** Emission of greenhouse -gas such asCO_2 is not expected from operation of sub-station.
Environmental Pollution	1) Air pollution	D	B-	D	**Planning Stage:** No negative impact is expected. **Construction Stage:** Emission of air pollutants is expected temporarily from construction vehicles, machines and plants. **Operation Stage:** In general, sub-station and transmission facility are not the source of air pollutants emission source sub-station and transmission facility.
	2) Water pollution	D	B-	B-	**Planning Stage:** No negative impact is expected. **Construction Stage:** Water pollution is expected due to following pollutant generation from construction work, although temporarily: (i) Run-off of dirty water including soils from cutting, filling and excavation of earthmoving work. (ii) Wastewater from worker' camps and construction office. (iii) Spilling over of toxic materials such as oil and lubricants. **Operation Stage:** If appropriate measures against run-off of soil are not made in the construction work, water pollution is expected due to spillage of soil. Generation of water pollutants is not expected from sub-station and transmission facilities.
	3) Soil contamination	D	B-	C	**Planning:** No negative impact is expected. **Construction Stage:** Possibility of soil contamination due to leakage of toxic materials from earthmoving work and construction materials. **Operation Stage:** Potential contamination of soil from inadvertent release of hazardous or contaminating material.
	4) Bottom sediment contamination	D	B-	D	**Construction Stage:** There is a possibility of bottom sediment contamination due to discharge of construction materials containing toxic materials and turbulence of bottom muds of river and swamp by excavation and dredging work. **Planning and Operation Stage:** No negative impact is expected.

Environmental Item		Planning Stage	Construction Stage	Operation Stage	Reasons
	5) Solid waste	D	B-	D	**Construction Stage:** Generation of solid waste from construction work, tree cutting and workers' camp is expected. **Planning and Operation Stage:** No negative impact is expected.
	6) Noise and vibration	D	B-	B-	**Planning Stage:** No negative impact is expected. **Construction Stage:** Generation of noise and vibration is expected from construction machines and vehicles temporarily. **Operation Stage:** Generation of noise is expected from operation of sub-station.
	7) Ground subsidence	D	D	D	**At all Stages:** no negative impact is expected.
	8) Odor	D	D	D	**At all Stages:** no negative impact is expected.
	9) Radio disturbance	D	D	D	**At all Stages:** no negative impact is expected.
	10) Electromagnetic field	D	D	D	**At all Stages:** International Commission on Non-Ionizing Radiation Protection (ICNIRP) prepared the guideline of occupational exposure for EMF and has set 200 micro tesla as reference level for general public exposure. In general, the level of EMF around the transmission line is 4~6 micro tesla which is well below compared with the ICNIRP's reference level. Since this project will comply with the applicable regulations in Japan as well as ICNIRP, health impact is not expected due to EMF. Therefore, no negative impact is expected at all stages.

7-3-3 TOR for EIA study

7-3-3-1 Scope of the Study Areas

Study areas correspond to those to be affected by to the project. The areas are mostly located around the area of project implementation but have some difference depending on environmental item.

Since the project area covers a wide range, it is necessary to divide the area to sub-areas by their locations and environmental conditions. Accordingly, the EIA report should be prepared for each sub-area by evaluating the results of the EIA study and describing mitigation measures with considering characteristics of sub-area.

7-3-3-2 Survey Items and Methodology

(1) Collection of Existing Data and Reconnaissance Survey

Collection of existing data and field survey including actual measurements should be carried out for environmental items as shown in Table 7-11.

Table 7-11 Environmental Items to be surveyed

Environmental Item	
Social Environment	1) Land acquisition/involuntary resettlement
	2) Local economy such as employment and livelihood etc.
	3) Utilization of land and local resources
	4) Social institutions such as social infrastructure and local decision-making institutions
	5) Existing social infrastructures and services
	6) Vulnerable group such as the poor, women, children, elderly, disabled etc.
	7) Misdistribution of benefit and damage
	8) Local conflict of interests
	9) Gender
	10) Children's rights
	11) Cultural and historical heritage site
	12) Water rights, fishing rights and rights of common
	13) Public health and Sanitation
	14) Infectious diseases such as HIV/AIDS
	15) Working condition (including occupational health)
	16) Hazards/security risks
	17) Accidents (Construction work and traffic)
Natural Environment	1) Topography and Geology
	2) Soil erosion
	3) Groundwater
	4) Hydrological situation
	5) Coastal zone
	6) Protected Areas
	7) Fauna, Flora, Biodiversity and Ecosystem
	8) Landscape
	9) Global warming/climate change
Environmental Pollution	1) Air pollution
	2) Water pollution
	3) Soil contamination
	4) Bottom sediment contamination
	5) Solid waste
	6) Noise and Vibration

(2) Field Survey

To obtain existing baseline data of environmental conditions field surveys should be carried out for items shown in Table 7-12 referring to the above results of the above scoping.

Regarding the survey on natural environment, the survey time and methods should be considered in order to be able to evaluate seasonal changes with taking climate condition of the project area into considerations.

Table 7-12 Contents and details of the Field survey

Environmental Item	Survey Item	Method for Survey
Comparison of Alternatives		
Comparison of Alternatives	(1) Options for transmission route and location sub-station (2) Methods and procedures of construction work	(1) Selection of the route and location to avoid, minimize the occurrence of involuntary resettlement, tree cutting and impacts on reserved areas and ecosystem (2) Measures to minimize or reduce adverse impacts by construction work
Baseline Data Survey		
（1） Social Environment		
1）Land acquisition/involuntary resettlement	(1) Census survey on land under the planned transmission route (30m to 50m width) and sub-station. (2) Census survey on affected land and assets. (3) Household survey on livelihood and living condition (4) For leasehold land survey on reason and details of leasehold and resettlement	(1) Conduct inventory survey on land and all the structures and occupants (including landowner, illegal occupant, leaseholder, businessman, employee of shop etc.) in the project area by interview and hearing and identify the number of Project Affected Persons (PAPs) (2) Inventory of assets with amount and recognizable legal rights of PAPs in the project area by actual measurement and hearing (3) Interview survey on socio-economic baseline data of affected households (livelihood, occupation, household size, household income, standard of living, socio-cultural characteristics etc.) (4) Hearing of past experiences of land acquisition an resettlement and complaints from residents
2）Local economy such as employment and livelihood etc.	Survey on livelihood and employment in the project area	(1) Collection of existing data of livelihood and employment condition (2) Interview survey on socio-economic baseline data of affected households (livelihood, occupation, household size, household income, standard of living, socio-cultural characteristics etc.)
3）Utilization of land and local resources	In and around the project sites: (1) land use and utilization of natural resources (residential, industrial, agricultural commercial, pasture use) (2) Water resources (surface water and groundwater)	(1) Inventory of assets with amount and recognizable legal rights of PAPs in the project area by actual measurement and hearing (2) Collection of qualitative data on land use and utilization of natural resources (existing and planned) (3) Interview survey on utilization of water resources

Environmental Item	Survey Item	Method for Survey
4) Social institutions such as social infrastructure and local decision-making institutions	Social institutions such as social infrastructure and local decision-making their roles in the project area	Collection of information about Sate, Administrative Division, Traditional leaders, religious associations, cooperatives etc, through stakeholder engagement
5) Existing social infrastructures and services	(1) Public facilities such as schools, hospitals (2) Means of transportation and communication	(1) Collect information through desktop review and site visit about public facilities, means of transportation and communication. Partly same as the 1) – (1)
6) Vulnerable group such as the poor, women, children, elderly, disabled etc.	Living condition and livelihood of the poor, and vulnerable groups in the project area	Interview survey on socio-economic baseline data of affected households (livelihood, occupation, household size, household income, standard of living, socio-cultural characteristics etc.) Same as the item 1) –(3)
7) Misdistribution of benefit and damage	Existing social institutions and means of mutual communication and obtaining consensus	(1) Survey on features of local stakeholders State, Local Government (2) Collection of information about State and local government level administration, traditional community leaders, religious associations, cooperatives etc. (3)Survey on good practices of making consensus and mutual communication
8) Local conflict of interests	Existing social institutions and means of mutual communication and obtaining consensus	(1) Survey on features of local stakeholders State, Local Government (2) Collection of information about State and local government level administration, traditional community leaders, religious associations, cooperatives etc. (3) Survey on good practices of making consensus and mutual communication
9) Gender	(1) Ownership of land and assets by women (2) Share of compensation fee to female by male householder (3) Condition at work of women	(1) Collect laws and regulations about ownership of women on land and assets through desktop study (2) Survey on traditional custom by hearing from local stakeholders such as residents and NGOs (3) Past experiences of TCN for gender issues (4) Survey on labour condition of women by hearing from local stakeholders such as residents and NGOs
10) Children's rights	Existing condition of children's labour	(1) Collection of laws and regulations of children's labour in Nigeria through desktop study (2) Collection of existing data about children's labour (3) Hearing from residents, local stakeholders, NGOs etc.
11) Cultural and historical heritage site	Distribution of cemetery, churches, mosques, heritage sites in the project area	(1) Collection of information about distribution cemetery, churches, mosques, heritage sites in the project area through site visit and stakeholder engagement (2) Hearing about condition of relocation and temporary agreement, if possible

Environmental Item	Survey Item	Method for Survey
12）Water rights, fishing rights and rights of common	(1)Utilization of water resources (2) Fishery activities	(1) Interview survey on utilization of water resources to local government and residents (2) Hearing from fishery associations
13）Public health and Sanitation	Public health condition of local residents in the project area	(1) Collection and analysis of public health and diseases in the project area through desktop study and stakeholder engagement (2) Hearing from local medical facilities
14）Infectious diseases such as HIV/AIDS	Existing health condition of local residents, especially suffering from infectious diseases in the project area	(1) Collection and analysis of infectious diseases in the project area through desktop study and stakeholder engagement (2) Hearing from local medical facilities
15）Working condition (including occupational health)	Safety condition during construction work	(1) Confirm labour related laws and regulations such as Labour Law in Nigeria (2) Collect information about safety measures during construction work
16）Hazards/security/ risks	(1) Existing situation of crime and security in the project area (2) Fire prevention plan from transmission line and tower and sub-station	(1) Hearing from local police and other concerned organizations (2) Collection and analysis existing data
17）Accidents (construction work and traffic accidents)	(1) Accidents during construction work (2) Accidents during operation and maintenance	(1) Collection of information about safety measures of TCN during construction work through interview to TCN (2) Collection of information about safety measures of TCN for operation and maintenance of transmission line and sub-station through interview to TCN
（2）Natural Environment		
1）Topography and Geology	(1) Existing situation of fragile land and accidental collapse soil erosion in the project area (2) Installation plan of transmission line and sub-station	(1) Collection of existing data (2) Field survey and hearing of cases of collapse
2）Soil erosion	Existing situation of soil erosion in the project area	(1) Collection of existing data (2) Field survey and hearing on cases of soil erosion
3）Groundwater	(1) Existing use of groundwater and surface water (rainy season and dry season) (2) Plan for topographical change, cutting and filling at the earthmoving work	(1) Collection of existing data (2) Hearing of groundwater use
4）Hydrological situation	(1) Stream regime of rivers, wetlands and lagoons (2) Floodplain and area of flooding risk (rainy and dry season) (3) Plan for topographical change, cutting and filling at the earthmoving work	(1) Collection of secondary data (2) Field survey and hearing on conservation and use of rivers, wetlands, lagoons etc.
5）Protected Areas	Distribution of Protected Areas in the project area	To confirm location of the existing and candidate Protected Area around proposed Badagry sub-station

Environmental Item	Survey Item	Method for Survey
6）Fauna, Flora, Biodiversity and Ecosystem	(1) Existing situation of animal and plant species that may be affected by the project (2) Existing situation of felling plant species and area of deforestation in order to secure land for grid related facilities (3) Fishes and aquatic organisms in rivers, wetlands and lagoons (4) Existing utilizing condition of wild animals and plants by local residents	By cooperation with Local governments, NGOs, research organizations etc. to conduct following survey: (1) Inventory survey on endangered species, endemic species, protected species by Nigerian Government, plant and animal species affected by deforestation and bird species. Collection of secondary data and hearing from experts regarding conservation situation and ecological features. Collection of information about avoidance of bird striking. (2) Survey on felling tree species, vegetation and area of deforestation by the project. Survey on laws and regulations of felling and deforestation as well as procedures of obtaining necessary approval from concerned authorities. (3)Collection of secondary data and hearing
7）Landscape	(1) Existing landscape (2) Installation schedule of transmission line and tower at the construction work	(1) Collection of existing data (2) Field survey and hearing
8）Global warming/climate change	(1) Present situation of global warming and climate change in the project area (2) Operation plan of construction vehicles and machines (3) Tree cutting plan	(1) Collection of existing data (2) Hearing to relevant organizations (3) Collection of data about national policy for global warming and climate change of Nigeria (4) Estimation greenhouse gas emission by using data about number of construction vehicles, machines and time of operation etc. (5) Collection of existing measures for reduction of greenhouse gas emission from construction work
（3）Environmental Pollution		
1）Air pollution	(1) Air quality standard (2) Existing Air quality (3) Major air pollution sources (4) Operation plan of construction vehicle s and machines	(1) Collection of existing data (2) Field survey and hearing on existing air pollution (3) Collection of baseline data by field measurement of air quality such as SO_2, NO_2, TSP, PM_{10}. (measuring point: near sub-station site, urban area, road area, forest area etc.) (4) Estimation air pollutants emission by using data about number of construction vehicles, machines and time of operation etc. (5) Collection of existing measures for reduction of air pollutants emission from construction work

Environmental Item	Survey Item	Method for Survey
2) Water pollution	(1) Water quality standards (2) Existing situation of water pollution (3) Major water pollution sources and water use	(1) Collection of existing data (2) Field survey and hearing on existing water pollution (3) Collection of baseline data by field measurement and analysis water samples such as water temperature, pH, turbidity, DO, SS, BOD, COD, oil and grease, salinity, anions, heavy metals, Coliform etc. (Measurement point: river, wetlands, and lagoons etc.)
3) Soil contamination	(1) Soil contamination standards (2) Existing situation of soil contamination	(1) Collection of secondary data (2) Field survey and hearing of existing pollution (3) Baseline data survey by sampling and analysis of heavy metals and other hazardous compounds for soil in and surrounding areas Items should be determined by consideration with environmental standards capability of local consultants.
4) Bottom sediment contamination	(1) Existing situation of bottom sediment contamination	(1) Collection of secondary data (2) Field survey and hearing of existing pollution (3) Baseline data survey by sampling and analysis of organic compounds, sulfide, heavy metals, oil and grease and other hazardous compounds for rivers, wetlands and lagoons. The survey item should be determined by consideration with environmental standards capability of local consultants.
5) Solid waste	(1) Regulation of solid waste treatment and disposal (2) Existing situation of solid waste generation, collection, treatment and disposal	(1) Collection of secondary data (2) Field survey and hearing of solid waste treatment and disposal in the project area
6) Noise	(1) Environmental standards for noise pollution (2) Existing ambient noise level (3) Major noise sources	(1) Collection of secondary data (2) Actual field survey and hearing of noise level (3) Measurement of daytime and night-time ambient noise level of sub-station, urban area, roadside, forest area etc. as baseline data

7-4 ESIA study

7-4-1 Schedule of ESIA study

The schedule of EIA process to be carried out up to today is shown in below.

Table 7-13 Schedule of EIA Study for each LOT

Item	Lot1	Lot2	Lot3
Kick Off Meeting (Lagos and Ogun state, TCN, consultants)	May 3 2017		
TOR approval from FMEnv	July 17, 2017	July 11, 2017	July 11, 2017
ESIA study	Aug 2017-Mar2018		
Draft ESIA report submitted to FMEnv	Apr 2018	Apr 2018	Apr2018
Public Disclosure (30 days)	May 1 – 31 2018		
Panel Review	Oct 19, 2018		
EIA approval	May 3, 2019	July 3, 2019	February 5, 2019

7-5 Description of Existing Environment

7-5-1 Physical Environment

7-5-1-1 Climate

Nigeria located in the tropics, is wide country and has four climate types depending on geographical and topographical condition, namely, tropical rainforest climate for coastal area faced to the Gulf of Guinea, tropical savanna climate for central and western area of the country, tropical dry climate for northern area and highland climate for mountain area with higher than 1,500 m above sea level.

Both Lagos State and Ogun State, where the proposed project area is included, belong to tropical rainforest climate and tropical savanna climate. Both States have rainy and dry seasons and humid and hot. However, Ogun State located in inland area is less humid than Lagos Sate.

Annual rainfall is 1,500mm to 2,500mm in Lagos State and 1,000mm to 2, 000 mm in Ogun State. In Lagos State in general there are two rainy seasons, namely, first rainy season (from April to July) and second rainy season (from September to December), and other time is in dry condition. In Ogun State there is one rainy season (from March to November) and one dry season (from December to February).

Regarding annual average temperature minimum low temperature is 20~24°C and maximum high temperature is 28~34°C for both States with little change in a year.

7-5-1-2 Topography and geology

Lagos State is located in coastal region of Western Niger Delta and estuaries of Ogun and Oshun River. About 40% of the area is occupied with water bodies such as tidal area, wetland, coast, river and bay area. On the other hand, inland area spread coastal plain, river mouth and island and 10% of land area prone to inundation by high wave and flooding.

In Ogun State lowland plain with fertile soil suitable to agriculture and hilly area fitted to grazing spread around inland area from northern boundary of Lagos State.

Topographical condition of the project area changes from hilly area of inland to lowland plain, swamp and lagoons of coastal area.

7-5-1-3 Air Quality

Air quality measurement were carried out at 74 locations along the proposed project routes. Parameters measured during the study includes, PM, SO_2, NO_2 and CO. The result shows that all measured parameters shows the compliance with the national air quality standard. The detail of result is shown in Appendix 4.

7-5-1-4 Ambient Noise

Noise measurement were carried out at 74 locations along the proposed project routes. Noise level along the proposed route were varied depend on the land use of sampling location. The undeveloped

area (away from residential area or road network) shows the low noise level (~approximately 50dB) while the area within developed area including along the heavy traffic road indicate the high noise level. For example, maximum noise level along the main road in Lot 1 was 81.2 dB, which was above WHO standard (55 dB). The detail of result is shown in Appendix 4.

7-5-1-5 Electromagnetic Field Strength

Electromagnetic Field Strength (EFS) measurement were carried out along the proposed project route. The result of the measurement was varied the area by area. The obtained highest values were measured at a sampling point closer to a power generation station fence line, but below 0.4μT. The obtained values were far below the ICNIRP guidelines for both occupational (1000μT) and general public exposure (200μT). The detail of result is shown in Appendix 4.

7-5-1-6 Surface and Ground Water

There are several surface waters around the project area, including River, Stream as well as Swampy area. Major River running around the project area is Ogun River, which runs from Abeokuta to Lagos Lagoon. Lot 1 and 2 component crosses the Ogun River. There is another major surface water in Badagry area (Lot 3) along which transmission line will run.

For surface water, water sampling was carried out at 8 locations (Lot 1), 12 locations (Lot 2) and 16 locations (Lot 3).

The result of water sampling indicated pollution regarding DO, TSS, COD, etc, of which concentrations were above WHO drinking water standard in most of surface water resource. The pollutions may be attributed to human activities. The detail of result is shown in Appendix 4.

7-5-1-7 Soil

The soil in the project area have moderate fertility. Generally, Concentrations of heavy metals and other in the soil parameters are show levels below the set limits under the WHO and FMEnv soil standards. However, there are apparent exceedances of certain parameters in each Lot. These include:

Lot 1: High levels of nitrates are observed in the project area. This NO3 limits may be attributed to intense agricultural activities (e.g. use of fertilizers, land use practices) in the area.).

Lot 2: The soils have moderate fertility status with the more fertile soils located on the Ewekoro axis underlain by shale and limestone. The plant-extractable Cu, Cd and Ni contents of the soils are within the acceptable limits for soils. There are observed was however an elevated concentrations of Pb in the soil around the Thames Valley College compared with other areas. This may could be attributed due to used lead expended leaded batteries in the area.

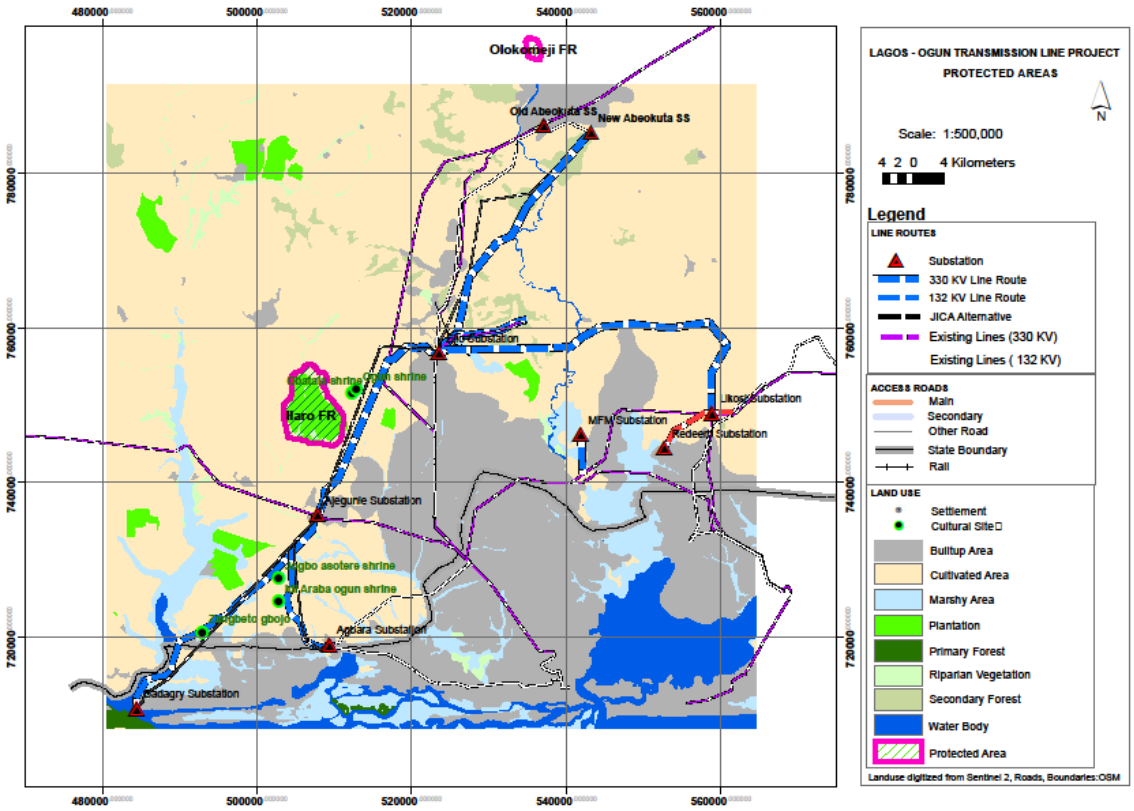
Lot 3: The concentration of Cu in about two-thirds of the samples taken during the survey exceeds the limits at all sampling points both for top soil and for subsoil. This may be attributed to agricultural

activities and municipal and industrial solid wastes, especially around the Agbara axis.

7-5-2 Biological Environment

7-5-2-1 Natural Conservation Areas

There are no protected areas within the zone of influence of the proposed project. The closest protected area is Ilaro Forest Reserve located approximately 3km from the route of transmission line. This Ilaro Forest Reserve is mainly used for teak plantation. There is no IBA (Important Bird Area) located within 10km from the project area.



Source: EEMS 2018

Figure 7-12 Protected areas close to the Project Area

7-5-2-2 Terrestrial Habitat

(1) Lot 1

The survey of the site revealed that the area shows partial degradation resulting from human activities. These activities range from housing, firewood collection and farming. Each of these activities conferred different outlook on the ranges where they were carried out. A closer look of the profiles of the vegetation of the area showed that the site can be stratified into grassland, riparian forest, secondary forest regrowth and farmland. Grassland form major expanse of land in Ejio-Olorunsogo section caused by man-made land conversions. The percentage of each land use type within ROW is shown in Table 7-14. The affected area of each land use type within ROW is shown in Figure 7-14. The pictures of representative areas in Lot 1 are shown in Figure 7-13.

Table 7-14 Land Use Type within affected area for Lot 1

Land use type	Affected area (Ha)
Primary Forest	0
Secondary Forest	63
Swampy area	0
Riparian vegetation	0
Water body	1
Cultivated area	175
Fallow field	0
Built-up area	0
Plantations	0
Others	0
TOTAL AREA	239

Source: EEMS 2018

Grassland: Ejio-Olorunsogo section

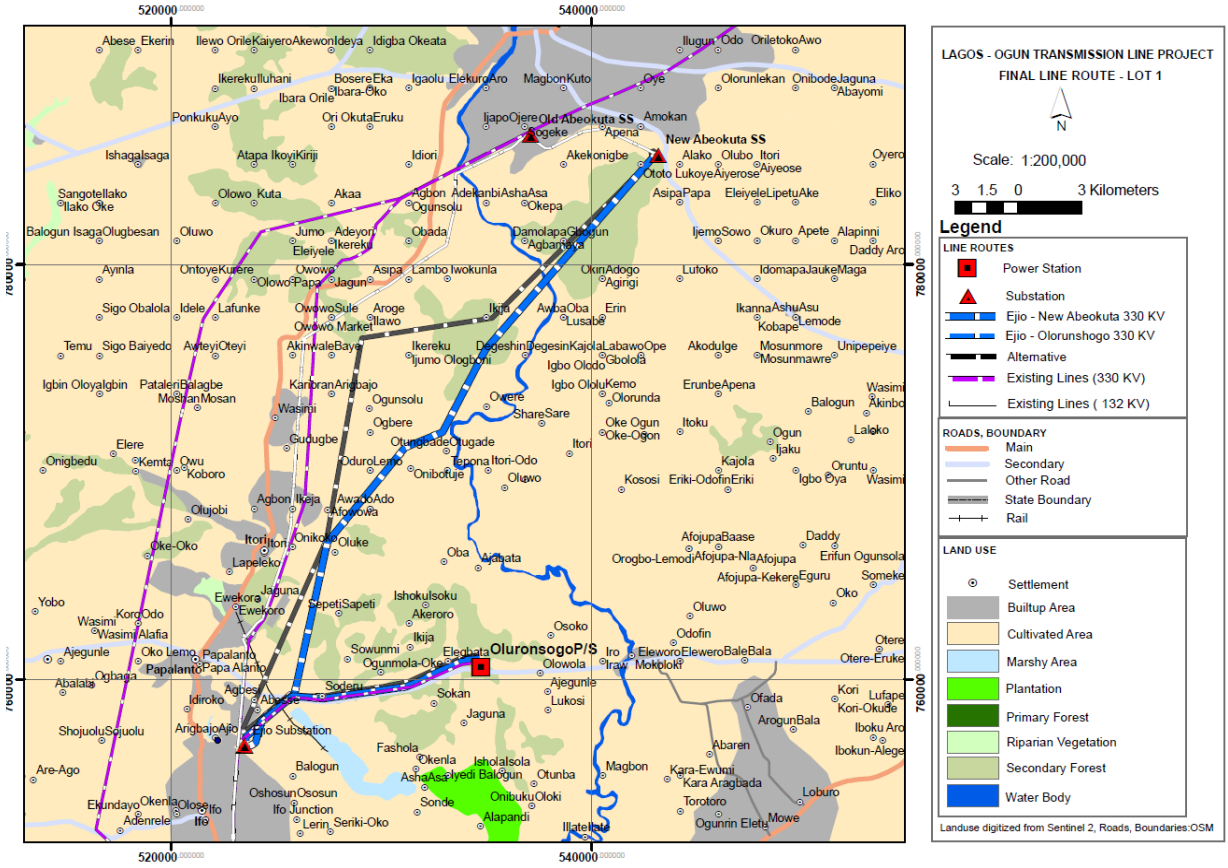
Riparian forest : Ejio-New Abeokuta section

Farmland with mixed crops: Ejio-New Abeokuta section

Farmland with cassava: Ejio-New Abeokuta section

Source: Lagos-Ogun Transmission Line ESIA for Lot1

Figure 7-13 Pictures of representative areas in Lot 1



Source: Lagos-Ogun Transmission Line ESIA for Lot1

Figure 7-14 Land use map for Lot 1 area

(2) Lot 2

The main block of the Nigerian forest formation along these routes is called lowland rainforest. The high human activities along the proposed transmission lines have greatly transformed the complex structure and species richness of these routes. The entire area under study along the transmission lines and Associated Substation Facilities, on the basis of structure and species composition has been classified as degraded lowland rain forest, made up of mixtures of trees, shrubs, herbs and grasses. The affected area of each land use type within ROW is shown in Table 7-15. The affected area of each land use type within ROW is shown in Figure 7-16. The pictures of representative areas in Lot 2 are shown in Figure 7-15.

Table 7-15 Land Use Type within affected area for Lot 2

Land use type	**Affected area (Ha)**
Primary Forest	0
Secondary Forest	0
Swampy area	17.02
Riparian vegetation	32.44
Water body	0
Cultivated area	3.96
Fallow field	309.13
Built-up area	0
Plantations	0.9
Others	0
TOTAL AREA	363.45

Source: EEMS 2018

Farmland

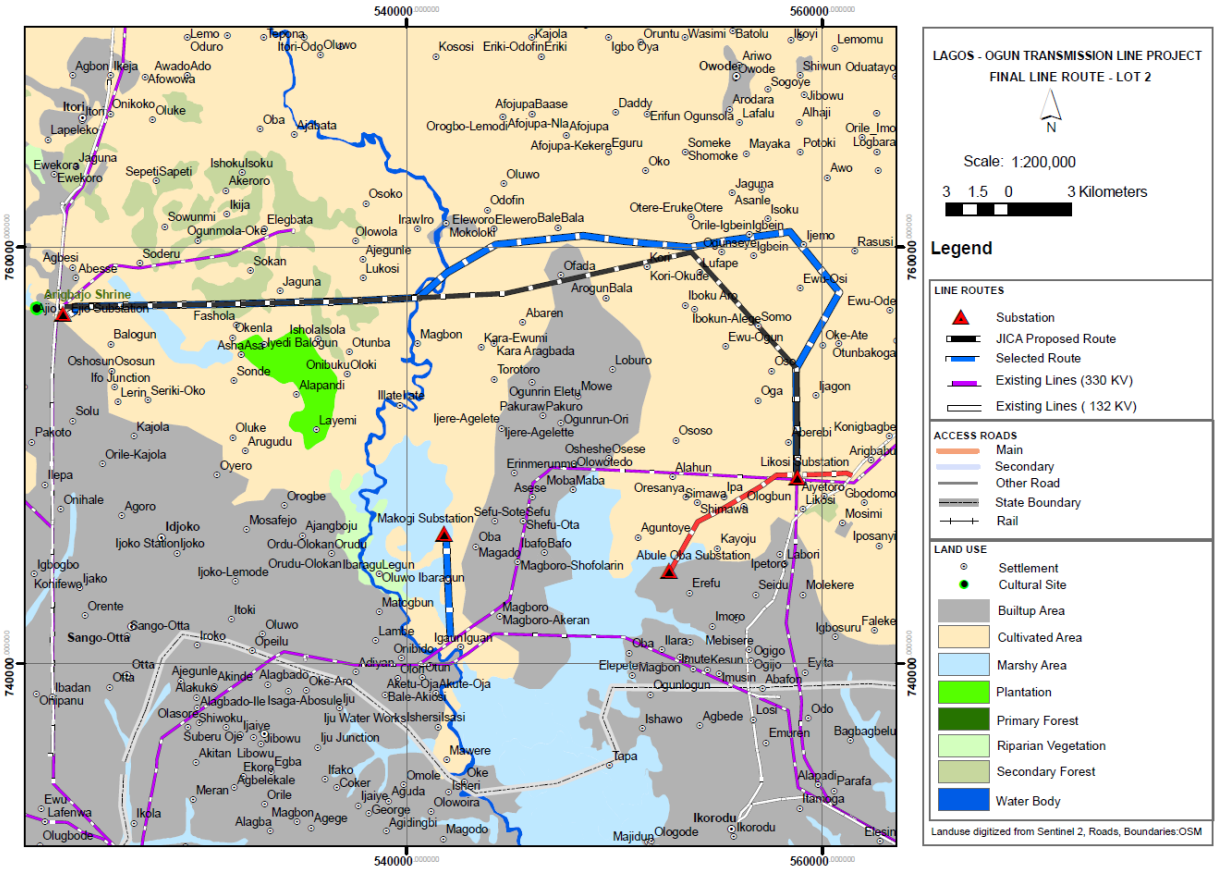
Freshwater Fallow land vegetation

Freshwater Fallow land vegetation

Fallow land vegetation with many woody species

Source: Lagos-Ogun Transmission Line ESIA for Lot2

Figure 7-15 Pictures of representative areas in Lot 2



Source: Lagos-Ogun Transmission Line ESIA for Lot2

Figure 7-16 Land use map for Lot 2 area

(3) Lot 3

The Study area consists of the following habitat types; Secondary Forest, Marshy area and Riparian vegetation (refer to Table 7-4). Estimate of the percentage cover by each habitat type obtained in respect to transect covered during field study is presented in Table 7-16. The affected area of each land use type within ROW is shown in Figure 7-18**.** The pictures of representative areas in Lot 3 are shown in Figure 7-17.

Table 7-16 Land Use Type within affected area for Lot 3

Land use type	LOT3
Primary Forest	0
Secondary Forest	56.08
Swampy area	44.28
Riparian vegetation	13.94
Water body	16.52
Cultivated area	85.64
Fallow field	158.57
Built-up area	19.43
Plantations	0
Others	2.21
TOTAL AREA	396.67

Source: EEMS 2018

Grassland: Ejio substation

Grassland : Ejio-New Ajegunle section

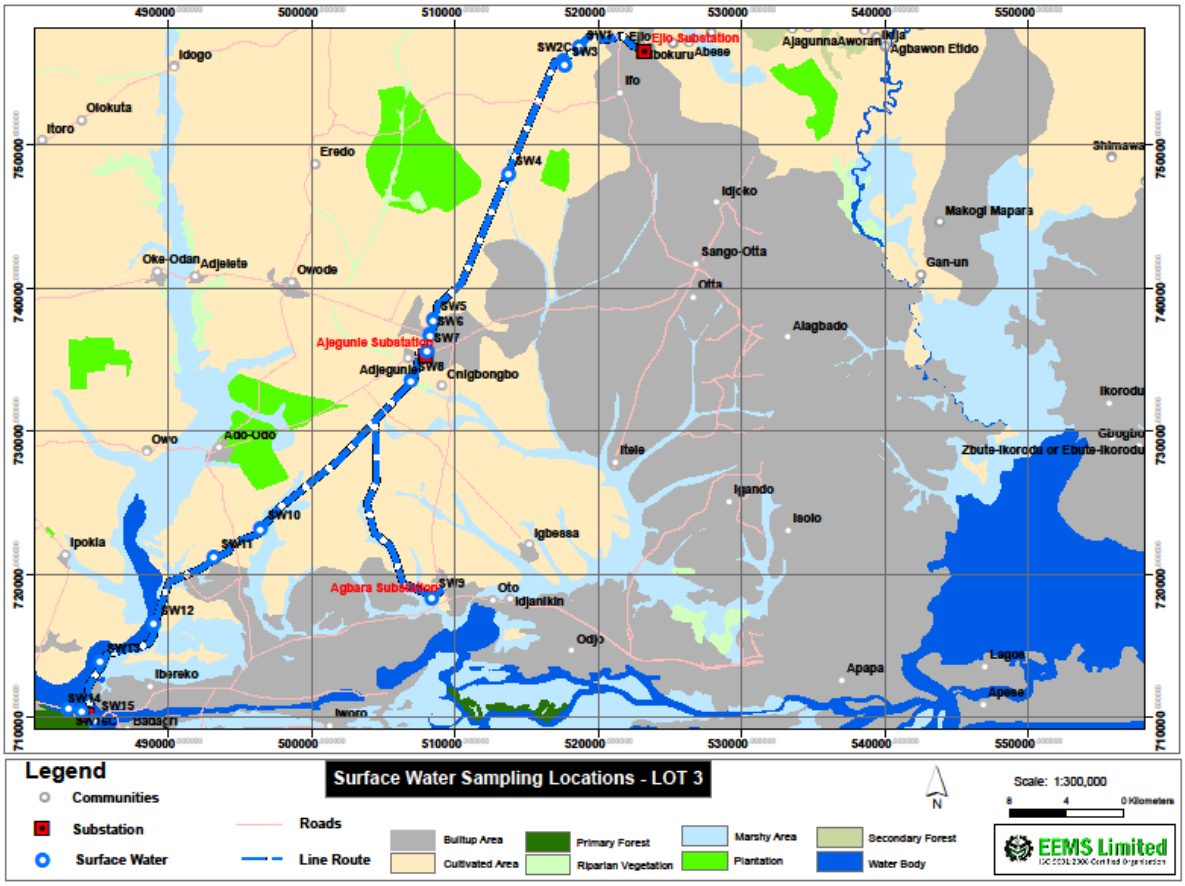
Shrub : Agbara area

Secondary forest: Abgara - Ajegunle

Swampy area: Iragbo (north of Badagry)
Source: Lagos-Ogun Transmission Line ESIA for Lot3

Swampy area: Ajegunle – Badagry sub station

Figure 7-17 Pictures of representative areas in Lot 3



Source: Lagos-Ogun Transmission Line ESIA for Lot3

Figure 7-18 Land use map of Lot 3 area

7-5-2-3 Terrestrial Flora

Lot 1:

A total of twenty-three (23) tree species and eighty-three (83) understorey species belonging to 15 and 43 taxonomic families. The results revealed that trees formed the dominant life form in the study area, which accounted for 48% followed by Herb (23%), Shrub (18%), Grass and Climbers accounted for 9 % and 2% respectively. Number of species per study site ranged from 1-11 species for trees and 12-28 species for understorey. Among the identified species, 3 species (Albizia ferruginea、Terminalia ivorensis and Diospyros barteri) are categorized as Vulnerable (VU) as per the IUCN Red List.

Lot 2:

The floristic composition of the vegetation of the proposed transmission lines and Associated Substation Facilities is diverse in species even over a relatively homogenous area. A total of 32 plant species belonging to16 families/sub-families and comprising trees/shrubs, herbs and grasses were recorded within the proposed project area. The IUCN status of the plant resources for the studied area was evaluated using IUCN version 2017 -3 criterion. Only one plant species sampled in a riparian habitat (*Mitragyna ledermannii*) is categorized as Vulnerable (VU) as per the IUCN Red List. According to IUCN, this species is threatened by overexploitation due to

its commercial value as general-purpose timber.

Lot 3:

A total of one hundred and twenty-two (122) flora species in forty-eight (48) taxonomic families were inventoried in the entire studies area. Some species were observed to occur solely in riparian habitat. Some of these indicator species include *Lasimorpha senegalensis*, *Mitragyna ledermannii, Raphia hookeri* and *Nymphaea lotus.* Derived savanna habitats were generally richer in species than the riparian forest habitats.

The IUCN status of the plant resources for the studied area was evaluated using IUCN version 2017 -3 criterion. The results showed that *Mitragyna ledermannii (*sampled in the riparian habitat*)* was the only Vulnerable (VU) species, which is also found in Lot2.

7-5-2-4 Terrestrial Fauna

Lot 1:

Farming , Hunting and ravaging activities of cattle and frequent collection of firewood and felling activities in the past are suspected to be major factors for inability of the wild fauna to thrive and triumph abundantly in the area. Bush bucks, Hare, Grass cutter, were the most abundant of all the mammals found. Birds recorded include: wood pecker, Morning dove, Cattle egret, Glossy sterlon etc. All the species encountered in the studies (e.g. birds, mammals, amphibians) are common or are listed as least concern in the IUCN Red list. The list of identified fauna species in Lot 1 is shown in Table 7-17.

Table 7-17 List of identified fauna species for Lot 1

Common Name	Biological Name	Direct Observation	IUCN
MAMMALS			
Bush Buck	*Tragelahpus scriptus*	●	-
Fruit Bat	*Rousethus smithii*	●	-
Hare	*Lepus capensis*	●	LC
Mona monkey	*Cercopithecus mona*	●	LC
Grass Cutter	*Thryonomis swinderianus*	●	-
Palm Squarrel	*Epixerus ebii*	●	LC
Forest Genet	*Genetta trigrina*	●	-
AVIAN			
Woodpecker	*Dendropicos fuscescens*	●	LC
Senegal coucal	*Centropis senegalensis*	●	-
Morning Dove	*Streptopelia decipens*	●	-
Grey heron	*Ardea cinera*	●	-
Cattle Egret	*Ardeola ibis*	●	LC
Francolin	*Francolinus bicalcaratus*	●	LC
Village Weaver Bird	*Ploceus cucllatus*	●	-
Senegal Parrot	*Poicephalus senegaus*	●	-
Glossy Sterlon	*Lamprotornis nitens*	●	LC
Willow Warbler	*Phylloscopus trochilus*	●	LC
Barn Owl	*Tyto alba*	●	LC
Grey Plantain Eater	*Crinifer piscato*	●	-
Orange Cheeked Waxbill	*Estrilda melpoda*	●	LC
Tawny-Flanked	*Prinia subflava*	●	LC
Senegal Firefinch	*Lagonosticta senegala*	●	LC
REPTILIA			
Red-necked Cobra	*Naja melanolenca*	●	-

Common Name	Biological Name	Direct Observation	IUCN
Lizard Buzzard	*Kaupifalco monogramicus*	●	-
AMPHIBIANS			
Nigeria Banana frog	*Afrixalus nigeriensis*	●	LC
Toad	*Amitophrnus supercillaris*	●	-

Source: Lagos-Ogun Transmission Line ESIA for Lot1

Lot 2:

Major wildlife components of the study area belong to the vertebrate classes of Reptilia, Amphibia, Aves and Mammalia. Their habitats include the farmlands and residential areas. Wildlife resources especially mammals reported in the area are remarkably few, because the project area has been exposed to significant human impacts from industrial development, hunting and clearance for agriculture. These would explain the sparse wildlife around the project area and suggest a less likely occurrence of rare or endangered species compared to unimpacted areas. Most of the wildlife taxa would, therefore, be classified as not evaluated or "data deficient" based on IUCN (1994) guidelines. None of the species identified is classified as threatened as per IUCN Red List. The list of identified fauna species in Lot 2 is shown in Table 7-18.

Table 7-18 List of identified fauna species for Lot 2

Common Name	Biological Name	Direct Observation	IUCN
MAMMALS			
Common Rats	*Rattus rattus*	●	LC
House Mouse	*Mus musculus*	●	LC
Giant Bush Rat	*Cricetomys gambianus*	●	LC
African Palm Squirrel	*Epixerus ebii*	●	LC
Ground Squirrel	*Xenus erythropus*		-
Grass Cutter	*Thryonomys swinderianus*		LC
African Civet	*Civettictis civetta*	●	LC
Bates Pygmy Antelope	*Neotragus batesi*	●	LC
Bushbuck	*Tragelaphus scriplus*		-
Maxwell's Duiker	*Cephalopus maxwelli*	●	-
Yellow backed duiker	*Cephalopus silvicultor*		-
AVIAN			
Black Kites	*Milvus nigrans*	●	-
Chicken Hawk	*Accipter erythropus*	●	-
Cattle Egret	*Ardeola ibis*		LC
Great White Egret	*Egretta alba*		LC
Common Vultures	*Necrosyrtes monarchus*	●	-
Francolin	*Francolinus bicalcaratus*		LC
Pin-Tailed Whydah	*Vidua macroura*		LC
Pied Crow	*Corvus albus*		LC
Wood Pecker	*Dendropicos pyrrhogaster*		LC
Bronze Manikin	*Lonchura cucullatus*		-
Village Weaver Bird	*Plesiositagra cucullatus*	●	-
White-Crested hornbill	*Tropicranus albocristatus Cassin*		-
Nectar Bird	*Anthreptes collaris Vieil.*		-
REPTILIA			
Rainbow Lizard	*Agama*	●	-
Nile Monitor Lizard	*Veranus niloticus*	●	-
Royal Pyton	Pyton regis	●	-
Black Cobra	*Naja melanoleuca*		-
Green Tree Mamba	*Dentroaspis viridis*	●	-
Black Tree Snake	*Thrasops occidentalis*		LC
AMPHIBIANS			
Frog	*Dicoglossus sp*	●	-
Long-Legged Frog	*Ptychodena sp*	●	-
Toad	*Bufo regularis*	●	

Source: Lagos-Ogun Transmission Line ESIA for Lot2

Lot 3:

Seventy nine (79) fauna resources were inventoried in the study. This comprises of 61 fauna species that were sighted (direct evidence) and 18 fauna species that were obtained via indirect evidences. Grass cutter was the most abundant of all the mammals found in the area. Birds recorded include: Cattle egret, buff-tailed corone, the great egret, etc. The avi-fauna group recorded the highest number of species, followed by the mammalian group. The reptilian group recorded and amphibians however, recorded the least number of species. There were two major habitats in the censored area which are derived savannah and riparian/swamp habitat. Derived savanna was observed to record the highest number of species. This high number of species in savanna habitat is attributed to disturbed environment, since fast growing species (colonizers) dominate such habitat.

Analysis for the conservation status of the species censored in the proposed project area was conducted using IUCN, 2017 Red List of Threatened species. Results revealed that none of the censored species was threatened. The list of identified fauna species in Lot 3 is shown in Table 7-19.

Table 7-19 List of identified fauna species for Lot 3

Common Name	Biological Name	Direct Observation	IUCN
MAMMALS			
The brown rat	*Rattus norvegicus*	●	LC
The bush rat	*Rattus fuscipes*	●	LC
The black rat	*Rattus*	●	LC
The little free-tailed bat	*Chaerephon pumilus*	●	LC
The hammer-headed bat	*Hypsignathus monstrosus*	●	LC
The Gambian epauletted fruit bat	*Epomophorus gambianus*	●	LC
AVIAN			
The cattle egret	*Bubulcus ibis*	●	LC
The buff-tailed coronet	*Boissonneaua flavescens*	●	LC
The great egret	*Ardea alba*	●	LC
The western bronze-naped pigeon	*Columba iriditorques*	●	LC
Laughing Dove	*Spilopelia senegalensis*	●	LC
REPTILIA			
Rainbow Lizard	*Agama*	●	-
Lizard	*Mabuya sp*	●	-
Smyth's Water Snake	*Grayia smythii*	●	-
Jameson's mamba	*Dendroapis jamesonii*	●	-
The forest cobra	*Naja melaoleuca*	●	-
The African rock python	*Python sebae*	●	-
AMPHIBIANS			
Forest White-lipped Frog	*Hylarana albolabris*	●	-
Hallowell's toad	*Amietophrymus maculates*	●	-
the Lime reed frog	*Hyperolius fusciventris burtoni*	●	-
the variable reed frog	*Hyperolius concolor*	●	LC
The crowned bullfrog	*Haplobatrechus occipitalis*	●	-

Source: Lagos-Ogun Transmission Line ESIA for Lot3

7-5-2-5 Migratory Bird

Some avian species are known to migrate. Avian migration is either a regular or an irregular (nomadism, irruption, or invasions) seasonal movement between north and south. In some species, the movement is one directional. In Nigeria as in other countries in the Northern hemisphere, migratory birds commence this movement between February, March and April to warmer areas and return between August, September and October to winter grounds. Migratory movement often results in high mortality and predation. In this study, a total of 4 migratory birds were inventoried (see Table 7-20). The bird survey was conducted in December 2017. Based on the consultation with Nigerian Conservation Fund (NCF) who is an NGO dedicated to nature conservation in Nigeria, it was indicated that;

- There is no fact that the presence of transmission line causes bird strike around the project area. Since no bird strike happened, survey has not been conducted,
- Migration route is not main concern for NCF since bird can fly over transmission lines; however, NCF concerns place to stay in winter.
- December is a good timing for bird survey since many species of bird visit the area and the migratory birds fly from outside of Nigeria, e.g. Europe from December to February in general (the biodiversity survey in this EIA study was conducted in December 2017).

Table 7-20 Migratory Species around the Project Area

Common Name	Biological Name	IUCN status	HABITAT	NESTLING GROUNDS	Breeding season	Major threats	Conservation actions
The great egret	*Ardea alba*	LC	Terrestrial and freshwater	Reed beds, bamboo, bushes.	April to July	Wetland degradation and loss	Colony protection, control of vegetation management.
Grey Heron	*Ardea cinerea*	LC	Freshwater	Low trees and bushes	February to June	Renewed hunting and timber harvesting	-
Little Egret	*Egretta garzetta*	LC	Mangrove	On grounds of protected sites, mangroves.	March to July	Wetland degradation and loss through drainage for agriculture.	Nesting sites should be protected
Black Kite	*Milvus migrans*	LC	Terrestrial and freshwater	Branches of trees	July to October	Poisoning, shooting and pollution of water	Establish non-intrusion zone around colonies.

Source: Lagos-Ogun Transmission Line ESIA for Lot3

7-6 Description of Social Environment

7-6-1 Profile of the Project area

7-6-1-1 Political context and Administrative structure

Nigeria is a Federal Republic made up of 36 States and a Federal Capital Territory. Nigeria became an independent state in 1960 and a republic in 1963. These are further sub-divided into 770 local government areas that form the third tier of government while the central and state governments form the first and second tier respectively.

7-6-1-2 Population

The components of the proposed project are located in Lagos and Ogun States. In both States, there are 20 Local Government Areas each.

Lagos State is the smallest as its surface area, however, supports the largest population among the other states of the nation. By the National Bureau of Statistics, the population of Lagos State was about 5.7million in 1991 and 9.1million in 2006. There is no data to show its ethnic composition, one can assume that it is composed with various ethnic groups, as it had been the capital of the country for long time and is one of the prominent large cities in Africa today.

Ogun State shares its southern boundary with Lagos State. By the National Bureau of Statistics, its population in 1991 was about 2.3million and 3.5 million in 2006. The major ethnic group is the Yoruba, followed by the Egba, the Yewa-Awori, the Egun, etc. [1]

No indigenous person by the definition of the World Bank, to which JICA refers, is present in the proposed project areas.

7-6-1-3 Socio Economic Activity

Lagos State is the center of financial, commercial and industrial activities of the nation. According to the Nigerian Service Portal, in 2010, a total GDP of Lagos State was about USD33, 679 million and is the economic base of the nation shouldering more than 65% of all business activities in the country. A total GDP of Ogun State is USD10, 500 million and industry, commerce and agriculture are major activities.

Lagos State, with the Port of Lagos, is also a center of trading activities including crude oil exportation, which is a major earning for the country. With many financial institutions, large enterprises and international enterprises, it plays a major role in financial and economic activities of the country. Currently, the Eko Atlantic City project, a planned district with residential and office areas, is under development by reclaiming land in the coastal area of Lagos City. Another project to develop a free trade zone is also ongoing in Lekki, the eastern coastal area of Lagos. While experiencing rapid economic development, Lagos has problems typical of a large city, such as expansion of the slum areas and a high crime rate and unemployment rate.

[1] Ogun State Government Official Home Page

With its location adjoining to the large city Lagos and a vast land, Ogun State hosts factories and industries of both national and international enterprises such as Nestle, Unilever, GraxoSmithKline, Honda, etc. The education sector of the state is also developed with nine university campuses. Other land development projects, such as a large compound with a mega church, residences, schools, and other facilities, are also undertaken in many areas in the State.

7-6-2 Social Economic baseline in project area

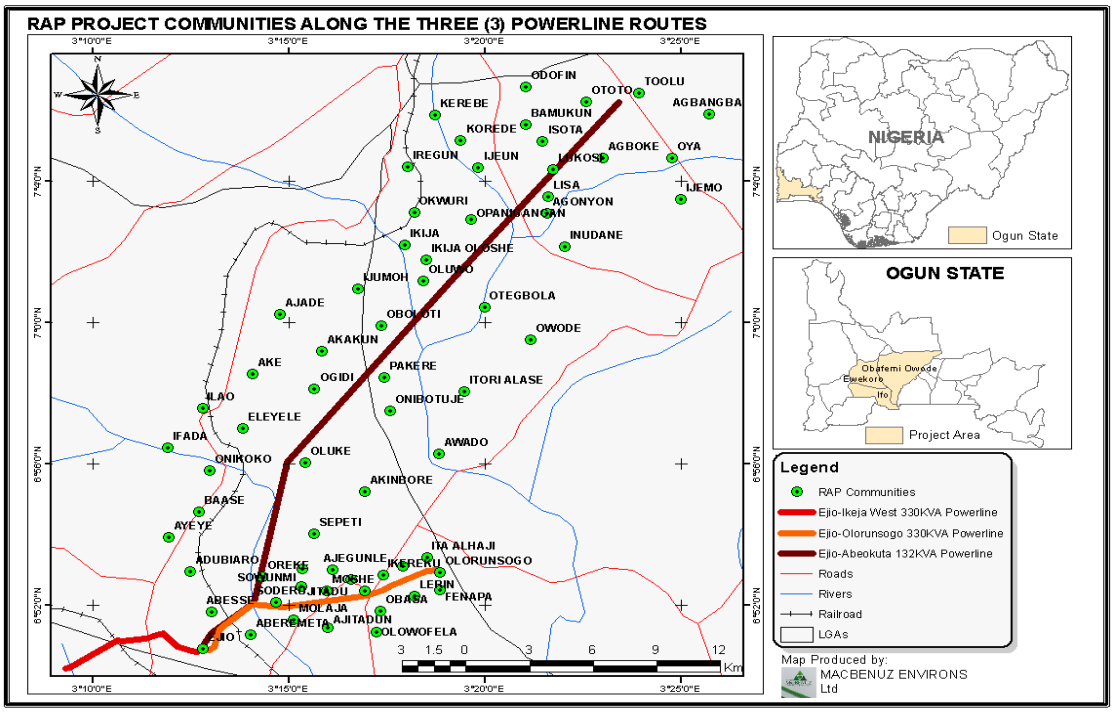
7-6-2-1 Affected Communities

There are 6 Local Government Areas (LGAs) and approximately 200 communities within the spatial boundary of the project (700m wide each of ROW) as shown in Table 7-21 and Figure 7-19, Figure 7-20, Figure 7-21.

Table 7-21 Project Affected LGA and Communities*

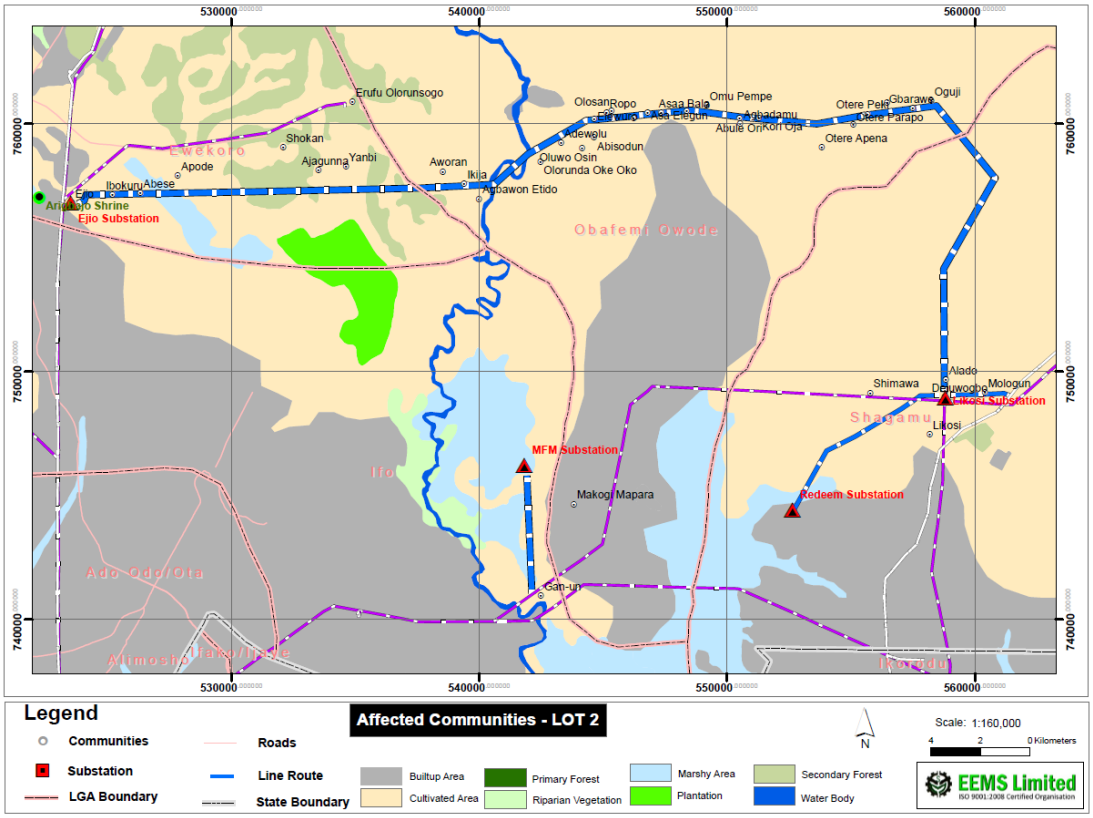
Lot #	State	Local Government Areas within study area	Number of Affected Communities
1	Ogun	Ewekoro	40
		Ifo	9
		Obafemi Owode	22
2	Ogun	Ewekoro	3
		Ifo	12
		Obafemi Owode	25
		Sagamu	38
3	Ogun	Ewekoro	8
		Ifo	16
		Ado Odo Ota	44
	Lagos	Badagry	9

*The number of community area within the project boundary is still preliminary and subject to change.
Source: JICA study team



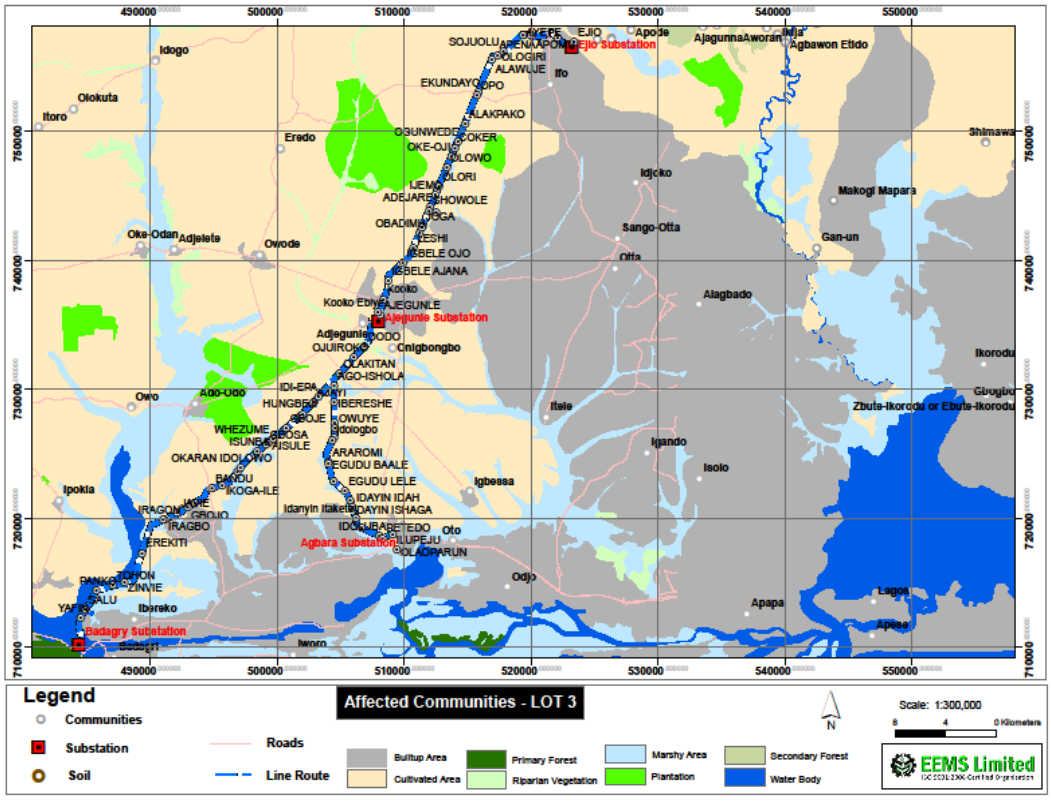
Source: Godirra 2018

Figure 7-19 LOT 1 Affected Communities



Source: EEMS 2018

Figure 7-20 LOT 2 Affected Communities



Source: EEMS 2018

Figure 7-21 LOT 3 Affected Communities

7-6-2-2 Population

The population of each affected LGA is shown in Table 7-22.

Table 7-22 Population Data in Project Affected Area (2016)

State	LGA	Total	Male	Female
Ogun	Obafemi Owode	326,700	50%	50%
	Ewekoro	76,600	51%	49%
	Ifo	750,000	51%	49%
	Ado-Odo/Ota	733,400	51%	49%
	Sagamu	355,700	50%	50%
Lagos	Badagry	327,400	51%	49%
	Total	2,569,800		

Source: National Population Commission projection from 2006 census

7-6-2-3 Age Structure and dependency rate

The age structure in the project area is shown in Table 7-23 below. The total dependency ratio is the proportion of the population not in the work-force who are 'dependent' on those of working-age, it's a calculation which groups those aged under 15 with those over 65 years as the 'dependants' and classifying those aged 15-65 years as the working-age population. The higher the dependency ratio, the more people who are not of working age, and fewer who are in the labour force (and paying taxes). The national average for Nigeria was 88.2% in 2015.

Table 7-23 Age Structure in Project Affected Area (2016)

LGA	1-14	15-44	45-65	>65	Dependency rate
Obafemi Owode	36%	37%	25%	3%	63%
Sagamu	37%	39%	24%	1%	60%
LGA	1-14	15-39	40-65	>65	
Ewekoro	35%	28%	26%	11%	85%
Ifo	39%	28%	27%	7%	83%
Ado-Odo/Ota	37%	28%	25%	10%	88%
Badagry	38%	28%	26%	8%	85%

Source: National Population Commission projection from 2006 census

7-6-2-4 Existing Infrastructure

The existing infrastructures such as water supply, electricity, transportation measures, health care facilities, waste management are summarized below.

(1) Water supply

The sources of water for household use within project area include borehole, well and river/stream. Type of water supply system is different area by area. It can be said that the most of communities within the project area depend on the water from river/stream or rainwater. On the other hand, rainwater while some of communities are connected with borehole (/portable water supply system, including Likosi and Ejio and Gan-un communities in (Lot 2) and portable water supply system (62.2% of some communities in Odo Ota LGA,(62.2%) and more than 50% of communities in Ewekoro, community (50.6%) and Ifo community, and (53.2%) in Badagry in Lot 3).

(2) Electricity

The national electricity supply is reported to be irregular and unreliable. Access to electricity supply decreases as one goes from more urbanized area in southern part (Lot 3 area) to suburban area in northern part (Lot 1 area). In Lot 3, around 62% are connected to the national grid. In Lot 2, few communities (Ejio, Likosi, Sagamu and Gan-un) are connected to the national electricity grid. In Lot 1, around 80% of communities have no electricity and only financially capable individuals generate their own electricity through diesel generators. Majority of households that do not have electricity use kerosene for lighting and fuel wood for cooking.

(3) Transportation

Road infrastructure and network appear more established as one goes from Lot 3 to Lot 1. In Lot 3, the project areas is traversed by several roads (Lagos-Abeokuta expressway, Sango-Idi-Iroko Rd, Sokoto Rd, Ado Rd, Coker-Atan Rd). In Lots 1 and 2, communities are connected to the main trunk road (Ifo-Abeokuta express in Lot 2; Papalanto - Shagamu road in Lot 1) by a network of small feeder roads. There are reports that some existing roads are not in good state with pot holes and gallops and absence of drainages. Feeder roads that connect to villages and settlements are mostly unpaved earth roads. Transportation is mainly by motor vehicles and motorcycles.

(4) Health care

Health facilities are more established in Lot 3 compared to Lot 2 and 1. In Lot 3, there are 9 Primary Health Centres (PHC) and 58 hospitals. All of the LGAs have PHCs, except Ifo LGA. In Lot 2, PHC in Likosi and Sagamu General Hospital are the only health facilities that serve the whole communities in the project area. In Lot 1, there are only 2PHCs found in Olorunsogo and Obaeerin communities. All other communities have no clinic or health centre. There are a few private clinics, which were usually too expensive for the masses.

(5) Education

In Lot 3, there over 755 primary schools, 181 secondary schools and 1 tertiary institution in the project area. About 90% of these schools are privately owned. In Lot 2, primary schools cannot be accessed within 1-5km distance, except for few communities (Ejio, Likosi, Ewu Lisa, Ganun, Simawa, Sagamu) and there is no public secondary school. In Lot 1, most communities do not have schools. There are a few primary schools and fewer secondary schools. Overall, communities in the project area only have access to government owned schools because private schools have high tuition fees. Students normally walk long distances to attend school.

(6) Waste Management

Common waste disposal methods in the project area include open dumping and burning of wastes. With regards to sewage, around 60% use toilets in Lot 3. In contrast, only few households use

water toilets in Lots 2 and 1. For communities that do not use toilets, common disposal methods include disposal to pit latrines, bush, or rivers.

7-6-2-5 Indigenous People

For all Lots 1-3, the communities in the study area predominantly belong to the Yoruba race. In Other tribes/nationalities represented are the Eguns, Igbos, Hausa/Fulani, Igedes, and Igala in Lot 2. It should be noted that the World Bank safeguard officer in Nigeria office stated that no indigenous groups are identified in Nigeria including the project area based on the 4 conditions described in WB OP 4.10.

7-6-2-6 Cultural Heritage Sites

There are archaeological and sacred sites, such as traditional burial grounds and shrines in the communities. These sites are highly valued by the people and considered sacred and encroachment in such areas would attract serious resentment from the communities. The people celebrate several traditional festivals, the observance of which is believed to be for the general well-being of the people. The picture of some of identified archaeological and sacred sites in each Lot is presented in. Figure 7-22.

Lot1			
	Sacred place for Shokpono	Tombs by residential homes at Abese	Sacred Esu deity at Ijumo
Lot 2			
	Oluweri Mapojo Shrine- Ibokuru	Ojualale Shrine- Ikija	Lagindigbi Orisa- Olorunsogo
Lot 3			
	Idi Araba ogun shrine	Obatala shrine	Ogun shirne

Source: Godirra, SEEMS, EEMS 2018

Figure 7-22 Identified Archaeological and Sacred Sites in each Lot

7-7 Impact Assessment

The summary of the Impact Assessment is provided in Table 7-25 for construction stage and Table 7-26 for operational stage. Potential environmental impacts during construction are likely to be temporary and localised to the Project Site. Significant negative impacts include land acquisition/resettlement, vegetation clearing along ROW and substation areas, and use of surface water resources.

7-7-1 Planning and Construction Stage

7-7-1-1 Environmental Pollution

(1) Air pollution

The movement of vehicles for the construction will result in PM, SO_2, CO, NOx, CO_2 emissions. Dust will also be generated during land preparation activities, vehicle movements, and material transport. However, impact will be local and limited to construction sites and access. A low number of vehicles and equipment will be required and the construction period will only be short term.

There are residents close to the transmission line and access roads. They may be affected by air emissions and dust during construction and material transport.

Therefore, the impact of air emissions and dust generated during construction is considered to be minor due to the relatively low number of vehicles and equipment required compared to the already existing traffic load on the roads, limited earthworks required on the site, and to the relatively short duration of the construction phase.

(2) Water pollution

The risk of accidental oil spills from heavy machinery is present during the construction phase and could result into both surface water and groundwater contamination. Moreover, groundwater could be contaminated during digging of foundation pits for the towers or substations, particularly near watercourses or the swampy area, such as Badagry area. Unsound waste management practices are likely to have an effect on water quality of surface water sources (e.g. improper waste disposal in surface waters) during heavy rainfall events.

It is noted that local communities use surface water sources. For example, Oke-Oji River and the Ajegunle River for bathing and washing and the Badagry Canal is used for water transport by the Communities). With this receptor sensitivity, coupled with the magnitude of the potential consequences of an uncontrolled spill and storm water runoff, potential impact on water resources is rated as moderate.

(3) Soil Contamination

Soils can be contaminated during the construction phase by accidental oil/fuel spills from heavy machinery at storage yards, work sites, and during material transport. In the event of an accidental spill, the proportion of soil contamination will depend on the magnitude of these

accidental events. Local communities use groundwater as water resource and there are agricultural areas, which will be crossed by the transmission line, thus receptor sensitivity is moderate. Considering the medium magnitude of this activity and medium receptor sensitivity, the impact is moderate.

(4) Bottom Sediment contamination

There would be potential contamination of bottom sediment from inadvertent release of hazardous or contaminating materials (liquid fuel, solvents, lubricants, aluminium oxide paint, etc.) due to the construction of foundation of tower as well as access road, especially within swampy area such as Badagry area. The magnitude of impact on sediment contamination by the activities is considered to be moderate.

(5) Solid Waste

Waste generated from the construction work will include vegetation, metal chips, waste plastic, wood shavings, waste glass and waste oil. Furthermore, household waste generated from worker`s activities will include cans, bottles and garbage. If such waste is inadequately handled, soil, surface water and underground water may be contaminated, and sanitation problems may arise. This may be of concern since there are nearby communities in the area. The impact magnitude on this item is considered to be Minor.

(6) Noise and vibration

During construction phase, construction activities, traffic, as well as the use of construction equipment and machinery are likely to lead to a temporary increase in noise levels, but this will be limited to the surrounding area where noise generating equipment and machinery are used. The construction activities will be undertaken during daytime and will be concentrated and done sequentially so that no area is prone to extensive duration of noise impacts. Considering the construction activity schedule and nature of construction, overall noise impact on nearby sensitive receptors with embedded controls in place will be of Moderate significance, especially in construction areas close to local residents.

7-7-1-2 Natural Environment

(1) Topography, Geology and Soil erosion

During the construction phase, construction of access roads, digging of foundation pits for the towers and removal of vegetation (for foundation purposes) are the activities likely to affect soil structure and quality. Excavation works and removal of vegetation, especially on steep slopes, would render soils unstable and more vulnerable to erosion. Soil quality may also deteriorate as a result of vegetation clearing. Considering that only small areas are exposed and impact is localized and very few ground water sources, duration short, sensitivity of the receptor medium and its magnitude will be Moderate, during the construction period

(2) Groundwater

Groundwater could be contaminated during digging of foundation pits for the towers or

substations as well as accidental spills and improper disposal of waste and wastewater, including potential alkaline wastewater generated due to the cast in piling method, particularly near watercourses or the swampy area. Giving that wastewater generated from the construction area is properly treated, the risk on groundwater contamination is considered to be minor.

Regarding to the impact on aquifer, considering the size and depth of foundation of towers (4 m x 4m x 4m), the impact to aquifer is considered to be limited.

(3) Hydrogeological situation

Sources of impacts to watercourses are removal of vegetation, construction of access roads, vehicle movement along the ROW and construction sites and excavation/piling for tower installations. Vegetation removal in riparian areas can increase soil erosion in erosion prone areas, causing sediment to be deposited into the waterbodies, especially during rain events. However, with a pylon spacing of an average of 300- 400m, no pylons will be installed in any of the riverbeds. The hydrodynamics of these watercourses are not expected to be varied significantly. Therefore, the impact on hydrogeology is considered to be minor.

(4) Protected area

There is no protected area, which is designated by the country, within the project area. The closest protected area is Ilaro Forest Reserve located approximately 3km from the route of transmission line. This Ilaro Forest Reserve is mainly used for teak plantation. There is no IBA (Important Bird Area) located within 10km from the project area. No protected area or other ecologically important area (e.g. IBA) will be likley affected by the project.

(5) Flora, Fauna, Biodiversity and Ecosystem

1) Terrestrial Flora and Fauna

The transmission line will require the vegetation clearance within ROW. The vegetation with height of over 4m will be subject for the vegetation clearance, corresponding to an area of 227.66ha. In addition, it is planned to clear whole vegetation including small shrub within toal10m width of centreline of ROW for the purpose of construction of access road as well as footprint of substations, corresponding to an area of approximately 146.46ha.

Vegetation clearance will lead to a permanent loss of woody species in terrestrial habitat found along the corridor. In addition, habitat fragmentation and degradation will result in modification of species composition in flora and fauna communities and the introduction and risk of spread of invasive species. Table 7-24 presents the different habitats within ROW at each Lot.

Table 7-24 Land Use Type within affected area

Land use type	Affected area (Ha)			
	LOT1	**LOT2**	**LOT3**	Total
Primary Forest	0	0	0	0
Secondary Forest	63	0	56.08	119.08
Swampy area	0	17.02	44.28	61.3
Riparian vegetation	0	32.44	13.94	46.38

Land use type	Affected area (Ha)			
	LOT1	**LOT2**	**LOT3**	Total
Water body	1	0	16.52	17.52
Cultivated area	175	3.96	85.64	264.6
Fallow field	0	309.13	158.57	467.7
Built-up area	0	0	19.43	19.43
Plantations	0	0.9	0	0.9
Others	0	0	2.21	2.21
TOTAL AREA (ha)	239	363.45	396.67	999.12
Vegetation with over 4m height within ROW*	63	50.36	114.3	227.66
Vegetation clearance within affected area	35	62.618	48.842	146.46

Prepared by JICA study team based on data base in Nigeria

Most of the transmission line ROW consists of various type of land use, including secondary forest, marshy area, cultivated area, fallow area or built-up area. Most of the area are already considered to be impacted by human activities. The flora present in the transmission line ROW does not include flora species identified in the IUCN Red List of threatened species, except a riparian tree species (*Mitragyna ledermannii*) which is listed as vulnerable (VU). *Mitragyna ledermannii* is observed in riparian forest in Lot 2 and Lot 3. This species are threatened by overexploitation due to its commercial value as a general-purpose timber.

In addition, there are many species identified which offer provisioning services. Some provide food/fire, other are sources of raw materials and medical service. These species includes *Albizia adianthifolia, Albizia zygia, Abuliton mauritiana, Asystasia vogeliana, Annona senegalensis, Bambusa vulgaris, Ceiba pentandra* and *Eleaise guineensis.* These plant species will need to be cleared, reducing their availability for local communities. However, since the affected area would be limited to the proposed RoW (30m width or 50 m width) and the local species will regenerate again with similar habitat, impact is considered as minor.

Vegetation losses represent habitat loss for local fauna and flora. Even if local fauna consists mostly of common species, terrestrial habitats impacted are susceptible to host some threatened wildlife species. Small fauna species are more susceptible to be impacted by habitat loss. The survey did not identify any fauna species with high conservation status (species with IUCN conservation status is Least Concern (LC) are only identified), however, appropriate management measure is required to be implemented to minimize the impact.

2) Aquatic Flora and Fauna

The construction of the roads, vegetation clearing, and pylon construction may cause wetland and riparian habitat loss. Aquatic macrophytes are represented by the plants in river and vegetation supported by wetlands. Some species observed to occur solely in riparian habitat, include Lasimorpha senegalensis, *Mitragyna ledermannii, Raphia hookeri* and *Nymphaea lotus.* All along the ROW, *Mitragyna ledermannii* is the only Vulnerable (VU) species.

Impact on aquatic and semi-aquatic habitats will be limited in areas where there will be direct construction of pylons and substations [*i.e. tower foundation*]. In addition, aquatic habitat might be indirectly impacted due to the result of construction activity, such as sediment run off, accidental spill. Although, the impacts will be local and the magnitude will be low, areas with aquatic habitat are highly sensitive, the impact significance is moderate. No habitat with important aquatic species is identified within the affected area.

(6) Landscape

Aesthetic impacts during the construction phase will be limited to work zones. Deforestation of the ROW will change the landscape in rural areas, which is very limited since it is mainly crossing agricultural areas. The area already has many existing transmission lines as well as many telecommunication towers. The changes in the landscape is not likely produce significant impacts in most areas.

(7) Global Warming

GHGs will be emitted from material production as well as energy use in construction activity. In addition, there will be carbon loss due to the forest clearance. In addition, deforestation will be required within ROW, which would be contributor to GHG emission. Although the transmission line route was selected to avoid and minimize impact on forest areas as practically reasonable, it is assumed that total 374 ha of vegetation (among of which 227.66ha is vegetation over 4m height and 146.46 is small vegetation) is required to be cleared. Carbon loss from forest clearance is estimated by multiplying aboveground biomass in project area and carbon fraction value to convert dry matter to carbon as a conservative approach (all cleared vegetation is considered as forest type). Carbon loss due to deforestation is calculated as 29,757 t-CO_2 equivalent as a conservative approach. Formula used for the calculation is as below.

$C_{LB} = B_{AG} \times A \times CF \times 44/12$

C_{LB} =Carbon stocks in living biomass in forest (t-CO_2e/y)

A = land area of organic soils, (ha)

CF = carbon fraction of dry matter (t-C/t-dm) (default = 0.5, IPCC GPG-LULUCF)

B_{AG} = aboveground biomass, (t-dm/ha)

Parameter	Description		C	Unit	Source
A	land area of Forest		374	ha	JICA team
B_{AG}	Aboveground biomass	Evergreen Forest	43.4	t-dm/ha	Table 3.2.2, IPCC GPG-LULUCF
CF	Carbon fraction of dry matter	Default value	0.5	t-C/t-dm	IPCC GPG-LULUCF

Carbon loss due to deforestation will **29,757** t-CO_2 equivalent.

29,757 t-CO_2e = 43.4t-dm/ha×374ha×0.5 t-C/t-dm×44/12

During the construction stage, emission from construction activities as well as the deforestation is considered to contribute to the GHG emission at certain level. GHG emission will be short and temporally, but the deforestation impact is permanent. Therefore, the impact on climate change during the construction stage is considered to be moderate.

7-7-1-3 Social Environment

(1) Land acquisition and resettlement

The entire project consists of about 203 km high voltage transmission lines and 6 high voltage substations. The Project will involve acquiring the RoW that is about 50m width for the 330kVA transmission line, and 30m width for the 132 kV transmission line. The total project area is approximately 931 ha consisting of 87 ha of the land for substations and 844 ha of land for transmission lines. Loss of land and crops will have to be compensated before the beginning of the project. These aspects are discussed in detail in Section 7-8.

(2) Employment and Local Economy

There will be no significant adverse impacts on local and regional economy during the line construction. On the other hand, the project could generate some temporary jobs during construction of the transmission lines and substations. In addition, there would be supply chain opportunities for Nigerian companies that can provide goods and services needed by the company.

(3) Utilization of land and local resource

The land use of the affected project area is mostly cultivated area, with secondary forest, marshy area and riparian vegetation. There will be a change in land use caused by land take for ROW, vegetation clearance, and access restriction.

No significant cumulative impact is expected on the land use in relation to the existing transmission lines and there would no area that would be significantly restricted from the development. In addition, those people who were involuntary relocated due to the development of existing transmission line would not become the subject for involuntary relocation for this project.

(4) Social Institution

The project area covers various area with different types of administrative system, i.e., administrative division (State and Local government level etc.) and traditional community and (kingdom and chiefdom) and their roles. There was potential conflict on how to name the project component, such as name of substations.

(5) Social Infrastructure

Influx of outside workers may pose additional pressure on social infrastructure, like medical posts, emergency services, water supply, roads and solid waste management. However, there will be no significant impact on the social infrastructure, except temporarily limiting their access.

To the extent possible, existing road will be used as access roads to the ROW. New access road may only be required at swampy area at north of Badagry substation. Access roads are planned to be restricted to 3m for a total distance of around 16 km across the entire project site. The new access road will be built while minimizing environmental and social impacts by planned countermeasures.

(6) Vulnerable group

Marginalization of vulnerable groups (e.g. women heads of households, disabled or elderly, etc.) might be increased if appropriate engagement is not carried out. The impact and mitigation measures for vulnerable group is discussed further in Section 7-8 and 7-9.

(7) Cultural and historical heritage

There are archaeological and sacred sites, such as traditional burial grounds and shrines in the communities that are located within the ROW. 78 shrines in total (11 shrines in Lot 1, 48 shrines in Lot 2 and 19 shrines in Lot 3) are located in the Project area. These sites are not structures seen in Asian countries (e.g. temples and Japanese shrines), are sometimes stones and trees but highly valued by the people and considered sacred and encroachment in such areas would attract serious resentment from the communities. Through the consultation with communities, it was agreed that those cultural heritages will be relocated. The relocation of these cultural heritages is addressed in the Resettlement Action Plan and this will be implemented with continuous consultations with affected communities.

(8) Water right and fishing wright

The project area will not affect any area which would cause conflict related to fishing right since the transmission line route is located onshore. Transmission towers will not be built in any river, such as Ogun River.

(9) Public health and Sanitation, Infectious diseases

During the construction phase, the influx of foreign workers in local communities can increase the risk of communicable diseases such as the transmission of HIV/AIDS. In addition, construction areas can be a source of pollution and various disturbances to the surrounding environment – such as waste, septage, and wastewater, if not properly managed. However, this impact remains low since the construction period will be temporary and short term.

(10) Working condition

In the construction, occupational accidents may occur particularly among unskilled labour force, ranging between minor incidents such as cuts and major incidents related with working at height, tower collapse and the risk of electrocution.

(11) Hazardous and security risk

Temporary influx of outside workers in the communities may lead to tensions between outside (partly possibly expatriate) labour and local population due to differences in wealth and culture.

(12) Accidents (Construction work and traffic)

Transport of construction materials, machineries, and workforce will increase traffic volume in the villages. This can be a source of accidents.

In addition, occupational accidents may occur particularly among unskilled labour force, ranging between minor incidents such as cuts and major incidents related with working at height, tower collapse and the risk of electrocution.

7-7-2 Operational Stage

7-7-2-1 Environmental Pollution

(1) Air pollution

Sulfur hexafluoride is used in insulation and current interruption applications in transmission network systems and in gas-insulated switch. There is a risk of leakage of SF6 due to the inappropriate maintenance of the facility.

(2) Water pollution

No impact on the surface waters in the area is anticipated from the operation of the transmission line and the substations since the foundation of transmission line or substation will not be installed within surface water such as a river.

(3) Soil Contamination

There is the potential soil contamination caused due to the inappropriate handling of hazardous chemical, such oils at substation site.

(4) Solid waste

Wastes such as waste oil, general waste will be generated from maintenance activities and substations. Wastes will be collected by licensed waste contractor and disposed at licensed waste management facilities.

(5) Noise and vibration

Noise from overhead line due to Corona effect is expected form transmission line and sub stations. Considering the voltage grade of the Project transmission line and that it will only reach its maximum during rainy events, it is highly unlikely that the corona discharge noise will exceed the normal background noise levels in the area.

(6) Soil Erosion

During maintenance, vehicular movement along unpaved access roads, could cause soil compaction that will affect soil organisms. This effect is likely to affect soils in swampy areas of Badagry. Considering that only small areas are exposed and that frequency of routine inspection of the lines is low, the impact will be minor.

(7) Groundwater

It is assumed that the activity during the operation of transmission line and substations will not

interfere with the groundwater, therefore no impact is expected on groundwater.

(8) Hydrogeological situation

It is assumed that the activity during the operation of transmission line and substations will not interfere with the hydrological situation, therefore no impact is expected on hydrological situation

(9) Flora, Fauna, Biodiversity and Ecosystem

During the operational stage, maintenance of the ROW requires regular clearing of vegetation. These vegetation disturbances will lead to a loss of habitats for some terrestrial fauna species. This long-term modification of natural habitats could cause a barrier effect for small fauna, limiting their movements. Nonetheless, these impacts remain limited given the already altered environment caused by human activities.

Power lines are susceptible to affect bat population and birds population during operational phase because the presence of these lines pose risks of collision and electrocution to these species. In general, aquatic birds, including shorebirds, waterfowl, cranes, and herons, are known as the most common victims of power transmission lines (Rioux et al. 2013). Collision risks are higher for species with small binocular fields of vision and large blind areas. In addition, Collisions are thought to be more common during migratory movements (Morkill and Anderson 1991).

Based on the consultation with Nigerian Conservation Fund (NCF), which is an NGO dedicated to nature conservation in Nigeria, it is reported that there is no evidence of any bird strike incident via transmission line around the project area.

(10) Landscape

Most of the project area is already developed and there are several existing transmission lines running around the project area and there are no area within the project site with significant landscape value. However, transmission line will be visible even from far place and would change the landscape in the area at a certain extent.

(11) Global Warming

When there are significant leaks from aging equipment, and gas losses occur during equipment maintenance and servicing, the project will have a significant contribution of the emission of GHG emissions since the Sulfur hexafluoride, which is an extremely potent greenhouse gas, is used in the transmission network systems. However, the improvement of electricity grid would contribute to mitigate the GHG emission as a whole and also identified as the key action plan for climate change Nigeria`s nationally determined contribution (NDC) implementation. Therefore, the climate change impact during the operational stage is considered to be positive. Assuming that the maintenance will be conducted appropriately.

7-7-2-2 Social Environment

(1) Local Economy

There are opportunities for businesses and economic development of the country through

stabilization of electric power supply to the project area and surrounding areas. In addition, construction works may give rise to positive impact on employment and livelihood.

(2) Utilization of land and local resource

Enhancement of local economy as a result of stabilization of electric power may change the land use in the project area and may result in degradation of greenery area in the region. The degree and nature of the impact on land use due to stabilization of electric power would be varied and it is difficult to predict the impact. However, it is expected that stabilization of the electricity would mainly contribute in improving the condition of existing development, assuming that the land development will be controlled and managed by the regulatory authorities.

(3) Social institution

No negative impact is expected during the maintenance period

(4) Social infrastructure

Improved electricity supply in the area will result in the improvement of social services and may reduce cost of providing these services. These include water supply, schools, telecommunications, etc. that would have otherwise relied on captive power generating plants.

(5) Vulnerable group

Stabilization of electric power would improve the local community, resulting in the improvement of poor condition in the project region as whole.

(6) Misdistribution of benefit and damage, local conflict of interest, gender

No negative impact is expected during the maintenance period

(7) Water right and fishing right

No commercial fishing is practiced in the areas for substation and tower constructions. The project area is not likely affect area which would cause conflict with fishing right. Transmission towers will not be built in any river, such as Ogun River.

(8) Working condition

There may be risks to occupational health & safety while conducting regular and emergency maintenance and repair works. The likelihood of these risks is lower compared to construction stage, as there will be less hired labour and fewer activities, compared to the construction phase.

(9) Hazard and security risk

There may be fire risks due to lack of maintenance (e.g. oil leakage from transformers).

(10) Accidents

There are risks of electrocutions, bush fires, line snapping and tower collapse during the operational phase. The ROW shall be maintained to be cleared and residences or other permanent structure shall be out of ROW. To mitigate this risk, appropriate maintenance program shall be developed for transmission line and substation.

7-7-3 Summary of impacts

(1) Planning and Construction Stage

Table 7-25 Impact Assessment Results during Construction Phase

Environmental Item		Scoping Rate		Impact Assessment Result	Potential Receptor	Impact Rating
		Planning Stage	Construction Stage			
Social Environment	1）Land acquisition/Involuntary Resettlement	A-	D	• A total of 526 households (HHs) with 1,989 PAPs in currently occupied residential land will need to be physically relocated. The structure of HHs will need to be demolished or displaced before the construction • 1,873 of unoccupied structures (e.g. uncompleted structure) will need to be demolished or displaced before the construction. • There are total 3,992 of private landowner of agricultural land whose land will be affected by the project. • Total 372 project affected units are identified occupying on affected land without recognised land occupancy in Likosi S/S.	All affected properties and livelihood	A-
	2） Local economy such as employment and livelihood etc.	D	B-/B+	• Creation of temporary jobs for local's residents and Nigerian nationals with skilled trades ; • Supply chain opportunities for Nigerian companies that can provide goods and services needed by the company.	Local residents of affected communities and Nigerian nationals Nigerian companies and local SMEs	B+
	3）Utilization of land and local resources	B-	B-	<u>Land use</u> • The land use of the affected project area is mostly cultivated area, with secondary forest, marshy area and riparian vegetation. Change in land use cause by land take for ROW, vegetation clearance, and access restriction	Land on the RoW and substation	B-
	4） Social institutions such as social infrastructure and local decision-making institutions	B-	B-	• The project area covers various area with different types of administrative system, i.e., administrative division (State and Local government level etc.) and traditional community and (kingdom and chiefdom) and their roles. There was potential conflict on how to name the project component.	Affected administrative institution	B-
	5）Existing social infrastructures and services	B-	B-	• Influx of outside workers may pose additional pressure on social infrastructure, like medical posts, emergency services, water supply, roads and solid waste management.	Affected communities in project area	B-
	6）Vulnerable group such as the poor, women, children, elderly, disabled etc.	C	C	• Increased marginalization of vulnerable groups (e.g.: women heads of households, disabled or elderly, etc.)	Affected vulnerable people	B-
	7）Ethnic minority	D	D	Not applicable		

Environmental Item	Scoping Rate		Impact Assessment Result	Potential Receptor	Impact Rating
	Planning Stage	Construction Stage			
8）Misdistribution of benefit and damage	C	C	• There is potential impact on this item in case that there is not sufficient/transparent information disclosure on project information including land acquisition/resettlement matters, procedures and schedules of construction work such as operation of construction machines and vehicles, and staying of construction workers, and benefits after operation. • The RAP is prepared and disclosed to PAPs.	Affected communities in project area	B-
9）Local conflict of interests	C	C	Same as a above	Affected communities in project area	B-
10）Gender	B-	B-	There are 688 of HHs with woman heads in the project affected area	Households with woman head	B-
11）Children's rights	D	B-	There is no child labour issue on the general construction sector in the project area. Therefore, the no impact is expected on this item	Not applicable	D
12）Cultural and historical, heritage site	C	C	• Shrines are located within the RoW along the transmission line and need to be relocated. • Potential interactions between construction works and cultural festivals due to traffic, noise and/or vibration impacts	Affected communities along the RoW Lot 1: Affected communities in Ifo, Obafemi-Owode and Ewekoro LGAs & their shrines (e.g Ogun. Yemoja and Alale, etc shrines).	B-
13）Water rights, fishing rights and rights of common	D	C	• The project area will not affect area that would cause conflict with fishing right since the transmission line route goes on on-shore area. When crossing the river, no installation of foundation of tower is required in the inside of the River, such as Ogun River.	Not applicable	D
14）Public health and Sanitation	D	B-	• Potential for increase in prevalence of sexually transmitted diseases in local communities	Affected communities in project area	B-
15）Infectious diseases such as HIV/AIDS	D	B-	• Potential for increase in prevalence of sexually transmitted diseases in local communities	Affected communities in project area	B-
16）Working condition (including occupational health)	D	B-	• Occupational accidents may occur particularly among unskilled labour force, ranging between minor incidents such as cuts and major incidents related with working at height, tower collapse and the risk of electrocution.	Construction labour force	B-
17）Hazards/security risks	D	B-	• Temporary influx of outside workers in the communities, risking tensions between outside (partly possibly expatriate) labour and local population, due to differences in wealth and culture.	Workers and affected communities in project area	B-
18）Accidents (Construction work and traffic)	D	B-	• Increased risks of traffic safety incidents on public roads	Affected communities in project area	B-

Environmental Item		Scoping Rate		Impact Assessment Result	Potential Receptor	Impact Rating
		Planning Stage	Construction Stage			
Natural environment	1） Topography and Geology	D	B-	• Change to soil structure (erosion and compaction) as a result of excavation and backfilling and removal of vegetation (at the tower foundation pits and possibly parts of the access roads)	Soil on construction sites, especially vulnerable at following areas; • Lot1: panigangan, Iregun, Inandan, Okuri Site • Lot2: Likosi/Dejuwogbo and Redeem • Lot3: Badagry substation	B-
	2） Soil erosion	D	B-			
	3） Groundwater	D	B-	• Potential groundwater contamination from accidental spills and improper disposal of waste and wastewater, including potential alkaline wastewater generated due to the cast in piling method.	Groundwater resources around the construction sites	B-
	4） Hydrological situation	D	C	• Potential impact on hydrological condition due to the construction activities including the construction of foundation as well as the access road within the swampy area.	Swampy area around the construction sites including Lot 3: Badagry area	B-
	5） Coastal zone	C	C	No coastal zone is affected by the project	Not applicable	D
	6） Protected Area	C	C	No protected area is affected by the project	Not applicable	D
	7）Flora, Fauna, Biodiversity and Ecosystem	D	B-	<u>Terrestrial Flora and Fauna</u> • A vegetation area needs to be cleared (ROW clearance) and constitute the permanent loss of habitat. • Habitat fragmentation and degradation will result in modification of species composition in flora and fauna communities and the introduction and risk of spread of invasive species • Disturbance to habitats, fauna and flora arising from dust, air emissions, light, noise and vibration, traffic, accidental spillages and sediment run-off • Loss of species that offer provisioning Service	Flora and fauna and habitat in the area of influence and within ROW and Substations	B-
				<u>Aquatic</u> • Impact on aquatic and semi-aquatic habitats will be limited in areas where there will be direct construction of pylons and substations • Sediment runoff or accidental discharge possibly impact on aquatic habitat	Local surface water and the inhabiting flora and fauna: Lot 2: Oniyan (Ogun River), Abese (River Wagunu), Asa Elegun, Kori, and Mologun Lot3: Badagry area	

Environmental Item		Scoping Rate		Impact Assessment Result	Potential Receptor	Impact Rating
		Planning Stage	Construction Stage			
	8）Landscape	D	C	• Temporary presence of an active construction site with storage of materials and equipment within the RoW and/or the site for the substation.	People living close to the construction sites.	B-
	9）Local climate	D	D	Not applicable		
	10）Global warming/climate change	D	B-	• GHG emission from construction activities • Reduction in carbon sink ability of the environment due to vegetation clearing.	Local & global climate	B-
Environmental Pollution	1）Air pollution	D	B-	• Localized impairment of air quality by exhaust emissions from vehicles and equipment engines (SO_2, CO, NOx, CO_2, PM) • Elevated dusted levels in nearby communities as a result of dust raised by vehicle movements, wind, and handling of dusty material	Affected communities in project area	B-
	2）Water pollution	D	B-	• Potential surface contamination from accidental spills and improper disposal of waste and wastewater, including potential alkaline wastewater generated due to the cast in piling method.	Surface water and swampy area around the construction sites including • Lot 3: Badagry area	B-
	3）Soil contamination	D	B-	• Potential contamination of soil from inadvertent release of hazardous or contaminating material (liquid fuel, solvents, lubricants, aluminium oxide paint, etc.)	Soil on construction site, especially by construction camp and each tower	B-
	4) Bottom sediment contamination	D	B-	• Potential contamination of bottom sediment from inadvertent release of hazardous or contaminating material (liquid fuel, solvents, lubricants, aluminium oxide paint, etc.) due to the construction of foundation of tower as well as access road within swampy area. • No construction of pillar is expected within the water source, such as in River.	Bottom sediment on construction site, especially within swampy area including • Lot 3: Badagry area	B-
	5）Solid waste	D	B-	• Generation of vegetation waste due to the clearing of vegetation, general waste from work force, scrap metal, concrete waste.	Around the construction site	B-
	6）Noise and vibration	D	B-	• Nuisance noise from construction activists	Affected communities in project area	B-
	7）Ground subsidence	D	D	Not applicable		
	8）Odor	D	D	Not applicable		
	9）Radio disturbance	D	D	Not applicable		
	10) Electromagnetic field	D	D	Not applicable		

(2) Operational Phase

Potential impacts during operation will be limited to vegetation loss from maintaining ROW, wastes from maintenance activities, risks to occupational health and safety, and impacts from accidental events.

Table 7-26 Impact Assessment Results during Operational Phase

Environmental Item		Scoping Rate Operation Stage	Impact Assessment Result	Potential Receptor	Impact Rating
Social Environment	1）Land acquisition/Involuntary Resettlement	D	Not applicable		
	2） Local economy such as employment and livelihood etc.	A+	• There is an opportunities for businesses and economic development of the country through stabilization of electric power supply to the project area and surrounding area. In addition, temporary road for construction work and new road construction for maintenance of transmission line may give rise to positive impact on employment and livelihood.	Local economy	B+
	3）Utilization of land and local resources	C	• Enhancement of local economy as a result of stabilization of electric power may change the land use in the project area. The degree and nature of the impact would be varied and it is difficult to predict the impact. However, stabilization of the electricity would mainly contribute to improve the condition of existing development area and pressure will be on natural environmental area (forest, swampy area) is assumed	Local land resource	B+
	4） Social institutions such as social infrastructure and local decision-making institutions	C	• No negative impact is expected during the maintenance period	Not applicable	D
	5）Existing social infrastructures and services	B+	• Improved electricity supply for the national grid	Social infrastructure	B+
	6）Vulnerable group such as the poor, women, children, elderly, disabled etc.	C	Stabilization of electric power would improve the local community, resulting in the improvement of poor condition in the project region as whole.	Vulnerable people	B+
	7）Ethnic minority	D	Not applicable		
	8）Misdistribution of benefit and damage	C	• No negative impact is expected during operational stage	Not applicable	D
	9）Local conflict of interests	C	• No negative impact is expected during operational stage	Not applicable	D
	10）Gender	C	• No negative impact is expected during operational stage	Not applicable	D
	11）Children’s rights	D	• No negative impact is expected during operational stage	Not applicable	D
	12） Cultural and historical, heritage site	D	• Potential interactions between maintenance works and cultural festivals due to traffic, noise and/or vibration impacts	Affected communities in the RoW	B-

Environmental Item		Scoping Rate / Operation Stage	Impact Assessment Result	Potential Receptor	Impact Rating
	13） Water rights, fishing rights and rights of common	C	The project area will not affect area that would cause conflict with fishing right. When crossing the river, no installation of foundation of tower is required in the inside of the River, such as Ogun River.	Not applicable	D
	14） Public health and Sanitation	D	Not applicable		
	15） Infectious diseases such as HIV/AIDS	D	Not applicable		
	16) Working condition (including occupational health)	B-	• Potentially workers may be exploited and occupational health & safety risks may occur in the regular and emergency maintenance and repair works.	Workers	B-
	17） Hazards/security risks	B-	• There is a risk of a fire from transmission line and tower, and sub-station facilities.		B-
	18） Accidents	B-	• External safety risks of electrocutions, bush fires, line snapping, tower collapses	Affected communities along the Row Maintenance workers	B-
Natural environment	1） Topography and Geology	D	Not applicable		
	2） Soil erosion	B-	• Compaction effects on soil structure due to vehicular movement in swampy areas during line maintenance	Lot 3: Ecologically sensitive areas, particularly around Badagry	B-
	3） Groundwater	C	• No negative impact is expected after the construction.	Not applicable	D
	4） Hydrological situation	C	• No negative impact is expected after the construction.	Not applicable	D
	5） Coastal zone	D	Not applicable		
	6） Protected Area	D	Not applicable		
	7） Flora, Fauna, Biodiversity and Ecosystem	B-	<u>Flora and Fauna</u> • Impact due to alien species • Impact on aquatic species due to maintenance of ROW	Flora and fauna within the RoW	B-
			<u>Avifauna</u> • Habitat of ecological importance for birds in the project area is around marshy area around Badagry. • Based on the consultation with the consultation with The Nigerian Conservation Foundation (NCF), it was evident that there is no fact that the presence of transmission line cause the bird strike around the project area.	Birds in the area of influence	B-
	8） Landscape	C	• Transmission lines and towers will be visible from far and become an extrinsic element in the landscape.	Communities near RoW	B-
	9） Local climate	D	Not applicable		

Environmental Item		Scoping Rate Operation Stage	Impact Assessment Result	Potential Receptor	Impact Rating
	10 ） Global warming/climate change	(D)B-/+	• the improvement of electricity grid would contribute to mitigate the GHG emission as a whole and also identified as the key action plan for climate change Nigeria`s nationally determined contribution (NDC) implementation.	Local and global climate	B+
Environmental Pollution	1） Air pollution	D	• There is a risk of leakage of SF6 due to the inappropriate maintenance of the facility.	Workers on site, communities in project area.	B-
	2） Water pollution	B-	• No impact on the surface water and hydrogeology of the area is anticipated from the operation of the transmission line and the substations	Local surface water sources	D
	3） Soil contamination	(D)C	• Potential contamination of soil from inadvertent release of hazardous or contaminating material.	Areas along RoW and substations	B-
	4) Bottom sediment contamination	D	Not applicable		
	5） Solid waste	(D)B-	• Wastes such as waste oil, general waste will be generated from maintenance activities and substations.	Areas along RoW and substations	B-
	6） Noise and vibration	B-	• Noise from overhead line due to Corona effect is expected form transmission line and sub stations. Considering the voltage grade of the Project transmission line and that it will only reach its maximum during rainy events, it is highly unlikely that the corona discharge noise will exceed the normal background noise levels in the area.	Affected communities along the RoW and substations	B-
	7） Ground subsidence	D	Not applicable		
	8） Odor	D	Not applicable		
	9） Radio disturbance	D	Not applicable		
	10) Electromagnetic field	D	Not applicable		

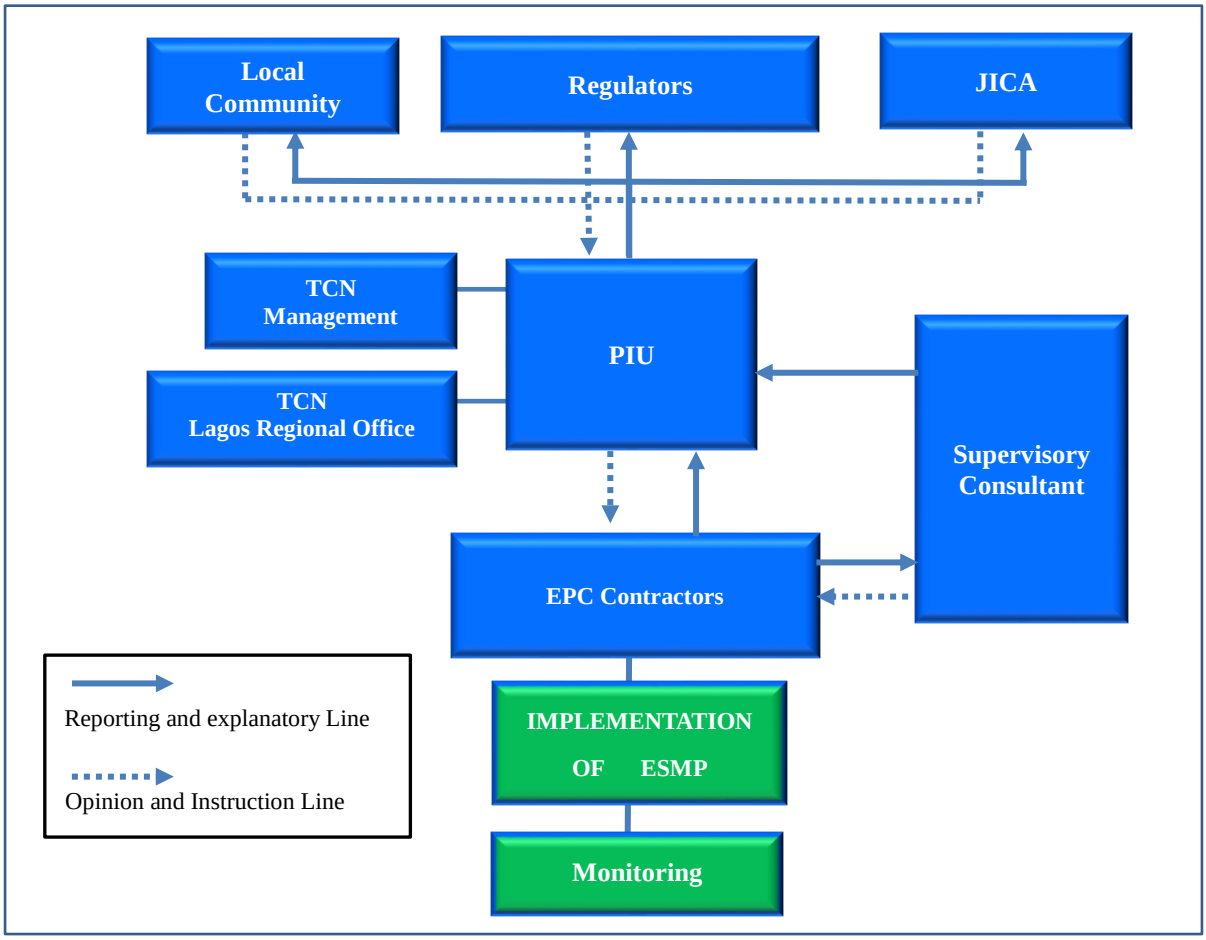
7-7-4 Environmental and Social Management Plan (ESMP)

(1) Implementation System

1) Pre-construction and construction stage

The Environmental and Social Management Plan (ESMP) and monitoring activity will be implemented by EPC Contractor under the supervision of TCN during pre-construction and construction stage. TCN has set up a Project Implementation Unit (PIU), who will be responsible for the project execution during this stage.

In the PIU, Environmental and Social Unit will be a responsible administrator to manage environmental and social aspect including the implementation of ESMP. PIU will coordinate with TCN Management and TCN Lagos Regional Office for the necessary support for the preparation and implementation of ESMP. Figure 7-23 illustrates the structure of the institutional arrangements.



Source: JICA Study Team

Figure 7-23 Implement structure of ESMP for pre and during construction stage

PIU will instruct contractors to ensure that implementation of ESMP will be carried out in appropriate manner. In order to confirm the implementation of environmental management and

to consider further mitigation measures, the contractors shall carry out environmental monitoring according with monitoring plan and prepare and submit the environmental monitoring report to PIU and Supervisory Consultant. It is responsibility of contractors to obtain necessary permit prior or during the construction stage, including the tree-cutting permit and waste generation permit from the State Government. The operator (i.e. contractors in this project) is required to submit a Site Waste Management Plan (SWMP) to Federal Ministry of Environment prior to the commencement of construction works in accordance with National Environmental (Construction Sector) Regulations, 2011. PIU and Supervisory consultant will also monitor that the contractors has obtained these permit appropriately.

PIU shall regularly hold explanation session to local communities, and continuously listen to their grievances, then submit the monitoring report regularly to stakeholders, including Regulators (such as FMEnv and State Governments) and JICA regarding this grievance, as well as the implementation status of environmental management and environmental monitoring.

2) Operational stage

TCN after the transfer of operation will take a responsibility for the implementation of ESMP during operational stage. The HSE coordinator of TCN will be the responsible for environmental and issue, including;

- Communicate with the regulatory authorities and communities.
- Communicate with communities
- Prepare relevant HSE documents,
- Implement the necessary mitigation measures as described in ESMP
- Carry out monitoring and prepare monitoring report
- Conduct internal audit

(2) Management Plan

The Environmental and Social management and mitigation measures, and the responsibilities for implementation are in Table 7-27 and Table 7-28 respectively. The EPC contractors have responsibility for implementing the mitigation actions during construction phase. The budget for implementation shall be included in the EPC contract as part of the overall construction cost.

Additional detailed specific plans shall be developed by EPC Contractor to support the implementation that are included in the standalone ESMP report. This Plan shall be reviewed and approved by PIU prior to the commencement of the construction. The list of the management plans for this project is below.

- Waste Management Plan;
- Vegetation Management Plan

- Local Content Plan
- Traffic Management Plan;
- Occupational Health and Safety Management Plan.

(3) Monitoring Plan

The monitoring plan in Table 7-29 (Construction stage) and Table 7-30 (operational Stage) contain details of responsibilities, parameters to be monitored. Monitoring methods and standards/targets as well as locations and monitoring frequency. EPC Contractors will carry out the monitoring during the construction stage at the cost of EPC contractors under the supervision by PIU. During the operational stage TCN HSE Department will carry out the monitoring.

Monitoring Report will be prepared and submitted as following Monitoring Report	Prepared by	Submitted to
Construction stage		
Monthly Monitoring Report	EPC Contractors	PIU
Quarterly Monitoring Report	PIU	FMEnv, OGMEnv and LAMEnv JICA
Operational stage		
Annual Monitoring Report	TCN-HSE Dept.	FMEnv, OGMEnv and LAMEnv JICA

Source: JICA Study Team

(4) Capacity Building

It is recommended to conduct capacity building for PIU and officers in Lagos office to improve the capacity for the implementation of ESMP, especially on following items.

- Training on the Handling and clean-up of PCB contaminated materials,
- Monitoring & Modelling,
- Environmental Audit,
- Basic Sampling Techniques,

Table 7-27 Environmental and Social Management and Mitigation Measure (Construction Phase)

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
Air quality	Localized impairment of air quality by exhaust emissions from vehicles and equipment engines (SO_2, CO, NOx, CO_2, PM)	Affected communities in area of influence	×	×	×	▪ Maintain and operate all vehicles and equipment engines in accordance with manufacturers recommendations ▪ Stationary generators to be located to facilitate dispersion	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
	Elevated dust levels due to vehicle movements, wind, and handling of dusty material	Affected communities in area of influence	×	×	×	▪ Cover properly loose materials and keep top layers moist ▪ Regular cleaning of equipment, drains and roads to avoid excessive buildup of dirt ▪ Spray surfaces prior to excavation ▪ Use covered trucks for the transportation of materials that release dust emissions ▪ Speed limits on-site of 15 km/h on unhardened roads and surfaces	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
Climate change	GHG emissions that could add to climate change effects	Global warming	×	×	×	▪ Maintain and operate all vehicles and equipment engines in accordance with manufacturers specifications, location of stationary generators to facilitate dispersion, restriction of vegetation clearing to only the required area	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
Noise, vibration	Nuisance noise from construction activities	Affected communities in area of influence Construction workers	×	×	×	▪ Select 'low noise and vibration' equipment or methods of work ▪ To minimize vibration of vehicles and trucks, access road will be graded ▪ Heavy materials will be transported only during daytime ▪ Use temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources). ▪ Maintain and operate all vehicles and equipment's in accordance with manufacturers recommendations ▪ Ensure periods of respite are provided in the case of unavoidable maximum noise level events	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
						Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the responsible person. ▪ Noisy activities (activities that can be heard in nearby communities) restricted to day-time working hours ▪ Provide appropriate PPE to construction workers and visitors			
Soils, geology and land-use	Change to soil structure (erosion and compaction) as a result of excavation and backfilling and removal of vegetation	Soil on construction site	×	×	×	▪ Construction of foundations to be undertaken in the dry period as reasonable as possible. ▪ Protect excavated soil materials from erosion (e.g. ▪ Ensure that the land is physically restored (include revegetation where possible) before leaving to next tower location and before the next rainy season. ▪ Use of existing road for transport of man and material to the extent possible.	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
	Potential contamination of soil from inadvertent release of hazardous or contaminating material (liquid fuel, solvents, lubricants, aluminium oxide paint, etc.)	Soil on construction site, especially by each tower	×	×	×	▪ Implement effective site drainage on the construction yard to allow for the directed flow of surface water off site. This shall include cut-off drains to divert surface runoff from exposed soils or construction areas. ▪ Install oil/water separators and silt traps before effluent, leaves the site. ▪ Minimise bare ground and stockpiles to avoid silt runoff. ▪ Bunding of areas where hazardous substances are stored (e.g. fuel, waste areas). Regular checking and maintenance of all plant and equipment to minimize the risk of fuel or lubricant leakages. ▪ Training of relevant staff in safe storage and handling practices, and rapid spill response and clean-up techniques. ▪ Set-up and apply procedure regarding dealing	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
							EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
						with contaminated soils. ▪ Development and implementation of a Waste Management Plan to ensure that waste is disposed of correctly. ▪ Spread sheet underneath the tower structure prior to start any painting activity.			
Water resources	Potential surface and groundwater contamination from accidental spills and improper disposal of waste and wastewater	Local groundwater-well and bore hole	×	×	×	▪ See above measures to mitigate 'Potential contamination of soil' impact	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
	Potential impact on hydrological condition due to the construction activities including the construction of foundation as well as the access road within the swampy area.	Rivers and streams crossed	×		×	▪ Natural flow of a River shall not be blocked ▪ Based on an appropriate project design, avoid erecting towers within wetlands. If unavoidable, select the most optimized site for each tower considering human uses and areas of higher ecological integrity through visual inspection of vegetation habitat in wetland. ▪ Prohibit construction of permanent access roads along river banks, in swamps or in areas where soils are saturated ▪ Consider and Select the engineering design for construction work, including construction of foundation as well as access road, which would minimize the impact on hydrological condition. ▪ Cement will be mixed outside swampy area, river and stream and will be brought at construction site to avoid wastewater discharge to water resources ▪ In case that impact to water sources is unavoidable, drinking water will be provided during the period when impact is expected (i.e. construction period)	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
Terrestrial ecology	Vegetation loss and disturbance to habitats, fauna and flora by	Flora and fauna and habitat in the area of influence	×	×	×	▪ Minimize the construction of new access roads. Promote the use of existing access roads for machinery and vehicle movements.	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
	construction activities	Flora and fauna and habitat in the area of influence				▪ Promote the use of existing roads for transporting material and tower parts to the construction sites in order to reduce the project's footprint and minimize the need for new access roads ▪ Herbicides should not be used for vegetation clearing ▪ Clearing should be minimised and restricted to the area required for construction purposes only and disturbance to adjacent vegetation communities and/or remnant trees within the corridor should be strictly controlled.			LAMENV
						▪ Revegetation will be carried out, as necessary. Revegetation will use species locally native to the site. The site of revegetation shall be identified and provided by the relevant government agency.	TCN 100,000USD	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
	Vegetation clearing will cause habitat disturbances that could create suitable conditions for invasive species to spread	Flora and fauna and habitat in the area of influence	×		×	▪ Implementation of the invasive species management plan as part of the Vegetation Management Plan.	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
	Potential avian collision	Birds in the area of influence	×	×	×	▪ Consult with relevant agency (e.g. local NGO) to seek any advice for mitigation measures to be considered for the design and construction of the transmission line. ▪ "Bird diverters" on the top (ground) wire to make the lines more visible to birds shall be installed, particular in the swampy areas of Badagry ▪ Complete tree and/or brush cutting prior to or after the core nesting season	EPC Contractor	PIU Supervision Consultant	FMENV, OGMENV and LAMENV
	Loss of species that offer Provisioning Services	Local communities who rely on provisioning service, especially around swampy area.	×		×	▪ Site clearance activities to be restricted to the minimum required area	EPC Contractor	PIU Supervision Consultant	FMENV, OGMENV and LAMENV
						▪ Provide a training/education for the sustainable livelihood practice to local communities, as	NGO, Expert,	TCN/PIU	FMENV, OGMENV

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
						necessary, with cooperation of relevant agency.	Academia 50,000USD		and LAMENV
Aquatic ecology	Loss/disturbance of aquatic species	Rivers/streams/Swampy area crossed	×		×	▪ Natural flow of a River shall not be blocked ▪ Conduct activities during the dry period to minimize disturbance of sensitive shoreline and wetland areas ▪ Adjust pylon siting to span rivers and wetlands areas, or limit equipment access in wetlands, wherever possible. ▪ Perform all vegetation clearing work manually along streams/rivers and swamps. ▪ Avoid vegetation clearing along stream shores and on steep slopes. ▪ Based on an appropriate project design, avoid erecting towers within wetlands. If unavoidable, select the most optimized site for each tower considering human uses and areas of higher ecological integrity. ▪ Prohibit construction of permanent access roads along river banks, in swamps or in areas where soils are saturated ▪ Dismantle temporary access roads built for construction phase in swamps and wetland areas. Perform this dismantlement during the dry season and dispose of materials outside wetland areas; ▪ Avoid equipment and vehicle movements in rivers, floodplains and wetland areas. If unavoidable, reduce access to a minimum length in wetlands and floodplains and select the most optimized site for the access considering human uses and areas of higher ecological integrity	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
Waste management	Potential contamination of soil from inadvertent release of hazardous or	Surrounding environment and communities	×	×	×	▪ Prepare and implement the waste management plan	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
	contaminating material (liquid fuel, solvents, lubricants, aluminium oxide paint, etc.)								
Visual amenities	Temporary presence of an active construction site with storage of materials and equipment within the ROW and/or the site for the substation.	People living close to the construction sites.	×	×	×	▪ Maintain construction site in orderly condition and do not distribute material over many sites before usage.	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
Land planning and use	Change in land use cause by land take for towers, vegetation clearance, and access restriction	Land on the RoW	×		×	▪ Site clearance activities to be restricted to the minimum required area. ▪ Provision of predefined route, barriers or boundary markings to prevent incursion of machinery and workers into neighbouring areas ▪ See below measures under 'Resettlement'	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
Stakeholder and Community expectation/ relations Management	Community concerns linked to impacts associated with construction phase issues (like air and dust emissions, traffic, influx and community safety/security, noise/vibration, etc.) and adverse impact/inconveniencies resulting from it.	Affected communities in area of influence	×	×	×	▪ Follow mitigation for construction phase air quality, water quality, noise and traffic. ▪ Inform communities about details of construction activities (e.g., employment opportunities, schedule, timing of noise activities, traffic including movements of oversized loads) by billboards, posters and community meeting ▪ Set-up and effectively monitor construction grievance redress mechanism ▪ Engage communities in the monitoring activities to enhance transparency and involvement.	PIU RIC	TCN/PIU	FMENV, OGMENV and LAMENV
Community Health, Safety and Security	Increased risks of traffic safety incidents on public roads	People living close to access roads and road users	×	×	×	▪ Implement a traffic management plan including design of access point, signalization, speed limits, training of drivers, use of traffic guards, procedures for transport of oversized loads (e.g., engines), maintain log of traffic related incidents, sensitization of road users and people living close to the construction site.	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
	Risk of erosion into creeks, which are used as source of domestic water for the communities	People who use the river water as source of domestic water	×	×	×	▪ Follow mitigation for construction phase water quality			
	Temporary influx of outside workers in the communities, risking tensions between outside (partly possibly expatriate) labour and local population, due to differences in wealth and culture.	Affected communities in area of influence	×	×	×	▪ Priority of employment shall be given to locals. ▪ A Local Content Plan should be prepared to facilitate involvement of local labour. ▪ Develop a code of behaviours for workers. All workers to receive training on community relations and code of behaviour. ▪ Periodic refreshing as needed based on community liaison/grievance mechanism feedback.	EPC Contractor	TCN/PIU Supervision Consultant	FMENV, OGMENV and LAMENV
	Potential for increase in prevalence of sexually transmitted diseases in local communities and other diseases	Affected communities in area of influence	×	×	×	▪ Do sensitization and awareness to all EPC workers regarding sexually transmitted diseases ▪ Provide Sexually transmitted disease awareness material to all EPC workers and host communities	EPC Contractor	TCN/PIU Supervision Consultant	National Agency for Control of AIDS (NACA)
Resettlement	Land acquisition	Affected properties and livelihood	×	×	×	▪ Follow principles and procedures of Resettlement Action Plan (RAP), including way forward, micro-plans per affected household.	PIU RIC	TCN/PIU	Witness NGO
Labour and working conditions	Exploitation of workers	Labour force	×	×	×	▪ Develop transparent human resources policies and procedures for recruitment process, working conditions and Terms of Employment wages, worker-employer relations, Grievance Redress Mechanism, non-discrimination, monitoring, roles and responsibilities following Nigerian Labour Law and ILO conventions. ▪ Provide reasonable, and if applicable negotiated, working terms and conditions. ▪ Establish worker's grievance redress mechanism, so that potential conflicts can be dealt with in an early and proper way. ▪ No use of child labour (workers under age 18) or forced labour	EPC Contractor	TCN/PIU Supervision Consultant	TCN relevant department

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
						▪ Provisions to ensure compliance with labour standards by supply chain and subcontracts, including training if required. ▪ Provide proper work place facilities for water/sanitation/rest rooms etc. ▪ A worker's grievance redress mechanism will be in place.			
	Activities and staff at site may create security risk (e.g. infiltration of criminal)	Workers and local communities	×	×	×	▪ Liaise with community security structure ▪ Provision of security during the construction work ▪ Make security plan and emergency response and contacts with security forces. Coordinate if applicable with TCN security measures for their site. ▪ Provide the identification tag for all workers and visitors.	EPC Contractor	PIU Supervision Consultant Nigerian Security and Civil Defence (NSCDC)	Nigerian Police Force
	Creation of tension between security personnel and local communities	Local communities	×	×	×	▪ Provide the training and awareness to security personnel ▪ Establish the communication with local communities and awareness	EPC Contractor	TCN/PIU Supervision Consultant Nigerian Security and Civil Defence (NSCDC)	Nigerian Police Force
	Risk of health & safety incidents amongst labour force, including minor incident's such as cuts and major incidents such as loss of life	Construction labour force	×	×	×	▪ Develop project specific health and safety procedure, including provisions for training and certifications to be followed by all workers including subcontractors.	EPC Contractor	TCN/PIU	TCN HSE department
Employment and economy	Creation of temporary jobs for locals residents and Nigerian nationals with skilled trades	Local residents of affected communities and Nigerian nationals	×	×	×	▪ Prepare a local content plan to enhance ability to locate local hires and Nigerian nationals. Include provisions for hiring women and youth and for "equal pay for work of equal value". ▪ A local hiring office (or offices) to be set-up for use by all contractors to advertise positions,	EPC Contractor	TCN/PIU	TCN

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub-station	Access and maintenance road		Mitigation Action/Cost	Supervision	External Monitoring or Reported to (when necessary)
						receive applications, and provide guidance to applicants.			
	Supply chain opportunities for Nigerian companies that can provide goods and services needed by the company	Nigerian companies and local shops	×	×	×	▪ Prepare a local content plan to facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. Include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities. In addition, provisions for hiring women and youth and for "equal pay for work of equal value" will be considered when needed. ▪	EPC Contractor	TCN/PIU	TCN
Infrastructure	Influx of outside workers may pose additional pressure on social infrastructure, like medical posts, emergency services, water supply, solid waste management	Affected communities in area of influence	×	×	×	▪ Coordinate with medical posts and emergency services to prepare for water supply and waste management. ▪ Install proper and independent facilities at construction site for water supply, sanitation, solid and liquid waste, so that pressure on community infrastructure is limited.	EPC Contractor	TCN/PIU	TCN
Cultural heritage	Shrines are located within the RoW along the transmission line and need to be relocated.	Affected cultural heritage	×		×	▪ The shrines will be relocated to outside the RoW, where the local communities will continue to use them. The exact location and ceremony for relocation will be managed by the communities ▪ During road construction, shrines will be avoided	RIC	PIU	Witness NGO
	Potential interactions between construction works and cultural festivals due to traffic, noise and/or vibration impacts	Affected communities along the RoW and substation	×	×	×	▪ Consult with local communities on festivals and potentials for interaction with construction works. If required cease works on the specific dates.	RIC	PIU	Witness NGO

Table 7-28 Environmental and Social Management and Mitigation Measure (Operations Phase)

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub station	Access and maintenance road		Mitigation Action	Supervision	External Monitoring or Reported to (when necessary
Air pollution / Climate Change:	Accidental significant leaks of SF6 from aging equipment, and gas losses occur during equipment maintenance and servicing	Air quality	×	×		▪ Impact of SF6 shall be mitigated through the improvements in the leak rate of new equipment, refurbishing older equipment, and the use of more efficient operation and maintenance techniques.	TCN	TCN HSE Dept.	FMENV,
Noise, vibration & EMF	Noise & EMF from overhead line due to Corona effect and EMF effect	Affected communities along the RoW and Substations	×	×		▪ Avoiding over loading Transmission Lines ▪ Keep residences and other permanent structures such as schools, shops or offices out of the RoW to minimize exposure to Noise and EMFs. ▪ Noise and vibration sources will be installed center portion of Substation site as reasonable as practicable, avoiding site boundaries.	TCN	TCN HSE Dept.	FMENV,
Soils, geology and land-use	Potential contamination of soil from inadvertent release of hazardous or contaminating material (liquid fuel, solvents, lubricants, aluminium oxide paint, etc.)	Soil in substations and maintenance road	×	×	×	▪ Proper management of hazardous substances storage space (e.g. fuel, waste areas). Regular checking and maintenance of all plant and equipment to minimize the risk of fuel or lubricant leakages. ▪ Training of relevant staff in safe storage and handling practices, and rapid spill response and clean-up techniques. ▪ Development and implementation of a Waste Management Plan to ensure that waste is disposed of correctly.	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Terrestrial ecology	Impairments of natural habitats and associated flora communities	Flora and fauna around the ROW	×		×	▪ Maintain all maintenance work inside the footprint of RoW to reduce encroachment on natural habitats ▪ Clearly mark the extent of vegetation control in the ROW. Identify and mark the vegetation to be preserved along sections of the ROW ▪ Undertake selective control of the vegetation in order to keep low scrubby and herbaceous species that do not represent a risk for the powerline (species that cannot grow more than 4m in height) ▪ Use mechanical method for vegetation control	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub station	Access and maintenance road		Mitigation Action	Supervision	External Monitoring or Reported to (when necessary
						inside the ROW. ▪ Forbid use of chemical pesticides to control vegetation in the ROW			
		Bats and Birds in the area of influence	×		×	▪ Schedule RoW maintenance activities to avoid breeding and nesting seasons of bird species with special status ▪ Develop and implement a mortality monitoring program, as necessary, with cooperation of local NGO.	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
	Potential Impact due to introduction of alien species	Flora and fauna around the ROW	×		×	▪ Develop and implement vegetation management plan to control the introduction of alien species ▪ A monitoring program of invasive species propagation within the right-of-way should be instituted and, if present, shall be removed.	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
	Loss of species that offer Provisioning Services	Local communities who rely on provisioning service, especially around swampy area.	×		×	▪ Undertake monitoring of natural resources exploitation and implement a sensitization program in order to educate and increase local communities' awareness on natural resources protection	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Aquatic ecology	Degradation of aquatic species	River crossings along the ROW	×		×	▪ Wastes shall not be disposed along water courses or sensitive areas. ▪ Existing access roads shall be utilized during maintenance of the ROW. ▪ Avoid equipment and vehicle movements in rivers, floodplains and wetland areas as reasonable as practicable. ▪ Forbid use of chemical pesticides to control vegetation in the ROW	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Waste management	Wastes such as waste oil, general waste will be generated from maintenance activities and substations	Surrounding environment and communities	×	×	×	▪ Prepare and implement the waste management plan	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Visual	Transmission lines and	Communities	×		×	▪ Vegetation will be felled, but if possible smaller trees	TCN	TCN HSE	FMENV,

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub station	Access and maintenance road		Mitigation Action	Supervision	External Monitoring or Reported to (when necessary
amenities	towers will be visible from far and become an extrinsic element in the landscape.	around the project area				can be kept. .		Dept.	OGMENV and LAMENV
Stakeholder and Community expectation/ relations Management	Management of Community concerns linked to impacts associated with operation phase issues	Affected communities in the area of influence	×	×	×	▪ Set-up, manage and manage grievance redress mechanism ▪ Engage communities in the monitoring activities to enhance transparency and involvement. ▪ Prepare and implement Stakeholder Engagement Plan(SEP). ▪ Enhance ongoing consultations with local communities by TCN to create continuous dialogue, trust and planning of community development activities according to SEP. ▪ Explain effects of electromagnetic fields to communities to limit concerns. Keep fields within limits of International Commission on Non-Ionizing Radiation Protection (ICNIRP).	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Community Health, Safety and Security	External safety risks of electrocutions, bush fires, line snapping, tower collapses	Affected communities along the RoW and Substations	×	×	×	▪ Develop an emergency response plan following TCN and international best practice including provisions for prevention and response to electrocution, fires, repair of snapped lines and collapsed towers, roles and responsibilities. Coordinate with emergency services of LGAs ▪ Keep residences and other permanent structures such as schools, shops or offices out of the wayleave to minimize exposure to EMFs ▪ Communicate to communities in RoW the safety risks of the transmission lines and provide response measures. Put signboards on towers about electrocution risk. ▪ Implement the anti-climbing device for on the Transmission Tower.	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Labour and working conditions	Exploitation of workers	Labour force for maintenance work	×	×	×	▪ Develop transparent human resources policies and procedures for recruitment process, working conditions and Terms of Employment wages,	TCN	TCN HSE Dept.	FMENV, OGMENV and

Indicator	Potential impact	Receptor	Project Component			Mitigation or enhancement measures	Responsibilities		
			Transmission Line	Sub station	Access and maintenance road		Mitigation Action	Supervision	External Monitoring or Reported to (when necessary
						worker-employer relations, Grievance Redress Mechanism, non-discrimination, monitoring, roles and responsibilities following Nigerian Labour Law and ILO conventions. ▪ Provide reasonable, and if applicable negotiated, working terms and conditions. ▪ Establish worker's grievance mechanism, so that potential conflicts can be dealt with in an early and proper way. ▪ No use of child labour (workers under age 18) or forced labour. ▪ Provisions to ensure compliance with labour standards by supply chain and subcontracts, including training if required. ▪ A worker's grievance mechanism will be in place.			LAMENV
	Occupational H&S risks in operation and maintenance	Labour force	×	×	×	▪ TCN should follow their Occupational HSE plan following Nigerian and international requirements: train staff, monitor and keep record. Special focus on slip-trip, fall from height and electrocution in maintenance and repair works, emergency prevention and management. Use personal protection equipment. ▪ Have medical emergency equipment at hand.	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Employment and Economy	Improved electricity supply for the national grid, creating opportunities for businesses and economic development in the country.	National level Nigeria	×	×	×	▪ Regular maintenance of the project to ensure reliable production of power	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV
Cultural heritage	Potential interactions between maintenance works and cultural festivals due to traffic, noise and/or vibration impacts	Affected communities in the RoW	×		×	▪ Consult with local communities on festivals and potentials for interaction with maintenance works. I f required cease works on the specific dates.	TCN	TCN HSE Dept.	FMENV, OGMENV and LAMENV

Table 7-29 Environmental and Social Monitoring Plan (Construction Phase)

Component	Parameters to be Monitored	Method	Standards/Targets	Location	Frequency	Responsibility		Cost Estimates (NGN)
						Implementation	Supervision	
Air quality	Dust	Visual inspection of construction sites, access roads; verification of equipment and machinery	Avoid significant degradation of baseline conditions.	Along ROW, access roads and work areas	Daily	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee
	SO_2, NOx, CO, PM10, PM2.5, TSP	Ambient air quality measurements	IFC and National ambient air quality standards (FMENV)	Around substations (6)	Quarterly	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee (8,000,000/ year)
Noise	Noise Levels	Noise level measurements	IFC and FMENV noise standards	Along ROW and around substations (20)	Quarterly	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee (19,200,000/ year)
Soils integrity	Visual signs of contamination Status of drainages, bundwalls, stockpiles, etc.	Visual inspection of construction sites and access roads	Avoid the use of erosive processes or control them Reduce soil compaction Avoid soil profile structure destruction Avoid any soil contaminations	Along ROW, access roads and work areas	daily	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee
	Soil biological, physical and chemical properties	Sampling and analyses of soils	Compare with Baseline condition	Around substations (6)	Once the construction completed	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee (10,800,000/year)
Water quality	Water physico-chemical and microbiological - pH, temperature, TSS, turbidity, phosphorus, metals, sulphate, BOD, COD, coliform, fungi, etc.	Analysis of surface and ground water samples Visual detection of pollution signs (presence of oil, waste, etc.)	Avoid significant degradation of baseline conditions WHO and FMENV water quality standards	Groundwater: Around substations (max 8) Surface water: Rivers and Surface water (50)	Twice a year	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee (50,400,000/year)
Aquatic ecology	Degradation of aquatic ecology	Visual inspection of rivers and streams	Avoid equipment and vehicle movements in rivers and swamps.	The construction area around rivers and swamps	Daily	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee
Vegetation integrity and Fauna protection	Vegetation cover Pictorial comparison (before and after)	Visual inspection of construction sites Visual inspection of vegetation habitat in wetland	Avoid significant degradation outside the ROW. Protection of flora species with conservation status	ROW	Once during vegetation removal in the ROW	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee

Component	Parameters to be Monitored	Method	Standards/Targets	Location	Frequency	Responsibility		Cost Estimates (NGN)
						Implementation	Supervision	
Waste management	Type and amount of waste generated Disposal of wastes	Keep the record	All waste are appropriately treated and disposed according with applicable regulation	ROE and substation sites	Daily	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee
Visual amenities Land planning and use	Orderliness and cleanliness of sites disturbance outside ROW	Visual inspection of construction sites and access roads	Good housekeeping practice Site clearance activities to be restricted to the minimum required area. Provision of predefined route, barriers or boundary markings to prevent incursion of machinery and workers into neighbouring areas	ROW and substation sites	Daily	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee
Stakeholder relations management	No of complaints/ concerns received including vibration Status of grievance resolutions	Interview neighbouring communities Stakeholder meetings Inspection of complaints/grievance log book	As per Resettlement Action Plan	Neighbouring communities	Continuous	EPC Contractor	TCN/PIU	Included in RAP cost
Health, Safety and Security	Incidences	Inspection and review of incidence log	ILO requirements and Factories Act minimum labour standards	All work sites and base camps	Daily	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee
Employment and economy	Proportion of employees from local community materials procured from local community made in Nigeria materials used Proportion of hired women and youth in the employment by the project will be included when needed	Inspect employee records Random interview with workers on site Inspection of procurement records Interview with suppliers and vendors	Semi-skilled and non-skilled labour employed from local community Materials available in the communities are used Made in Nigeria products are utilized, except where not available	Work sites and base camps	Daily	EPC Contractor	TCN/PIU	Included in EPC Contractor Fee

Table 7-30 Environmental and Social Monitoring Plan (Operational Phase)

Component	Parameters to be Monitored	Method	Standards/Targets	Location	Frequency	Responsibility (Implementation and Supervision)	Cost Estimates (NGN)
Air quality	SO_2, NOx, CO, VOC, PM, SF_6	Visual inspection of substations and access roads; verification of equipment and machinery records Ambient air quality measurements	Avoid significant degradation of baseline conditions. WHO and National ambient air quality standards (FMENV)	Substations (6)	The 1st year and every 3 years	TCN-HSE Dept.	1,500,000/3 years
Noise and EMF	Noise Levels, EMF Levels	Noise level measurements EMF measurement	Avoid significant degradation of baseline conditions. WHO and FMENV noise standards ICNIRP EMF exposure limits	Along ROW and around substations (20)	The 1st year and every 3 years	TCN-HSE Dept.	6,000,000/3 years
Soils integrity	Visual signs of contamination Status of drainages, bundwalls, stockpiles, etc	Visual inspection of substation sites	Avoid the use of erosive processes or control them Reduce soil compaction Avoid soil profile structure destruction Avoid any soil contaminations	Substations (6)	The 1st year and every 3 years	TCN-HSE Dept.	Included in TCN`s administrative cost
	Soil biological, physical and chemical properties	Sampling and analyses of soils	Compare with baseline condition	3 locations / substations (6) Total 18	The 1st year and every 3 years	TCN-HSE Dept.	6,500,000/3 years
Terrestrial ecology	Introduction of Alien species	Visual inspection of alien species within and around the ROW	Avoid the introduction of alien species	Around ROW	The 1st year and every 3 years	TCN-HSE Dept.	Included in TCN`s administrative cost
	Avian collision	Visual inspection of incident of bird strike around the transmission line	Avoid avian collision Once bird strikes are identified during the monitoring, TCN will take mitigation measures (e.g. colouring or light installations to improve noticeability)	Around ROW	Every 1 year for fist 3 Year	TCN-HSE Dept.	Included in TCN`s administrative cost
	Natural resource exploitation	Visual inspection and interview with communities	Increase awareness on natural resource protection	Around ROW	Continuous	TCN-HSE Dept.	Included in TCN`s administrative cost
Vegetation integrity and Fauna protection	Vegetation cover Pictorial comparison (before and after the maintenance)	Visual inspection of areas around substations and along the ROW	Avoid significant degradation outside the ROW and undeveloped areas. Protection of flora species with conservation status Avoid habitat loss and disturbances for local fauna	ROW	At the time of ROW maintenance	TCN-HSE Dept.	Included in TCN`s administrative cost
Waste management	Type and amount of waste generated Disposal of wastes	Keep the record	All waste are appropriately treated and disposed according with applicable regulation	ROW and substations	ROW At the time of ROW	TCN-HSE Dept.	Included in TCN`s administrative cost

Component	Parameters to be Monitored	Method	Standards/Targets	Location	Frequency	Responsibility (Implementation and Supervision)	Cost Estimates (NGN)
					maintenance Substations Regularly		
Visual amenities Land planning and use	Orderliness and cleanliness of sites disturbance outside acquired sites	Visual inspection of areas around substations and along the ROW	Good housekeeping practice Site clearance activities to be restricted to the minimum required area. Provision of predefined route, barriers or boundary markings to prevent incursion of machinery and workers into neighbouring areas	ROW	Daily	TCN-HSE Dept.	Included in TCN`s administrative cost
Stakeholder relations Management	No of complaints/ concerns received Status of grievance resolutions	Interview neighbouring communities Stakeholder meetings Inspection of complaints/grievance log book	Grievances are resolved effectively Complaints and issues are addressed timely	Neighbouring communities	The 1st year and every 3 years	TCN-HSE Dept.	Included in TCN`s administrative cost
Health, Safety and Security	Incidences	Inspection and review of incidence log	ILO requirements and Factories Act minimum labour standards	Transmission Tower and Substations	Daily	TCN-HSE Dept.	Included in TCN`s administrative cost
Employment and economy	Proportion of employees from local community materials procured from local community made in Nigeria materials used Proportion of hired women and youth in the employment by the project will be included when needed	Inspect employee records Random interview with workers Inspection of procurement records Interview with suppliers and vendors	Semi-skilled and non-skilled labour employed from local community if required Made in Nigeria products are utilized, except where not available	Transmission and Substations	As required	TCN-HSE Dept.	Included in TCN`s administrative cost

7-8 Land Acquisition and Resettlement

7-8-1 Extent of Potential Impact

The entire project consists of about 203 km high voltage transmission lines and 6 high voltage substations. The Project will involve acquiring the Right of Way (RoW) which is about 50m width for the 330 kV transmission line, and 30m width for the 132 kV transmission line. Land will also be required for temporary access road and campsites/logistic bases, however they are planned to be rent by EPC contractors. The total project area is approximately 931 ha consisting of 87ha of the land for substations and 844 ha of land for transmission lines.

7-8-2 Policy of Land Acquisition and Compensation

Land required for the construction, operation and maintenance of the project should be acquired and allocated to the project by the Government.

The legal framework provides the basis for three key elements of the Resettlement Action Plan (RAP). They include:

- Establishing rates for compensation;
- Determining eligibility for compensation and resettlement assistance, including development initiatives aimed at improving the social and economic well-being of affected populations;
- Establishing mechanisms to resolve grievances among affected populations related to compensation and eligibility.

Land ownership (Right of Occupancy or Customary Right of Occupancy) in Nigeria is subject to a range of diverse cultural and traditional practices and customs. Land can be classified according to the following broad categories:

Communal land: consists mostly of under-developed forests and is owned by the community collectively and not a particular individual. Those individuals who clear it first claim ownership.

Clan or family land: is owned by clans and families, as the name suggests.

Institutional land: land allocated to traditional institutions such as traditional authorities and chiefs.

Individual land: land acquired by an individual, which may be inherited by the immediate family, depending on customary practices

It is noted that the land which fall into the categories of *Clan or family land*, *Institutional land* and *Individual land* is considered as private land.

The legal framework for land acquisition and resettlement in Nigeria is the Land Use Act (LUA) of 1978, reviewed under Cap 202, 1990 and now Cap L5, Laws of the Federal Republic of Nigeria (LFN), 2004.

The relevant World Bank policy (OP) 4.12, which addresses land acquisition and resettlement, was

adopted in 2001.

The differences between the Land Use Act and the Bank's OP 4.12/JICA Guidelines mostly concern rehabilitation measures, which are neither proscribed, underprovided for, nor mandated in the Act.

In case that a land is donated on a voluntary basis without payment of full compensation, Environment & Social Framework for IPF Operations issued by the World Bank need to be considered. The Guidance Notes providing guidance for the borrower on the application of the Environmental and Social Standards, ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement, stated in footnote 10 that "*Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached*".

The land for Abule Oba (Redeem) Substation is planned to be donated by a Christian group, Redeem on a voluntary basis. Reportedly, the agreement on the voluntary land donation has been concluded between TCN and Redeem.

Six provisions on voluntary land donation described in the World Bank Guidance Notes, ESS5, and results being addressed to the provisions by TCN are summarized below:

(a) ESS5 suggests that the potential donor or donors shall have been appropriately informed and consulted about the project and the choices available to them. As TCN stated, TCN started consultation with the landowner, Redeem, and sharing the project plan since April 2017.

(b) ESS5 suggests potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation. According to the agreement concluded between TCN and Redeem, Redeem expressed their intention to donate the land on a voluntary basis without compensation in writing;

(c) ESS5 suggests that the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels. It was confirmed that Redeem owns approximately 1,000 ha of land and agreed to donate 9.8 ha of land to TCN, which means Redeem still have enough area of vacant land for future use;

(d) ESS5 suggests that no household relocation is involved, and it was confirmed that no resettlement will be caused for the land;

(e) ESS5 suggests that the donor is expected to benefit directly from the project. It was confirmed that

Redeem's facilities will be able to connect to the national grid directly and access to more reliable power source instead of Redeem's in-house power generation, once this project is completed; and

(f) ESS5 suggests that donation can only occur with the consent of individuals using or occupying the land for community or collective land, however, it was confirmed that the land is vacant and not used.

7-8-3 Institutional Framework

7-8-3-1 Relevant Institutions

This section gives highlights on relevant institutions for planning and implementation of land acquisition and resettlement in the project. A number of institutions have been identified and will be involved in the overall implementation of this project. TCN especially the Project Implementation Unit (PIU) will take responsibilities in implementing the Resettlement Action Plan and monitoring its progress, with support from Wayleave and the Chemical Resettlement and Environment (CR&E) Departments of TCN and a constituted Local Resettlement Committee, Federal Ministry of Power etc.. Multi-stakeholders, including the funding agencies, relevant government agencies and even NGOs will also support TCN when necessary. Summary of institutions including their role is shown in Table 7-31below.

Table 7-31 Summary of Institutions

Name	Descriptions
The Federal Government of Nigeria (FGN)	Responsibilities for commitments proposed in the RAP exist within Federal Government of Nigeria, ratifications of multilateral and endorsed agreements and conventions, and are delegated internally to the relevant Ministry, which in this case is the Federal Ministry of Power, Works and Housing.
Federal Ministry of Power (FMP)	All consultation efforts are coordinated by the Ministry of Power through the Transmission Company of Nigeria (TCN). The FMP is responsible for the approval of payment of compensation to PAPs. Payment is effected by TCN.
Transmission Company of Nigeria (TCN)	TCN as the implementation agency for the project on behalf Federal Government of Nigeria. The TCN established the Project Implementation Unit (PIU) the end-to-end delivery of the project on its behalf.
TCN Project Implementation Unit (PIU)	PIU is a unit established by TCN with responsibility for the end-to-end delivery of all JICA funded projects, including planning, ESIA, ESMP, RAP, engineering, procurement and construction. PIU, headed by a substantive Project Director with members representing relevant departments serves as the interface with other relevant agencies for this project and the overall coordinator of all efforts for realizing this project.
TCN Wayleave Department, Property Department, Chemical, Resettlement and Environment (CR&E) Department	Oversee compensation and resettlement activities of the project. PIU will liaise with the TCN Wayleave department on RoW acquisition process associated with crops in agricultural land department and Property Department on RoW acquisition process associated with structures. Verify the compensation rates/budget and schedule as used in RAP to ensure proper implementation and provide recommendations to Project Implementation Unit for improvement/approval. Also the department support PIU to conduct: Internal monitoring and evaluation of RAP activities; In coordination with TCN-PIU and Local Resettlement Committee, organize meetings with PAPs and communal authorities, to disseminate copies of Resettlement Information Booklet (RIB) and entitlement forms; Document the complaints and grievances raised by complainants and ensure timely solution by responsible institutions in line with the project approved RAP; Organizing seminars to disseminate the RAP report to relevant stakeholders, communities,

Name	Descriptions
	etc.; and Assist local people in overcoming the difficulties during the implementation period. Perform other functions as is required by the department in the TCN Organogram. The department staffs in Lagos Regional Office will assist PIU to communicate with communities and PAPs and oversee field work by the RAP Implementation Consultant (RIC) to conduct activities listed above as same as Regional staffs have supported RAP preparation.
Lagos and Ogun States Governments	State governments facilitate the land acquisition and resettlement through their relevant ministry, bureaus and organizations including: *Lagos State Lands Bureau* which ensure optimal utilization of land resources to for sustainable development of the state and take responsibilities on land policy and land matters, acquisition of land for State purposes, land Registration (Administration & Control) in conjunction with Ministry of Justice, compensation for acquired lands, issuance & revocation of Certificates of Occupancy (C of O), etc. *Lagos State Ministry of Physical Planning and Urban* that has responsibilities on comprehensive land use, re-planning, improvement. *Lagos State Ministry of Women Affairs and Social Development* which has the responsibility to promote Gender Equality and provide Empowerment facilities for Socio-economic Development for people displaced by the project in Lagos State, to promote the survival, protection, participation and development of children, to provide care, support, rehabilitation and empowerment for the vulnerable groups (challenged persons, older persons, destitute and the likes), etc. *Ogun State Bureau for Lands and Survey* which is responsible for the issuance of right of way (ROW) and certificate of occupancy (C of O) for portions of line route and substation sites that falls within Ogun State. Other functions of the Agency include preparation and issuance of Certificates-of-Occupancy and other certificate evidencing titles, preparation and issuance of Right-of-Occupancy, land application processing and administration, etc. *Ogun Ministry of Urban and Physical Planning* is responsible for the formulation of Physical Planning policies and the coordination of physical development within the State. *Ogun State Ministry of Women Affairs and Social Development***,** which has the responsibilities to promote Gender Equality and provide Empowerment facilities for Socio-economic Development as same as relevant ministry of Lagos state.
Local Government Authorities (LGA)	The project will pass through six LGAs, five in Ogun State –Obafemi Owode, Ewekoro, Ifo, Ado-Odo/Ota and Sagamu as well as Badagry LGA in Lagos State. The LGAs have roles in the administration (e.g. registration etc.) of lands in rural areas and hence, will be involved in the resettlement process as well as sites for the substations.
Local Council Development Authorities (LCDA)	LGAs are split into Local Council Development Areas by Ogun/Lagos states for administrative purpose. These lower-tier administrative units (LCDAs) provide public services to citizens in the area of their jurisdiction.
The Customary District Councils	The line route will pass through the Chiefdoms as several villages under them. The Obas (traditional head of chiefdom) and Community or Village Heads (Baales) have important role to play in the project with respect to mobilization of the community members to support the project, grievance redress, peace and security of personnel, equipment and facilities to be installed. Close contact and regular consultation shall be maintained with customary chiefs throughout the life of the project
RAP Implementation Consultant (RIC)	RIC will be retained by TCN PIU to implement RAP practically. The RIC, having good credentials and knowledge about the project area, is responsible for the following: Provision of information on compensation and resettlement activities; Consultation with PAPs, management of compensation payment; Reporting the progress of RAP implementation to relevant institutions; and Deliver the corridor of ROW to TCN.

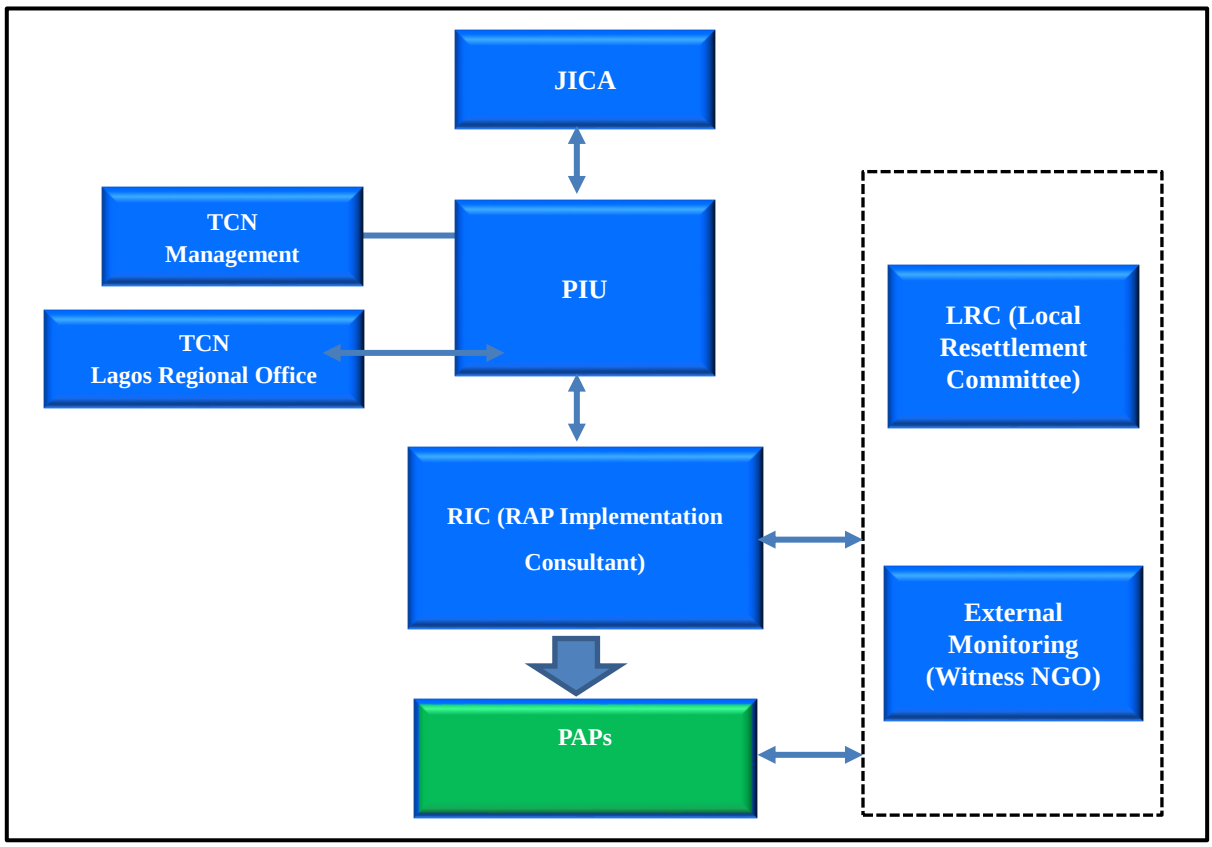
Name	Descriptions
Local Resettlement Committee (LRC)	This committee will be established in each LGA in the project area to support TCN PIU and RIC. The role of LRC includes: Assistance to identify and select the resettlement sites; Witnesses of the final agreement with the PAP in relation to compensation valuation and signing of agreements with households and selection of resettlement sites Identification of vulnerable people and households; and Work with PIU to address specific concerns of these peoples. These LRCs will comprise of a respected person (e.g. a retired senior citizen, Iman/Alfa or Church Priest), Customary Chiefdom, LCDA chairman, officer from department of security service and elected representatives of affected PAPs including women leader and youth leader.
Witness NGO	To enhance transparency and trust from PAPs it is planned that a witness NGO will be retained. Witness NGO will conduct external monitoring to ensure that proper procedures and stated compensation processes are followed, that PAP grievances are well taken care of, and that PAPs are treated with fairness. Witness NGO will participate even LRC meetings as an observer with neutrality and independence in order to ensure proper management of compensation processes, reconstruction and management of grievances by LRC. The role of witness NGO includes: Revise reports of compensation payment process; Meet with PAPs; Check implementation of the measures, livelihood restoration, etc. in the field; and Provide comments and recommendations. All PAPs will be informed of the NGO role and function and need to have access to its representatives, in a confidential manner if necessary, to explain and discuss their difficulties to report grievances. A witness NGO should be retained through a public proposal and selection process by the PIU to provide independent advice and report on RAP implementation and management focusing on consultation activities, compensation and resettlement related activities and grievances management. This NGO could be a recognized and credible Human Right advocacy group or an NGO active in environmental management or rural development in the project area.
Contractors	Each contractor shall appoint a qualified environmental and social manager who, after approval by the PIU, will be responsible for management on-site and for the implementation of management measures from the ESMP and RAP as well. Contractors may give employment opportunities for PAPs as a part of assistance and training in the RAP. This manager will report the progress and results of their works regularly to the PIU during the entire construction period.

Source: JICA Study Team

7-8-3-2 RAP implementation System

The responsibility of RAP implementation will be allocated among multiple stakeholders, including the TCN, RIC and LRC. TCN has set up a Project Implementation Unit (PIU), which will be mainly responsible for the project execution.

Within the PIU, the Environmental and Social Unit will be the responsible administrator, which will manage RAP implementation. PIU will coordinate with TCN Management and TCN Lagos Regional Office for the necessary support for the preparation and implementation of RAP.



Source: JICA Study Team

Figure 7-24 Organizational Structure of RAP Implementing Agencies

7-8-4 Land Acquisition Process

This section summarizes the land acquisition process that is applied for the Project. Generally, the steps of the process listed below are implemented in sequence. However, some steps may be implemented in parallel:

- The Project owner communicates the relevant authorities such as Lagos/Ogun states about the Project;
- The Project owner communicates the landowners in the Project area about the Project;
- The Project owner develops the Resettlement Action Plan. During the preparation of the RAP, field studies including stakeholder consultations, census survey, and PAPs identification, are carried out;
- Upon completion, the RAP may be submitted to the States for validation of RAP;
- The implementing units are established and organized, including LRC;
- The Project owner starts PAP engagement activities for RAP implementation phase;
- The Project owner explains compensation package and offers compensation to PAPs;
- Negotiations are conducted through personal contacts with the PAP regarding compensation;
- Upon accepting the compensation offer by the PAPs, the Project owner provides full payment of compensation before commencement of civil works;
- The project owner notifies the States regarding completion of compensation payment to the PAPs;

- The PAPs provides the Certificate of Indemnity for access rights over land in favour of the Project owner. This Certificate serves as evidence of acquisition of the land and access rights;
- The project owner notifies issuance of the Certificate of Indemnity the by PAPs; and
- The relevant States issue/gazette the Certificate of Occupancy (C of O) to the Project Owner.

7-8-5 Project Affected Persons and Assets

This section gives highlights on project affected persons and assets in the project area.

7-8-5-1 Summary of Projected Affected Persons and Assets

All affected persons and assets including land within the project area were recorded and counted during the RAP study conducted by TCN. The number of Project Affected Units (PAU) such as project affected persons (PAPs) and affected households (HHs) in each lot area are summarized in Table 7-32 and Table 7-33 below. A total of PAU such as number of land where structures are located or agricultural/commercial activities are operated will be 7,040. A total of 526 HHs with 1,989 PAPs in residential land will need to be physically relocated based on the currently planned line route. The structures owned and occupied by the project affected HHs will need to be demolished or displaced before the construction. 1,873 of unoccupied structure (e.g. uncompleted structure and nobody live currently) will need to be demolished or displaced before the construction as well.

There are total 3,992 of landowner of agricultural land whose private land will be affected by the Project. Agricultural lands in the project area are firmed by family basis. Number of family member who participate in the farming cannot be calculated exactly since contribution of each family member for the firming change season by season. Hence, the number of agricultural landowner is considered to be the number of PAPs associated with agricultural land.

Total 372 project affected units are identified occupying lands without recognized land occupancy in the project area for Likosi S/S.

It should be noted that the number of PAPs of each type of land indicate the number of PAPs who own/use/live each type of land but some households own multiple type of lands (e.g. residential land and agricultural land). Hence, if the numbers of PAPs are summed up, some PAPs may be double counted.

Table 7-32 Summary of Project Affected Land

		Land Use	Number of owner (Project Affected Units)	Area Size (m^2)	Relocation Assistance Needed (compensation for land)
Lot1	Government Land	Residential Land	0	0	No
		Commercial Land	0	0	
		Agricultural Land	0	0	
		Public Facility Land	0	0	
		Others	0	0	
		Sub-Total	0	0	
	Community Land or Private Land	Residential Land	207	15,560.61	Yes
		Commercial Land	27	2,374.91	
		Agricultural Land	127	55,421.50	
		Others	140	772.28	
		Sub-Total	501	74,129.30	
	Lot 1 Total		**501**	**74,129.30**	
Lot2	Government Land	Residential Land	372	188,900.00	No
		Commercial Land	0		
		Agricultural Land	89	61,100.00	
		Public Facility Land			
		Others (	0	0	
		Sub-Total	461	250,000.00	
	Community Land or Private Land	Residential Land	700	795,859.89	Yes
		Commercial Land	4	3,136.14	
		Agricultural Land	1,129	1,957,600.00	
		Others (incl. Abule Oba and Makogi)	4	296,336	
		Sub-Total	1,835	3,052,932.03	
	Lot 2 Total		**2,296**	**3,302,932.03**	
Lot3	Government Land	Residential Land	0	0	No
		Commercial Land	0	0	
		Agricultural Land	0	0	
		Public Facility Land	0	0	
		Others (Badagry)	1	250,000.00	
		Sub-Total	1	250,000.00	
	Community Land or Private Land	Residential Land	1,188	- *1	Yes
		Commercial Land	30	- *1	
		Agricultural Land	2,647	- *1	
		Others	22	- *1	
		Sub-Total	4,242	-	
	Lot 3 Total		**4,243**	-	
Grand Total			**7040**	-	

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

Table 7-33 Summary of Project Affected Structures

Lot	Type of Primary Structure	Remark	Project Affected Units (PAUs)	Project Affected Persons (PAPs)		Project Affected Units (PAUs)	Project Affected Persons (PAPs)	
			Number of owner (HHs)	Physically displaced persons	Economically displaced persons	Number of owner (HHs)	Physically displaced persons	Economically displaced persons
			Title holder			Non-title holder (Encroacher)		
Lot1	Residential Structure	Occupied	44	239				
		Unoccupied	163	163*2				
	Residential Tenant Structure	Occupied	0	0				
	Commercial Structure		27	27*1	27*1			
	Other Structure	Public and Religious	140					
	Sub-Total		**374**	**429**	**27**	**0**	**0**	**0**
Lot2	Residential Structure	Occupied	74	74		84	84	
		Unoccupied	575	575*2		271	271	
	Residential Tenant Structure	Occupied		37		0	0	0
	Commercial Structure		1	1	1	1	1	1
	Other Structure	Public and Religious	56	56		16	16	
	Sub-Total		**706**	**743**	**1**	**372**	**372**	**1**
Lot3	Residential Structure	Occupied	324	1,592				
		Unoccupied	864	864*2				
	Residential Tenant Structure	Occupied	0	0	0			
	Commercial Structure		30	30*1	30*1			
	Other Structure	Public and Religious	22					
	Sub-Total		**1240**	**2486**	**30**	**0**	**0**	**0**
Grand Total			**2320**	**3,658**	**58**	**372**	**372**	**1**

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

*1: Only family business is operated in the project area. Wage earner is not applicable in the project area. Only business owner will be compensated.

*2: Number of residents who will live in the unoccupied structures including under construction cannot be calculated. The value represents the number of structure owners

7-8-5-2 Project Affected Land

The land in the project area are used for some purposes including:

- Agricultural use
- Residential use
- Commercial use
- Public use (TCN own land in Likosi, school, church, etc.)
- Others (not specifically used, e.g. forest)

The boundaries of each land are indicated by wall, fence or some markers in some land, some others are not clearly specified. During the consultation stages, RAP team obtained the boundary information including the coordination of the land boundary through community leaders, PAPs owning the land and its neighbours.

7-8-5-3 Project Affected Household

Characteristic information of the Project Affected Households were collected during census study conducted by TCN. This section highlight key information of the project affected households. Some other information related to the household are also mentioned in the Section 7-6 above.

(1) Household Size

Summary of household size obtained during the census survey are shown in Table 7-34. No big difference was identified among three lot project areas. The average of persons per household in the project area is 6.3.

Table **7-34 Summary of Household Size in Project Area**

		Household Size (persons per household)					
		1-2	3-5	6-10	11-15	>15	Total
Lot 1 Project Area	Number of HHs	48	635	827	166	0	1,676
	Ratio	3%	38%	49%	10%	0%	
Lot 2 Project Area	Number of HHs	5	71	73	9	0	158
	Ratio	3%	45%	46%	6%	0%	
Lot 3 Project Area	Number of HHs	219	1,889	1,011	211	147	3,478
	Ratio	6%	54%	29%	6%	4%	
Overall	Number of HHs	272	2,595	1,911	386	147	5,311
	Ratio	5%	49%	36%	7%	3%	
	Estimated Average HH Size	6.3					

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

(2) Occupation, Livelihood and Income

The compositions of occupations in each project area (and LGA) are shown in Table 7-35 below. It is observed that the major occupations of the people in the communities are farming, fishing and hunting. Some people, as shown from the prevalence figures of the occupations combined two or more occupations (e.g. fishing and farming, fishing and trading or even farming and civil service job) to boost their income. Most of harvested crops are generally consumed by the

households in the project area and only excess are sold to generate income.

During the study in Lot 1, most of the youths (about 85%) complained of unemployment hence they resorted to self-employment jobs of fishing, farming, trading or other laborious jobs. There have been no help from governments or any other organizations in the employment of the youths and no help to even enable them enhance their occupations of farming, trading or other jobs.

Table 7-35 Summary of Occupation in Project Area

Lot #	Local Government Areas (LGAs)	Occupation (%)							
		Farmer, Hunter and Fisherman	Pastoralist	Self-employed Business Person	Private employee	Public Employee	Trading	Teaching and Nursing	Others
1	Ewekoro, Ifo, Obafemi Owode	127	-	-	10	-	-	-	10
2	Obafemi Owode	12	-	64	15	-	6	3	-
	Ifo	33	-	34	33	-	0	0	-
	Ewekoro	6	-	29	53	-	6	6	-
	Sagamu	3	-	61	18	-	17	1	-
3	Ewekoro	72.3	1.7	24.2	8.9	17.3	6.2	-	1.2
	Ifo	78.5	0.5	17.3	2.8	24.7	3.1	-	0.8
	Ado-Odo/Ota	81.6	2.8	19.9	4.7	18.6	3.2	-	0.7
	Badagry	80.6	0.4	18.4	3.3	20.7	2.9	-	0.2

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

The income level of majority of the people in the area is low because most of them are farmer, hunter, fisherman (they are not merchandised fisherman, people fish sometimes for their selves), artisans or working as labor in companies around their vicinity. Also, evidence from Focused Group Discussions (FGDs) shows that a significant proportion of the youths are not gainfully employed and are not in any form of school for career development. Most of the aged are poor, except those whose children are in the city, who send money home. Some of the women are successful traders while some are housewives.

The ratio of people that are living in the poverty line (on less than N10,000/month equivalent to less than USD 1/day) consists of approximately 10 – 20 % of the people in the project area, especially 80% of people in Lot 1 project area earn less than N 20,000 monthly and are considered being poor compared other Lot 2 and 3 project area. Some people earn above N60,000, but those with this relatively high income are mainly those with multiple economic activities such as agriculture and business and are mainly in urban areas or close to urban areas.

7-8-5-4 Project Affected Vulnerable Groups

In the project area, the RAP study team identified some vulnerable groups including:

- Woman headed household including widows

- Physically disadvantaged persons
- Aged persons (>65)
- unemployed youths

Especially many female heads of households are identified in the project area, female heads of households constitute 8% (Lot 1), 3% (Lot 2) and 12.7% (Lot 3) of total households in each lot area respectively. The project is likely to increase the vulnerability of women if compensation and support for vulnerable group including women are not considered enough since vulnerable group tend to be affected by external factors more than non-vulnerable group. Consultations in the project area have shown that, in general, women do not own land although the land law stipulates that land belongs to the family. This makes women in a disadvantaged state since men control resources such as land other important assets and potentially compensation from the Project.

Some aged persons headed households were also identified and recorded for compensation (relocation assistance).

Four handicapped headed households were identified in the Lot 1 project area. Two of these handicapped PAPs are cripples and another two have sight problem.

7-8-5-5 Project Affected Structures

The project-affected structures are mostly residential house, others are buildings still under construction, warehouse, etc.. On the average, the use of bricks as walling materials is predominant. However, the use of mud bricks is most pronounced among communities in some LGAs including Ifo and Badagry. It was also observed that walling materials for a house could be mud, bricks and woods especially rural area. In addition, some houses are walled exclusively of bamboo, tarpaulin and zinc.

Zinc in Alapako

Mud in Olowo

Concrete in Berese

Source: EEMS 2018

Figure 7-25 Type of Material for Structures

Some houses equip other secondary structures including fence, wall, warehouse etc. and those structures are also counted and recorded for compensation.

Many non-occupied residential structures such as completed houses but nobody live in currently, and uncompleted houses including only foundation are observed in the project area. Those are also recorded as project-affected structures.

7-8-5-6 Economic Trees and Crops

Virtually all affected communities are located in areas where significant portions of lands are entirely used for agriculture where crops such as cassava, maize, plantain, sugarcane, kolanut, oil palm etc. are mainly grown. All of the impacted households have cultivated parcel or farming area affected by the wayleave. More than thousands of households were growing crops and economic trees in the wayleave. The numbers of affected trees and crops with commercial value in each Lot, are summarised in Table 7-36. Cassava is the most common food crops in the affected communities especially in Likosi/Dejuwogbo, Omu Pempe, Oluwo Oshin, Abisodun, Adewolu, and Otere Apena etc. Sugarcane is a popular cash crop in Asa Bala, Asa Elegun and Abese while Kolanut is a common crop grown in Sagamu area.

In the construction period crops will have to be destroyed in the wayleave area. Compensation of a year of harvesting of the area under cultivation in the wayleave should be given to all the households.

Table 7-36 Summary of Affected Economic Trees and Crops

	Unit	Lot 1	Lot 2	Lot 3	Total
ABURA	stand	0	0	384	384
ACACIA	stand	0	0	1	1
ADYMEN	stand	0	0	22	22
AFRICAN STAR APPLE	stand	5	0	0	5
AFARA	stand	3	0	0	3
AFUFORO TREE	stand	10	0	0	10
AGBALUMO	stand	0	24	0	24
AGBO TREE	stand	13	0	0	13
AKOKO TREE	stand	13	0	0	13
AKPA	stand	10	0	0	10
AKPOTO TREE	stand	4	0	0	4
ALIGATOR PEPPER	stand	2	0	0	2
AMARANTHUS	stand	0	0	18	18
APA	stand	61	0	6	67
APPLE	stand	15	0	67	82
APARA	stand	0	3	0	3
ARABA TREE	stand	5	0	0	5
ARERE	stand	1	0	0	1
AROEADO	stand	0	0	1	1
AUSTRY TREE	stand	6	0	0	6
AVOCADO PEAR	stand	11	0	6	17
AWEN	stand	14	0	0	14
AYIRA TREE	stand	35	0	0	35
AYURE	stand	10	0	0	10
BAMBOO	stand	435980	7916	38024	481920
BANANA	stand	3715	697	5877.6	10289.6
BAOBAB	stand	8	0	0	8
BARREN LAND	stand	2504.18	0	0	2504.18
BEANS	stand	0	300	0	300
BITTER KOLA	stand	5	2	302	309
BITTER LEAF	stand	576	5	3047	3628
BREAD FRUIT	stand	12	0	829	841
BUTTER BREAD	stand	0	0	13	13
CASHEW	stand	627	25	1089.8	1741.8
CASHIA	stand	8	0	0	8

	Unit	Lot 1	Lot 2	Lot 3	Total
CASSAVA	stand	680278.6	239540	4748190	5668008
CHERRY	stand	105	26	1955.2	2086.2
CHEW STICK TREE	stand	16	0	0	16
CITRUS	stand	0	279	68	347
COCOA	stand	1556	396	5671	7623
COCONUT	stand	779	44	4964.6	5787.6
COCOYAM	stand	19412	5450	811193.4	836055.4
COTTON WOOL	stand	0	0	360	360
DATE PALM	stand	0	88	0	88
DOGOYARO	stand	32	0	0	32
EFO LEAVES	stand	400	0	0	400
EWE LEAF	stand	0	495	21	516
EWEDU	stand	18800	1000	0	19800
EWERAN	ha	0	0.09	0	0.09
FLUTED PUMPKIN	stand	150	0	0	150
FRUIT	stand	0	1	5	6
GARDEN EGG	stand	0	600	960	1560
GINGER PLANT	stand	221	0	0	221
GERMAN TREE	stand	6	0	0	6
GINSIN HERBS	stand	55	0	0	55
GMELINA	stand	7	0	12	19
GPARUN	stand	3	0	0	3
GRAPE FRUIT	stand	0	0	54	54
GREEN LEAVES	stand	6700	0	0	6700
GROUNDNUT	stand	1030	0	0	1030
GUAVA	stand	257	203	665	1125
HARD WOOD	stand	18620	12886	2023.4	33529.4
HERBAL TREE	stand	2179	0	1	2180
IDI	stand	3	281	0	284
IDIN	stand	0	637	0	637
IDINGO	stand	0	129	0	129
IGIOWO	stand	7	0	0	7
INDIAN BAMBOO	stand	0	0	21	21
IRIN	stand	0	0	7	7
IROKO	stand	302	0	1489	1791
IRUGBA	stand	9	0	0	9
JATROVA PLANTS	stand	3	0	0	3
KACHIA	stand	165	0	0	165
KOLA NUT	stand	471	4084	8878.2	13433.2
LEMON	stand	0	0	10	10
LIME ORANGE	stand	6	0	0	6
LOCAL PEAR	stand	0	0	52	52
LOCUST BEAN	stand	47	0	14	61
MAHOGANY	stand	104	0	12	116
MAIZE	ha	9.484	1.1	41.714	52.298
MANGO	stand	208	91	3821	4120
MASQURADE TREE	stand	0	0	2	2
MELINA	stand	0	0	60	60
MOI MOI LEAF	stand	35108	0	0	35108
MORINGA	stand	21	14	41	76
NEEM	stand	0	0	39	39
NEEN TREE	stand	6	0	0	6
OAK	stand	131	0	0	131
OBESHE	stand	41	0	0	41
OIL PALM	stand	0	4293	18108.4	22401.4
OGBO	stand	0	0	2	2

	Unit	Lot 1	Lot 2	Lot 3	Total
OGBONO	stand	0	0	9037	9037
OKRA	stand	102	0	80	182
OKRO	stand	0	5800	0	5800
OMO	stand	0	0	6	6
OMOYI	stand	1	0	0	1
OPEPE	stand	0	0	246	246
OPOTO	stand	1	0	0	1
ORANGE	stand	174	24	2677.6	2875.6
ORINATA	stand	5	0	0	5
ORE TREE	stand	6	0	0	6
ORUDUDU	stand	0	0	56	56
OWO	stand	4	0	0	4
PALM TREE	stand	11828	0	4823.6	16651.6
PAW PAW	stand	1128	567	3259.2	4954.2
PEAR	stand	24	2	20	46
PEPPER	stand	2650	11120	384583	398353
PINEAPPLE	stand	7573	3464	967.6	12004.6
PLANTAIN	stand	12611	9436	26437.2	48484.2
POTATO	stand	500	0	764	1264
PUMPKIN	stand	0	0	18899	18899
PUMPKIN LEAF	stand	0	0	1	1
RAFFIA PALM	stand	2828	2174	9863.4	14865.4
RICE	stand	75300	0	0	75300
ROPHIS	stand	0	0	5	5
RUBBER TREE	stand	67	0	0	67
SAPO	stand	22	0	65	87
SCENT LEAF	stand	5	0	712	717
SHAKPO	stand	5	0	0	5
SHAWASHOP	stand	0	0	7	7
SHEA BUTTER	stand	237	32	8	277
SHRUBS	stand	120	0	0	120
SOFT WOOD	stand	15368	15196	2111	32675
SOUR SHOP	stand	1	0	0	1
SOYA BEANS	stand	6150	0	0	6150
SPINACH	stand	0	0	1036	1036
STAR APPLE	stand	10	0	0	10
SUGARCANE	stand	263742.2	34200	18525	316467.2
SWEET POTATO	stand	325	0	120	445
TEAK	stand	0	0	6715.6	6715.6
TICK	stand	113	0	0	113
TIMBER	stand	335	0	25	360
TOMATO	stand	2575	555	2896	6026
UMBRELLA TREE	stand	10	0	9	19
VEGETABLE	stand	5661	9700	6728	22089
VELVET TAMARIND(ICHEKU)	stand	1	0	0	1
WALNUT	stand	11	1	39	51
WATER MELON	stand	150	0	0	150
WRAPPING LEAVE	stand	150	0	0	150
YAM	stand	2732	900	29281	32913

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

7-8-5-7 Shrines and Cultural Heritages

There are archaeological and sacred sites, such as traditional burial grounds and shrines in the communities as described in Section 7-7-1-3. 78 shrines in total (11 shrines in Lot 1, 48 shrines in Lot 2 and 19 shrines in Lot 3) are located and need to be relocated in the Project area. These sites are highly valued by the people and considered sacred and encroachment in such areas would attract serious resentment from the communities. The people celebrate several traditional festivals, the observance of which is believed to be for the general well-being of the people.

There are shrines and believers in the traditional worship. Many of the people that have shrines are also either Christians or Muslims. They believe that their shrines depict their ancestral believe and heritage. They believe that the gods of the shrines listen to their needs and offer them protection against evil. They also informed us that the gods of the shrines provide people with children for the barren, protection from evil, good luck in life endeavour, etc.

7-9 Compensation Strategy

7-9-1 Eligibility

Any person who will suffer loss or damage to a piece of land, a structure, economic trees / crops, business, trade or loss of access to productive resources, as a result of the project will be considered eligible for compensation and/ or resettlement assistance. Eligible PAPs include the following:

- Those that have formal rights to land (including statutory, customary, traditional and religious rights, recognized under the Federal and/or State Laws of Nigeria);
- Those who do not have formal legal rights to land at the time the census began but have a claim to such land or assets provided that such claims are recognized under the state and/or federal laws of Nigeria or become recognized through a process identified in entitlement matrix;
- Those who have no recognizable legal right or claim to the land they are occupying, using or getting their livelihood from, but were occupying or making use of the land before the cut-off date announced by the project; and
- Those enumerated as owners of assets/improvements on land (Grave, Shrines, Economic trees and/or Crops whether they own the land or are tenants.

Compensation for land will be made as Land Relocation Assistance to the PAPs who have formal rights to land, and the PAPs who do not have formal legal rights to land at the time the census began but have a claim to such land provided that such claims are recognized under the state and/or federal laws of Nigeria or become recognized through a process (details are described in Section 7-9-3 below). The other PAPs will be eligible for the compensation of other type of loss except for land including, structures, economic trees, etc.

7-9-2 Cut-off Date

Cut-off date is a date to determine the eligibility to receive compensation. Any new structures or arrivals after cut-off date within the project area are not subject to the compensation. The set cut-off date for the 3 Lots are different (See Table 7-37). It is important to note that while Lots 1 and 2 set the cut-off date during the last day of survey, Lot 3 set the cut-off date on the day of commencement of survey.

Table 7-37 Cut-off Date for Each Lot

Lot	Set Cut-off Date
1	Cut-off date was set on March 4, 2018, the date on which final fieldwork was carried out in the last community Ajade. This was communicated in the local language during community consultations (district heads and village heads).
2	Cut-off date was set on June 8, 2018 when PAPs identification, enumeration and valuation exercise for each community concluded.
3	Cut-off date was set on January 12, 2018 when commencement of the enumeration established. Enumeration was conducted from January 12 to February 13.

7-9-3 Entitlement Matrix

The entitlement matrix is the basis for compensation budget, resettlement and income restoration measures to be administered by the TCN. The matrix shows specific and applicable categories of Project Affected Persons (PAPs) under this project as well as types of losses and entitlement plan for PAPs. Table 7-38 below provides an entitlement matrix for PAPs.

Table 7-38 Entitlement Matrix

Item	Type of loss	Entitled Persons	Entitlements	Responsibility
A. LAND				
A1	Loss of residential and commercial land	Private landowner with title deed or similar ownership document, and customary recognized in the community	• Land relocation assistance for land (cash compensation) will be at market value based on the market survey results conducted by TCN. • Livelihood restoration (assistance and training):G1 • Special assistance, if applicable: H1	TCN/PIU
A2	Loss of residential and commercial land	Land user of public owned land	• No compensation for land • Livelihood restoration (assistance and training): G1 • Special assistance, if applicable: H1	TCN/PIU
A3	Loss of agricultural land	Private landowner with title deed or similar ownership document, and customary recognized in the community	• Land relocation assistance for land (cash compensation). • Cash compensation for loss of crops and trees during the construction stage at the market value of crops based on the harmonized compensation rate in South-west area in Nigeria: C1 • Livelihood restoration (assistance and training): G2 • Special assistance, if applicable: H1	TCN/PIU
A4	Loss of agricultural land	Landowner and land user without legal title	• No compensation for land. • Cash compensation for loss of crops and trees during the construction stage at the market value of crops based on the harmonized compensation rate in South-west area in Nigeria: C1 • Livelihood restoration (assistance and training): G2 • Special assistance, if applicable: H1	TCN/PIU
B. STRUCTURES				
B1	Loss of structure	Owner of structure	• Cash compensation will be paid at the replacement cost and associated in-direct cost (e.g. registration tax, etc.) evaluated by TCN. • Shifting allowance: F1 • Special assistance, if applicable: H1	TCN/PIU
B2	Loss of rental Structure	Person renting in a residential or commercial structure with rental agreement or receipt of payment	• No compensation for structure • Shifting allowance: F1 • Special assistance, if applicable: H1	TCN/PIU
B3	Loss of rental Structure	Owner of structure	• Cash compensation will be paid at the replacement cost and associated in-direct cost (e.g. registration tax, etc.) evaluated by TCN.	TCN/PIU
C. CROPS AND TREES				
C1	Loss of crops and tress	Owner Farmer	• Cash compensation for loss of crops and trees during the construction stage will be paid at the market value of crops based on the harmonized compensation rate in South-west area in Nigeria	TCN/PIU
D. OTHER PRIVATE PROPERTIES OR SECONDARY STRUCTURES				
D1	Other property or secondary structure (i.e. shed, outdoor latrine, rice store, animal barn etc.)	Owners of structures (regardless if the land is owned or not)	• Cash compensation will be paid at the replacement cost and associated in-direct cost (e.g. registration tax, etc.) evaluated by TCN.	TCN/PIU
E. LOSS OF INCOME				

Item	Type of loss	Entitled Persons	Entitlements	Responsibility
E1	Job loss due to relocation of business to another area or business operator decides not to re-establish	Business owner	• 1 month income assistance • Shifting allowance : F1 • Livelihood restoration (assistance and training):G1	TCN/PIU
F. REHABILITATION ASSISTANCE				
F1	Loss of residential/commercial structures	Relocating APs/ APs reorganizing or rebuilding on same plot	• Moving cost will be paid for assistance at the value evaluated by TCN based on the quantity and size of items need to be moved.	TCN/PIU
G. LIVELIHOOD RESTORATION (ASSISTANCE & TRAINING to PAPs)				
G1	Effects on livelihood	All affected commercial owners/operators of businesses/ workers of businesses /	• Professional assistance and advice to re-establish and develop the business • Vocational or skilled training for business owners or their family members • Priority is given for PAPs for the position of construction workers	TCN/PIU TCN/PIU and contractor TCN/PIU and contractor
G2	Effects on livelihood	All affected owners/operators in agricultural land	• For farmers who have remaining land or farmers who cultivate on new lands will be assisted to increase productivity (i.e. increasing cropping intensity, use of high yielding seeds, diversification and introduction of new seeds or crops etc) and assistance to access existing subsidies. • Introducing new livelihood opportunities for farmers or their family members, such as priority for APs for project related employment opportunities during construction period. • Priority is given for PAPs for the position of construction workers • Vocational or skilled training for farmers or their family members	TCN/PIU and retained NGO TCN/PIU and EPC contractor TCN/PIU and EPC contractor
H. SPECIAL ASSISTANCE				
H1	Effects on vulnerable APs	Vulnerable APs including the female - headed households, elderly people and differently able.	• 300 Naira x 30 days per person of special grant for AP household to improve living standards of vulnerable APs (such as linking to national poverty reduction programs conducted by various government institutions) and assistance to in finding suitable land for relocation and shifting. • All women that are part of the resettled households will be informed of the compensation benefits offered to them specifically. • Special help will be given such as opening a bank account, budget management, etc.	TCN/PIU
I. COMMUNITY ASSETS				
I1	Loss of buildings and other structures (schools, shrine, temples, clinics, common wells etc.), infrastructure (local roads, footpaths, bridges, irrigation, water points etc.), common resources	Divisional Secretary of the division, local community or local authority owning or benefiting from community property, infrastructure or resources	• For shrine, amount of compensation will be calculated by TCN with consultation with PAPs based on replacement cost considering size, equipped item, traditional rites • For public assets including well, rebuild a new structure (Not money compensation)	TCN/PIU
J. UNANTICIPATED RESETTLEMENT				
J1	Any unanticipated adverse impact due to project intervention	Any unanticipated consequence of the project will be documented and mitigated based on the spirit of the principles agreed upon in this policy framework.		

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

7-9-4 Valuation Method

Following sections describe valuation methods for the various categories of affected lands and assets in the project area and the methods that were used in determining and valuing the assets. The methods described below are also consistent with the entitlement matrix for Project Affected Persons.

7-9-4-1 Valuation Method for Land

The replacement cost method (Land for land) is the preferred method as recommended by OP 4.12. However, since TCN does not have right to acquire land for replacement in the project area, in consultation with PAPs, this RAP adopted the method of cash compensation for land at market value based on results of market survey. This was done through interviews carried out with residents of the communities and real estate valuers in and around the project area. Entitlement for land compensation only applies for PAPs on communal land, clan or family land and individual land (not those on government land) with evidences of statutory rights or other forms of recognizable rights. During the market survey carried out by TCN, unit rates per square meter for land confirmed at Lot 2 and 3 were ranged from 100 to 300 Naira, and from 9 to 380 Naira, respectively. The unit price for land at Lot 1 was evaluated to be zero Naira. Based on the market survey and reconciliation meeting held on April 2, 2019 at Bureau of Land and Survey involving representatives of TCN RAP consultants for Lot 1, 2 & 3, Government representatives and the project coordinator (TCN), the unit price for land per square meter (m^2) in the project area was evaluated at 200 Naira for urban/semi-urban areas and 100 Naira for rural areas. During the consultation to explain the compensation package and offers compensation to each PAP, negotiations to adjust compensation package will be conducted in case that a PAP claim that replacement cost of the PAP's land is considered being higher than the unit prices mentioned above. The land acquisition process including consultation and negotiation above is described in Section 7-8-4.

7-9-4-2 Valuation Method for Structures

The replacement cost method was used in estimating the value of the house/structure. The replacement cost method is based on the assumption that the capital value of an existing development can be equated to the cost of reinstating the development on the same plot at the current labour, material and other incidental costs. The estimated value represents the cost of the property as if new. In arriving at appropriate rate for structures, the quantity surveyor embarked on market survey of building materials and labour in the project area. Although a few variations exist from one local market to the other, the upper price of materials was adopted to ensure that PAPs suffer no net loss but are made better off in line with the pro-poor objective that OP 4.12 supports.

Types of structures, type of material, level of completion and finishing were considered for the valuation of each structure in the project area.

7-9-4-3 Valuation method for Economic Tree and Crops

Valuation for economic tree and crops was based on the harmonized rate for economic trees in South West Zone of Nigeria (see Table 7-39). In adopting the rate, market survey in the locality was undertaken to ensure that the rates conform to the appropriate market value of the trees and crops. The South West Harmonized rate is higher than the National Gazette Rate as prescribed in the Land Use Act. The highest value rate in the harmonized gazette which assumed that economic trees to be affected are all of maturity status was used, or maturity of trees were evaluated by the specialist who was invited from Ogun State Ministry of Agriculture. Number of economic trees and crops owned by each PAP were counted and recorded during RAP survey.

Compensation for crops is at full market value of crop yield per hectare or number counts of the quantity of the crops within the affected farm land multiplied by the harmonized rate of government of the South West Zone of Nigeria. The harmonized compensation rates for crops is considered to be equivalent to the compensation for the crop amount harvested for 1 year.

Table 7-39 Harmonized Compensation Rates for Economic Trees and Crops in Southwest Geo-Political Zone

S/N	ECONOMIC TREES/CROPS	A 100%	B 70%	C 30%
1	Cocoa	1,200.00	840.00	360.00
2	Oil Palm	2,200.00	1540.00	660.00
3	Kola nut Tree	2,000.00	1,400.00	600.00
4	Rubber	500.00	350.00	150.00
5	Avocado Pear	900.00	630.00	270.00
6	Local Pear	900.00	630.00	270.00
7	Guava	500.00	350.00	150.00
8	Cashew	700.00	490.00	210.00
9	Bread Fruit	300.00	210.00	90.00
10	Mango	800.00	560.00	240.00
11	Citrus Orange	1,000.00	700.00	300.00
12	Coconut	1,000.00	700.00	300.00
13	Pawpaw	200.00	140.00	60.00
14	Grape Fruit	500.00	350.00	150.00
15	Coffee	500.00	350.00	150.00
16	Banana	250.00	175.00	75.00
17	Plantain	500.00	350.00	150.00
18	Maize	20,000.00/ha	14,000.00/ha	6,000.00/ha
19	Cassava	50.00	35.00	15.00
20	Guinea Corn	1,0.00	7.00	3.00
21	Tobacco	15,000.00/ha	10,500.00/ha	4,500.00/ha
22	Yam	100.00/stand	70.00/stand	30.00/stand
23	Cocoyam	30.00	21.00	9.00
24	Tomatoes	75.00	52.5	22.5
25	Walnut	500.00	350.00	150.00
26	Pineapple	100.00	70.00	30.00
27	Soft wood	1,500.00	1,050.00	450.00
28	Hard Wood	3,500.00	2,450.00	1,050.00
29	Alligator Pepper	2,500.00/ha	1,750.00/ha	750.00/ha
30	Pepper	75.00	52.5	22.5
31	Mellon	50.00	35.00	15.00

S/N	ECONOMIC TREES/CROPS	A 100%	B 70%	C 30%
32	Garden Egg	75.00	52.5	22.5
33	Vegetable, Onion and Cabbage	50.00	35.00	15.00
34	Cotton	50.00	35.00	15.00
35	Groundnut	50.00	35.00	15.00
36	Beans	75.00	52.5	22.5
37	Beniseed	100.00	70.00	30.00
38	Potatoes	50.00	35.00	15.00
39	Rice	50,000.00/ha	35,000.00/ha	15,000.00/ha
40	Raffia Palm	1,000.00	700.00	300.00
41	Iyere	100.00	70.00	30.00
42	Okro	20.00	14.00	6.00
43	Bamboo	100.00	70.00	30.00
44	Eweran	1,000.00/ha	700.00/ha	300.00/ha
45	Bush Mango (Oro)	500.00	350.00	150.00
46	Agbalumo	500.00	350.00	150.00
47	Pineapple (improved sp)	200.00	140.00	60.00
48	Cowpea	75.00	52.5	22.5
49	Locust Bean	800.00	560.00	240.00
50	Sugarcane	20.00	14.00	6.00
51	Orogbo (Bitter Cola)	500.00	350.00	150.00
52	Bitter Leaf	50.00	35.00	15.00
53	Aidon/Igisogba	60.00	42.00	18.00
54	Afon	75.00	52.5	22.5
55	Ori (Shear butter)	80.00	56.00	24.00
56	Idi	65.00	45.5	19.5
57	Eru	50.00	35.00	15.00
58	Teak	1,500.00	1,050.00	450.00
59	Melina	800.00	560.00	240.00
60	Dongoyaro	400.00	280.00	120.00

Source: Resolution on National Technical Development Forum (NTDF) on Land Administration

NOTES ON APPLICATION OF THE RATES The rates for these are in three grades – A, B, C
Grade A: For matured trees and crops in agricultural plantation or around homesteads regarded as 100%
Grade B: Applicable to trees and crops at medium stage of maturity representing 70% of grade A
Grade C: For immature trees or crops or those at the nursery stage and this represents 30% of grade A

7-9-4-4 Valuation Method for Business Loss

Some commercial structures were located in the project area. The structures include a shop selling daily items, fishponds for catfish aquafarming, a brick factory, etc., but all of them are not large-scale enterprise commercial structures, they are more like structures for family businesses. Their structures will be compensated as mentioned in Section 7-9-4-2. If business loss is happened due to the relocation of their structures, the amount of business loss will be considered when needed, e.g. the number of fish in the fishpond will be counted and multiplied by the market price of the fish around the area.

7-9-4-5 Valuation Method for Shrines, archaeological structures and sacred properties

Since the value of cultural properties cannot be market determined, the approach to compensation taken in this project was based on wide consultation with custodians of traditions (Baales) and those associated

with the affected cultural properties. It was agreed that 200,000 Naira per community shrine and 50,000 Naira per individual shrine, 50,000 Naira per earthen grave, 100,000 Naira per cemented grave and 150,000 Naira per marble grave.

7-10 Livelihood Restoration Program

7-10-1 Livelihood and Income Restoration Strategy

TCN is encouraged to use the guidelines such as the World Bank OP 4.12 and involve the affected communities, local leaders, NGOs and other stakeholders to gather opinions in order to assess livelihood restoration procedures.

The World Bank (WB)'s OP, 4.12 paragraph (6c), states the following:

> *''Displaced persons should be offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; and provided with development assistance, such as land preparation, credit facilities, training, in addition to the compensation they receive."*

Additionally, WB OP 4.12, paragraph (2c), requires that displaced individuals be given assistance for their efforts to improve their living standards or to at least restore them to the highest standard between pre-displacement or standards prevailing prior to the beginning of the project implementation.

It is recommended that TCN hire a consultant or partner with an NGO to coordinate the restoration programme.

It is recommended to inform the PAPs of the project as early as possible and at least three months before the start of the construction. In all cases, PAPs shall be advised to construct new structures at locations near the previous ones within the affected community to reduce disruption of community life, established spatial organization and services.

In addition, worthy of mentioning is the fact that many communities along the ROW have experienced workers that can be hired during the construction phase. Local experienced workers and entrepreneurs with necessary experience and capacity should be given priority work opportunities, if applicable. In addition, as suggested through consultations, EPC contractors should liaise with village chiefs to maximise local hiring as well as the purchase of relevant local materials and services.

7-10-2 Income Restoration and Improvement

Different restoration packages will be required for each of the various categories of PAPs and will depend on the type and magnitude of loss suffered the vulnerability level of the PAPs' household, the indicated preferences associated to their family characteristics and other relevant circumstances.

The support for income restoration and improvement will include; compensation for land, practical training courses on improved agricultural techniques; improvement of land for farming, agroforestry and other relevant techniques support; a moving allocation; special support for vulnerable groups, and

non-financial component. Details are described in the following sections.

7-10-2-1 Land Base

The households that will lose a piece of land will receive sufficient compensation to be able to buy a new land, off-set loss of crops and rehabilitate the land to similar production level.

Further investigations paired with experience on similar projects indicate that in most cases it would be difficult for the TCN to find and propose replacement land for different reasons (risk of speculation, administrative burden, lack of trust from PAPs, etc.) and PAPs requested cash compensation rather than land-to-land compensation. It is thus preferable to pay cash compensation to the PAPs to provide them with an opportunity to purchase new land and condition it themselves and continue farming. The amount of compensation for each land is calculated with area of the land and the unit price that was determined based on the market survey results as mentioned in Section 7-9-4-1.

However, to minimize negative impact to PAP's livelihood, adequate compensation level and implementation conditions are essential. PAPs need to be given the conditions summarized below:

- Sufficient time to find and evaluate their option and possible replacement land and organize the resettlement;
- Support for all legal aspects of the transaction;
- All "transaction costs" such as registration fees including cost to obtain C of O and CR of O, transfer taxes, and/or customary tributes are to be compensated;
- Moving cost for the residential and commercial structure owner/occupier being paid for assistance at the value evaluated by TCN based on the quantity and size of items need to be moved; and
- Adequate control of PAPs' use of compensations by project authorities through different mechanisms like progressive verification of land purchase.

7-10-2-2 Trees and Crops

Trees will be destroyed during the construction of the transmission line since no trees taller than the height specified by TCN (generally 4 meters height) are being kept in the wayleave. Compensation to households will be allocated according to the prescribed rates up to economic trees and crops within the ROW no matter they are taller than 4 meters or not.

PAPs whose crops are to be negatively impacted by the project should be provided seedlings and seeds for their gardens and crops on their replacement land.

Furthermore, compensation should cover cost of improvement (fertilized, tilled, weeded, fenced, etc.) to reach the productive condition of the original plot. Affected households will be paid as land relocation assistance for agricultural land by the project to do this work as much as possible, by themselves.

Additionally, technical assistance will be provided for at least a two-year period to help the impacted households improve their situation. Project Implementation Unit is encouraged to engage an

experienced NGO agronomist who will also ensure coordination with governmental agricultural departments for the coordination and efficiency of the work. This specialist will assess concerns, needs and the most relevant aspects of livelihood improvement with PAPs and local administration as well as it will propose improvement and support activities.

This help can include:

- Practical training courses on improved agricultural techniques;
- Improved crop varieties;
- Fertilization;
- Small scale irrigation;
- Animal traction and related equipment;
- Post-harvest grain conservation; and
- Agroforestry, other relevant techniques.

7-10-2-3 Structures

Structures including houses that are located in the wayleave will have to be displaced. In that case the PAPs indicated adequate compensation that they would not have problem to obtain an available land to relocate their houses during the survey campaign.

Those structures should therefore be rebuilt on new land where the risk of spatial disruption of household activities is the lowest. All necessary steps will be taken by the TCN and the PIU or consultants in charge of compensation to make sure that the PAPs find a suitable land for reconstruction and enough time for reconstruction is allowed and proper compensation is paid.

Each of these household will receive additional compensation to cover the following expenses:

- A moving allocation to pay for moving their goods and belongings
- An income support for of the household to mitigate the inconvenience and time constraints related to the resettlement.
- Cost for land administration, taxes and other charges associated with land acquisition.

7-10-2-4 Vulnerable Groups

A special focus must be given to the livelihood improvement of vulnerable groups prior to commencement of the construction of the project. Vulnerable groups include low-income families, women, and child (under 18 years heading a household) or handicap headed households.

Vulnerable households will be consulted at the onset of the operation to evaluate their concerns and needs. Special help that could be provided include:

- Support to open bank account and financial management (e.g. how to use compensation properly);
- Help for administrative transactions (land titling);
- Relocation logistics and other support for the physically resettled households such as:

  - Transport assistance;
  - Reconstruction advise (on materials, type of structures, etc.) to ensure the quality of construction;
- Psychological support (information, counselling, discussion);
- Special transitional funds specific to vulnerable households (the funds are financial aid for vulnerable households to recover their livelihood. The necessity of the funds was not identified during the stakeholder consultation process but it is planned to be established by TCN when needed).

Members of affected households should also benefit from the proposed training programs. Household members within vulnerable households are to be given priority for the allocation of project related employment and other benefits.

Given the current place of females in rural communities, when cash compensations is the only acceptable option, the following possible mitigation measures should also be examined and implemented when feasible:

- Awareness programs on issues directed towards authorities, local administrators and communities;
- Assistance of the PIU to inform and assist vulnerable people and groups;
- Seeking full consent of females in the households and explaining to them the proposed compensation options (it is recommended to record the full consent of females in documents by RIC and the document shall be filed by TCN when needed);
- Payment of large amounts of cash compensation (larger than N 200,000) through carefully distributed instalments (it can be over several months) to mitigate the potential for cash misuse;
- Careful monitoring.

Some handicapped headed households were identified in the project area. Two of these handicapped PAPs are cripples and another two have sight problem. These four handicapped headed households should be given necessary compensation and support for resettlement.

7-10-2-5 Non-Financial Components

As a part of non-financial components, professional assistance and advice will be given to all PAPs to re-establish and develop the business. In addition, vocational or skilled training will be provided for business owners or their family members. To provide these assistances, a professional expert or NGO may be retained by the TCN.

Priority should be given to all able bodied members of resettled households during the labour recruitment process. This applies to the employment and contract opportunities such as clearing of the corridor, porterage for movement of construction materials to transmission pylon development and other sites, construction of access roads and construction camps, reconstruction of community buildings and houses, provision of services and goods to the workers; administration of the compensation program,

monitoring activities, etc.

Furthermore, all the affected households and communities should be given all the wood that is cut on their parcel for their own use or sale. The materials salvaged from the affected structures should also be left to the affected households and communities.

All goods and services (sand, cement, food, etc.) should be bought locally when possible. This applies to all contractors and specific provisions to that effect must be included in the construction Terms of Reference.

7-11 Implementation Budget and Schedule

7-11-1 Land Acquisition and Resettlement Budget

The land acquisition, resettlement, Livelihood Restoration Strategies (LRS) implementation and monitoring budget is summarized in Table 7-40 below. This includes all costs involved in the execution of all RAP and LRS activities except for the compensation for the land and crops/economic trees within access road and work camp that will be designed during the construction period, and the cost will be included in contractors' cost. Also, it should be noted that the budget below is still under the evaluation process by RAP consultants. The total budget shared by TCN is 5,863,913,658.54 Naira (ca. USD 19,158,108 when currency conversion factor is 306.08 Naira/USD).

Table 7-40 Land Acquisition and Resettlement Budget

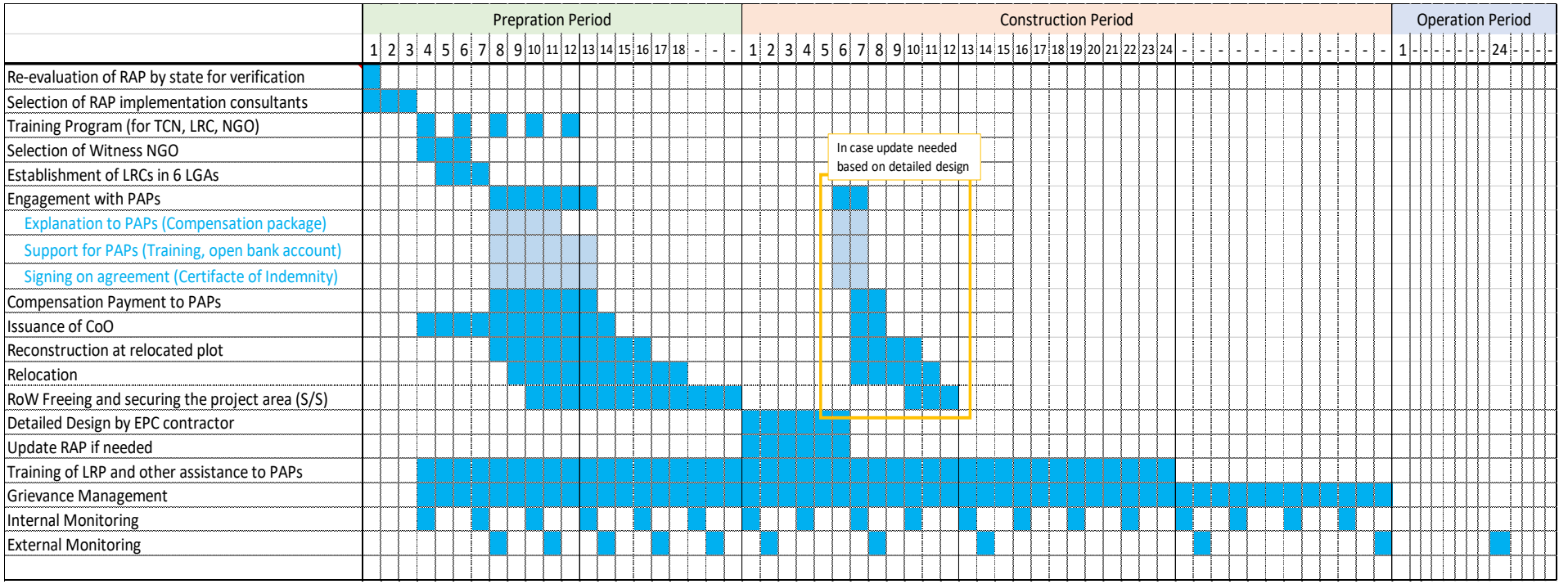
		Lot 1	Lot 2	Lot 3	Remark
(a)	Crops	386,027,143.00	396,993,628.50	400,905,574.24	
(b)	Structures	201,817,797.00	1,679,918,207.82	2,146,630,564.12	
(c)	(a) + (b)	587,844,940.00	2,076,911,836.32	2,547,536,138.36	
	Sub-Total	**587,844,940.00**	**2,076,911,836.32**	**2,547,536,138.36**	
(d)	Support to vulnerable groups	11,201,182.83	6,132,145.40	16,236,000.00	
(e)	Security, bank charges, stamp duty and other logistics, for compensation payment for Crops	9,650,678.58	9,924,840.71	10,022,639.36	2.5% of (a)
(f)	Security, bank charges, stamp duty and other logistics, for compensation payment for Structures	5,045,444.93	41,997,955.20	53,665,764.10	2.5% of (b)
(g)	Demolition and salvage of structures	10,090,889.85	83,995,910.39	107,331,528.21	5.0% of (b)
(h)	Contingency for structures and crops	29,392,247.00	103,845,591.82	127,376,806.92	5.0% of (c)
(i)	Livelihood restoration and training & support, etc.	13,777,454.87	11,933,663.71	NA	
	Sub-total	**79,157,898.05**	**257,830,107.23**	**314,632,738.58**	
	TOTAL AMOUNT of EACH LOT	**667,002,838.05**	**2,334,741,943.55**	**2,862,168,876.94**	
	GRAND TOTAL AMOUNT			**5,863,913,658.54**	

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

7-11-2 Land Acquisition and Resettlement Schedule

The implementation schedule for this land acquisition and resettlement is shown in Table 7-41 below. The cash compensation shall be made before commencement of relocation and construction, and non-financial compensation shall be started before commencement of relocation and construction and will be kept being provided during construction period.

Table 7-41 Land Acquisition and Resettlement Schedule (Plan)



Source: JICA Study Team

7-12 Monitoring and Evaluation

The purpose of resettlement monitoring is to ensure that measures developed for compensating the losses were effective in restoring PAPs living standards and income levels. Monitoring will be implemented by the PIU.

Throughout the project lifecycle, monitoring and evaluation activities will be reviewed and revised in case that the previously produced procedures, tools and forms are inefficient.

Monitoring and Evaluation (M&E) procedures establish the effectiveness of all land and asset acquisition and resettlement activities, in addition to the measures designed to mitigate adverse social impacts. The procedures include internal tracking efforts as well as independent external monitoring.

The purpose of resettlement monitoring for the Project will be to verify that:

- Actions and commitments described in the RAP are implemented;
- Eligible PAPs receive their full compensation prior to the start of the rehabilitation activities on the corridor;
- RAP actions and compensation measures have helped the people who sought cash compensation in restoring their lost incomes and in sustaining/improving pre-project living standards;
- Complaints and grievances lodged by PAPs are followed up and, where necessary, appropriate corrective actions are taken; and
- If necessary, changes in RAP procedure are made to improve delivery of entitlements to PAPs.

PIU monitoring and evaluation activities and programs shall be adequately funded and staffed. PIU monitoring will be verified by the witness NGO to ensure provision of complete and objective information.

7-12-1 General

7-12-1-1 Monitoring Framework

The monitoring and evaluation framework consists of three elements:

- PIU monitoring;
- External monitoring undertaken by the Witness NGO; and
- RAP Completion Audit by an individual third party (e.g. another Witness NCO).

Indicators have been established in order to measure RAP activities, results, objectives and goals. There are five categories of indicators for performance monitoring. The first three (3) indicators (input, output and process indicators) are for Internal Performance Monitoring. These are mostly used for medium term measures to ensure that the RAP is relevant, effective and efficient. The last two indicators (outcome and impact indicators) are for Impact monitoring. These are mostly used for assessing the results long term measures.

Table 7-42 RAP Monitoring Framework

COMPONENT ACTIVITY	TYPE OF INFORMATION/ DATA COLLECTED	SOURCE OF INFORMATION/ DATA COLLECTIONS METHODS	RESPONSIBILITY FOR DATA COLLECTION, ANALYSES AND REPORTING	FREQUENCY/ AUDIENCE OF REPORTING
Internal Performance Monitoring	- Measurement of input, process, output and outcome indicators against proposed timeline - budget including compensation disbursement	Quarterly narrative status and compensation disbursement reports	PIU team, including public relations representatives	Quarterly or as required by TCN Environmental Committee and JICA
Impact Monitoring	- Progress of land acquisition and resettlement - Implementation of income restoration assistance - Restoration of income and living standard - Results of public consultation - Details of grievance redress	Annual quantitative and qualitative surveys. Regular public meetings and other consultation with PAPs; review of grievance mechanism outputs.	PIU team, including public affairs representatives, RIC, Witness NGO	Quarterly as required by JICA

The main mechanism to alert management of any delays and problems and will help TCN measure the extent to which the main objectives of the resettlement plan have been achieved.

RAP monitoring and evaluation activities will be adequately funded, implemented by qualified specialists and integrated into the overall PIU budget and activities.

PIU monitoring and evaluation activities will be supplemented and verified by monitoring efforts of the witness NGO.

The establishment of appropriate indicators in the RAP is essential since what is measured is what will be considered important. Indicators will be created for PAPs as a whole, for key stakeholder groups, and for special categories of affected groups such as women.

The most important indicators for the RAP are the near term concern outputs, processes and outcomes since they define whether the planned level of effort is being made and whether early implementation experience is being used to modify/redesign RAP features. Over the medium to long term, outcome and impact indicators are critical since they are the ultimate measure of the RAP's effectiveness in restoring people's livelihoods.

Monitoring indicators may have to be defined or re-defined during the course of project in response to changes to project-related conditions. Consequently, implementation and mitigation measures may have to be adopted to incorporate these changes into the M&E plan.

7-12-1-2 Indicators

Input Indicators

These cover the human and financial resources that are utilized in the RAP activities.

Output Indicators

Include activities and services produced with the inputs, which can be a database of land acquisition, compensation payments made for the loss of assets etc.

Process Indicators

Process indicators represent the change in the quality and quantity of access and coverage of the activities and services. Examples of process indicators in the RAP include:

- The creation of grievance mechanisms;
- The establishment of stakeholder channels so that they can participate in RAP implementation; and
- Information and dissemination activities.

Outcome Indicators

Outcome indicators refer to the delivery of mitigation activities and measures to compensate physical and economic losses created by the project (e.g. restoration and compensation of agricultural production and overall income levels, changes in PAPs and community attitudes towards the project, use of compensation payments for income generating activities).

Impact Indicators

Impact indicators define the change in medium and long-term measurable results in behaviour and attitudes, living standards, and conditions. Impact indicators aim to assess whether restoration activities of the RAP are effective in maintaining and even improving social and economic conditions of PAPs.

In addition to quantitative indicators, impact monitoring will be supplemented by the use of qualitative indicators to assess client satisfaction and the satisfaction of the affected people with the choices that they have made in re-establishing themselves.

Tracking this data will allow the PIU in determining the following types of information:

- The extent to which the quality of life and livelihood has been restored;
- The success of the resettlement; and
- Whether PAPs have experienced any hardship as a result of the project.

7-12-2 Internal Monitoring

Internal monitoring measures the progress of activities defined in the RAP. The PIU will be

responsible for this process with support from appointed experts, as necessary.

It is the responsibility of the PIU to conduct regular internal monitoring of the resettlement efforts and performance of the operation through LRC, which will be responsible for implementing resettlement activities and manage grievances. The monitoring shall be a systematic evaluation of the activities of the operation in relation to the specified criteria of the condition of approval. The internal monitoring will be carried out quarterly. The RIC will collect necessary information to evaluate the progress of compensation and report it to the PIU, then PIU prepare the quarterly internal monitoring report and submit it to TCN management and other relevant organizations including JICA.

7-12-3 External Monitoring

External monitoring activities will verify the process defined in the RAP.

The witness NGO shall be established to periodically carry out external monitoring and evaluation of the implementation of the RAP. The external monitoring will be carried out quarterly until land acquisition will be completed, and semi-annually or annually after that as shown in Table 7-41.

The following parameters will be monitored and evaluated through PIU report review and sites visits:

- Public consultation and awareness efforts of compensation distribution;
- PAPs should be fully informed and consulted about all resettlement activities, including land acquisition, leasing land and relocation activities;
- The witness NGO representative should attend some public meetings to monitor consultation procedures, problems and issues which arise during the meetings, and proposed solutions;
- Levels of PAPs' satisfaction with various aspects of resettlement and compensation will be monitored and recorded;
- Operation of grievance redress mechanism, redress results, and effectiveness of grievance resolution will be monitored;
- Standards of Living - throughout resettlement implementation process, the trends of living standards of PAPs will be observed and surveyed, and any potential problems in restoration of living standards will be recorded and reported.

The witness NGO should have qualified and experienced staff and their terms of reference acceptable to the financing requirements of JICA.

In addition to verifying the information furnished in the internal supervision and monitoring reports, the independent monitoring unit shall visit a sample of 10% of PAP in each relevant district, six (6) months after the RAP has been implemented to:

- Determine whether the procedures for PAPs participation and delivery of compensation and other rehabilitation entitlements have been done in accordance with the Policy Framework and the respective RAP;
- Assess if the RAP objective or, enhancement or at least restoration of living standards and income

levels of PAPs have been met;

- Gather qualitative indications of the social and economic impact of project implementation on the PAPs; and
- Suggest modification in the implementation procedures of the RAP, as the case may be, to achieve the principles and objectives of this RAP.

Both internal and external monitoring will be assessed with RAP Completion Audit.

RAP Completion Audit

A RAP completion audit will be undertaken by a third party (e.g. an individual consultant) when previous monitoring has indicated that there is no significant outstanding issue regarding livelihood restoration and resettlement. It is expected that this final audit will be performed 3 years after the resettlement, at the latest.

The RAP completion audit will be undertaken by an independent consultant as required. It will provide final indication that the livelihood restoration is sustainable and no further interventions are required.

Therefore, the independent audit will assess compliance programs resettlement / compensation against the provisions described in the RAP, the Nigerian legal framework applicable and the requirements of World Bank/JICA. The evaluation report will be made public by the PIU and LRC meeting through public announcement by using appropriate media (e.g. TCN's web site, newspaper, radio, etc.).

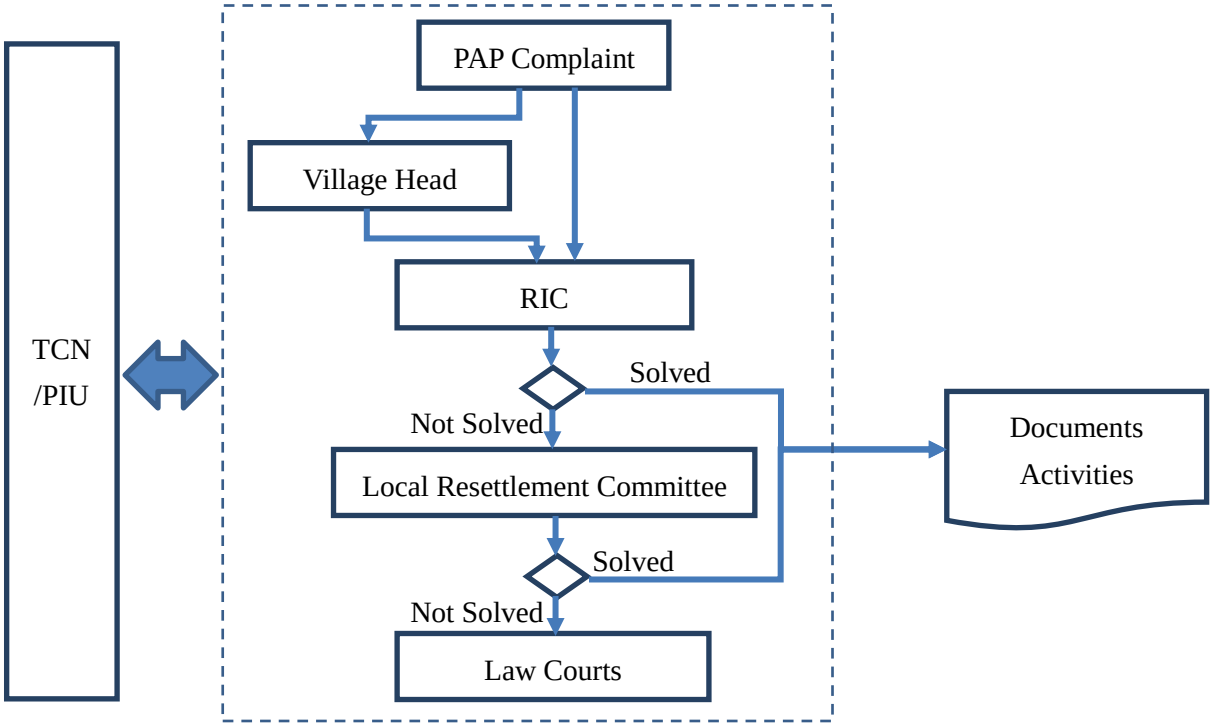
7-13 Grievance Mechanism

During implementation of the project activities, it is possible that disputes/disagreements between TCN and the PAPs will occur especially in terms of compensation, boundaries, ownership of crops or land, etc.

The practice of grievance arbitration over resettlement issues in Nigeria is conducted within the framework of the Land Use Act (LUA) of 1978, reviewed under Cap 202, 1990. Two stages have been identified in the grievance procedure: customary mediation by Local Resettlement Committee and judiciary hearings.

Procedures for grievances will be clearly explained during community meetings. The aggrieved person shall first report the matter to the Village Head (Baale) or RAP Implementation Consultant (RIC) for resolution. Issues that can be resolved by Customary Chiefdom and Village Chief at this level include, ownership tussle, management of deceased property, boundary issues, etc. The type of issues to report to the RIC may include perceived wrong valuation, incorrect PAP data, inadequacy of compensation received, etc.

In case that the issue is not resolved by Baale and/or RIC at this stage, it can then be escalated to customary mediation and if still no acceptable resolution is achieved, the parties may choose to go to court in accordance with laws of the Federal Republic of Nigeria. Figure 7-26 illustrates this mechanism.



Source: JICA Study Team

Figure 7-26 Grievance Resolution Procedure

7-13-1 Local Resettlement Committee

At the village levels, a series of customary avenues exists to deal with dispute resolutions. Those avenues should be employed, when and where it is relevant as a "court of first appeal".

Such customary avenues should provide a first culturally and amicable grievance procedure that will facilitate formal and/or informal grievance resolution for grievances.

A Local Resettlement Committee shall be set up by the PIU in each LGA to address complaints related to RAP implementation. This committee will be assisted by the PIU who will act as TCN representative. The Committee will consist of:

- Respected person (e.g. a retired senior citizen, Iman/Alfa or Church Priest, can act as Chairperson of LRC)
- Customary chiefdom (i.e. Oba) from the area crossing the project area
- All LCDA chairman from the area crossing the project area
- DSS officer (Department of security service, Divisional Police Office)
- Women leader and Youth leader at least one for each LGA as necessary
- Witness NGO

PAPs' complaints should first be lodged verbally or in writing through this process.

It is expected that the committee will deal with the grievances they receive within three days of receipt of the complaint. If the complaint cannot be resolved at this level, or if the plaintiff is not satisfied with the settlement proposed, the plaintiff should then be referred to the official legal procedures.

7-13-2 Courts of Law

The judicial process in accordance with applicable laws will be followed and the law courts will pass binding judgment on the matter.

7-14 Stakeholder Engagement

7-14-1 Objective

General objective of stakeholder engagement of this study were to:

- Inform stakeholders on the proposed infrastructures and activities and seek their informed opinion about the socio-environmental risks and opportunities potentially associated with the project as well as take the measures and actions in order to manage the anticipated impacts;
- Obtain feedback from stakeholders on issues of concern and expectations in order to optimize the project;
- Generate a social and institutional dialogue in order to assess and strengthen the project's social acceptability; and
- Help to consolidate, through the ESIA and RAP process, the efforts made by the TCN in order to establish lasting relationships with affected communities and other stakeholders.

7-14-2 Target Stakeholder

Target stakeholder groups of this study included:

- Concerned agencies and organizations at National and State levels;
- State level (Ogun and Lagos) agencies;
- LGA-level agencies;
- Customary authorities in communities affected by the line; -Obas, Ba'ales and Village Heads crossed by the line route;
- Representatives of women group, youth group and occupational group in communities affected by the line;
- Vulnerable people including elderlies, single women and physically handicapped persons;
- Industrial and commercial actors affected by the line, including relevant TCN departments, and JICA; and
- Security agencies, national civil security and defense corps, department of security service, and the Nigerian Police.

7-14-3 Summary of Consultations

Table 7-43 LOT 1 Stakeholder Engagement Meetings

Stakeholder Engagement	Engagement Activity	Stakeholders	Number of Participants	Venue	Date/Time	Specific Discussion Areas
STAGE 1 : SCOPING						
Government Agencies – Federal, State and Local Government Authority Regulatory Authorities.	Meeting with Federal, State and Local Council Officials.	Federal Ministry of Environment, Abuja.	9	Abuja & Ogun State	May 30, 2017 June 28, 2017 July 11, 2017 (12pm)	• Registration of the Project; • Scope of data collection and ToR approval; • Issues concerning site verification; • EIA process and scope of the EIA; • Approval for one season waiver; • Approval for the transmission lines; • Initial consultation/ sensitization on the project.
		Ogun States	25 32 28	Abeokuta, Ogun State	May 11, 2017 June 29, 2017 July 27, 2017	
		Ifo LGA Ewekoro Obafemi-Owode	6	LGA Secretariat	July 20, 2017 (11am-1pm)	
STAGE 2: Line Route survey/ESIA Study						
Baseline Data Collection: Community Engagement, engagement with local groups and traditional leaders.	Meeting with Traditional Rulers, women leaders , Youth leaders and Project Affected Persons (PAPs)	The head and chiefs of host communities. (75communities) women leaders, youth leaders &PAPs	About 500 persons	Palace of Oba/ Palace of Baale	December 18 - 23, 2017 and January 22 – 24, 2018 (between 10am -5pm)	• Formal presentation of the project Background information; • Discussion of community concern; and • The need for a grievance mechanism throughout the project life.
Government Agencies – Federal, State and Local Government Authority Regulatory Authorities.	Meeting with Local Government Officials and Project Affected Communities at the Secretariat. Line route inspection	Ifo LGA; Ewekoro LGA Obafemi-Owode LGA and concern parties TCN & Ogun State ministries	78 142 60 10	LGA Secretariat LGA Secretariat Palace of Oba-Eerin in Oba LCDA Line route for Lot 1	Dec. 12, 2017 Dec. 13, 2017 Dec. 23, 2017 (10am-1pm) Oct.25,2017	• Formal Presentation of the project background information. • Engagement with affected communities; • Potential positive impacts (provision of electricity and employment of opportunities for local people; and • Community development in general. • Line route optimization
Local communities	Meetings with persons in the project affected area	Communities (women group meetings were also separately held)	71 communities	All communities in Lot 1	July – December 2017	•Data collection and consultations for ESIA and RAP
Others		JICA consultants & TCN team	20	Ogun state Lagos State	March 2,2018 March 6,2018 (11am-5pm)	• Issues pertaining to hotspots on the lines • Issues pertaining to ESIA/RAP review
		Nigeria Conservation Foundation	12	NCF Head office Lekki- Lagos State	March 7,2018 (11am-12pm)	• Engagement with Nigeria Conservation Foundation to obtain their view on the project and review the report.

Source: Goddira 2018

Table 7-44 LOT 2 Stakeholder Engagement Meetings

Stakeholder Engagement	Engagement Activity	Stakeholders	Number of Participants	Venue	Date/Time	Specific Discussion Areas
STAGE 1: SCOPING						
Government Agencies – Federal, State and Local Government Authority Regulatory Authorities.	Meeting with State and Local Council Officials.	Federal Ministry of Environment, Abuja.	6	Environment House, Abuja	May 10, 2017 July 11, 2017	• Registration of the Project; • Scope of data collection and ToR approval; • Issues concerning site visitation; • EIA process and scope of the EIA; • Approval for one season waiver; and • Approval for the substation and the lines.
		Ogun States	35	Governor's office Secretariat	May 3,2017 Every last Thursday of the Month	
		Sagamu, Ewekoro, Owode Obafemi & Ifo LGA	7	Each Secretariat	November 19 -30, 2017 January 10, 2018	
STAGE 2: Line Route survey/ESIA/RAP Studies						
Baseline Data Collection: Community Engagement, engagement with local groups and traditional leaders.	Meeting with Traditional Rulers and Youths.	The head and chiefs of host communities. (78 communities)	129	Each host community as in Table 4.11.3	December 18 -23, 2017	•Formal presentation of the project; •Discussion of community concern; and •The need for a grievance mechanism throughout the project life.
Government Agencies – Federal, State and Local Government Authority Regulatory Authorities.	Meeting with Local Government Officials.	Sagamu South; Sagamu West and Ofada/Mokoloki LCDAs and others	155	Sagamu South LCDA Secretariat, Ejio Town Hall and Ofada/Mokoloki LCDA Secretariat	December 15-16, 2017	•Engagement with affected communities; •Potential positive impacts (provision of electricity and employment of opportunities for local people; and •Community development in general.
		Federal Ministry of Environment, Abuja.	18	Redemption Camp	July 11, 2017	•Issues pertaining to appropriate location of the Substations
		Transmission Company of Nigeria, Abuja.	10	Redemption Camp	December 20, 2017	•Engagement with Redeem Officials to take decision on the appropriate substation location
Local communities	Meetings with persons in the project affected area	Communities (women group meetings were also separately held)	78 communities	All communities in Lot 2	July – December 2017	•Data collection and consultations for ESIA and RAP
Non-Governmental Agency (NGO) –		Nigerian Conservation Foundation (NCF)	12	NCF Office, Lekki, Lagos	March 7, 2018	•Discussion on potential impacts of proposed projects on biodiversity NCF shows their interest for the collaboration of TCN`s project if there is any opportunity

Source: SEEMS 2018

Table 7-45 LOT 3 Stakeholder Engagement Meetings

Stakeholder Engagement	Engagement Activity	Stakeholders	Number of Participants	Venue	Date/Time	Specific Discussion Areas
STAGE 1: SCOPING						
Government Agencies – Federal, State and Local Government Authority Regulatory Authorities.	Meeting with State and Local Council Officials.	Federal Ministry of Environmental and the Federal Agencies, Lagos State agencies, Badagry LGA	42	Lagos	May 30, 2017 June 28, 2017 July 11, 2017	• Registration of the Project; • Scope of data collection and ToR approval; • Issues concerning site visitation; • EIA process and scope of the EIA; • Approval for one season waiver; and • Approval for the substation and the lines.
		Ogun State Agencies, Ewekoro LGA, Ifo LGA, Ado Odo/ Ota LGA	21	Abeokuta	May 11, 2017 June 29, 2017 July 27, 2017	
		Affected Communities	52	Baale's Palaces in respective communities	March 24-27, 2017	
STAGE 2: Line Route survey/ESIA/RAP Studies						
Baseline Data Collection: Community Engagement, engagement with local groups and traditional leaders.	Meeting with Traditional Rulers and Youths.	The head and chiefs of host communities.	67	Baale's Palaces in respective communities and hotspots in the communities and substations	December 18 - 23, 2017	•Formal presentation of the project; •Discussion of community concern; and •The need for a grievance mechanism throughout the project life.
Government Agencies – Federal, State and Local Government Authority Regulatory Authorities.	Meeting with Local Government Officials.	Sagamu South; Sagamu West and Ofada/Mokoloki LCDAs and others	27	TCN Office Hotspots along the line and substations	September 15-16, 2017	•Engagement with affected communities; •Potential positive impacts (provision of electricity and employment of opportunities for local people; and •Community development in general.
		Federal Ministry of Environment, Abuja.	7	Along the line and substations	December 18-23, 2017	•Issues pertaining to appropriate location of the Substations
Local communities	Meetings with persons in the project affected area	Communities (17% of participants were women)	77 communities	All communities in Lot 3	July – December 2017	•Data collection and consultations for ESIA and RAP

Source: EEMS 2018

7-14-4 Key Outcome of Consultations

Key outcomes from consultations with relevant national and state agencies are listed:

- The communities understood the objectives and requirements of the project and pledged support and cooperation
- The relevant agencies are aware of the project and the ESIA process (team, objectives and schedules
- The requirements of Ogun State and Lagos State Laws and Regulations relevant to the project were highlighted by the agencies and understood by TCN and its consultants;
- The Ogun State Governor established a committee to provide support for the project to speed up processes of this study especially in terms of access to the communities, information dissemination to the communities and the state as a whole as regards the state master plan and to speed up approvals by the state government, while Lagos State Governor provided a high ranking cabinet member (Commissioner for Energy) to coordinate Lagos State support for the project, specifically providing state land for Badagry Substation.

Key outcomes from consultations with affected communities are summarized in Table 7-46 below.

Table 7-46 Key Outcome from Community Consultations

Topic	Comments or Recommendation	Stakeholder Commented or Recommended	Actions to Address Comments
General Comments	Compensation should be paid directly to PAPs and not through any third party. PAPs request that they be paid in cash instead of building houses for them to decide the new location by themselves and control the cost and quality to avoid trust issues	Communities	Although the OP 4.12 discourages cash for land, the Land Use Act allows it. TCN also prefer cash compensation as a policy. Hence, cash payment will be adopted to respect request of the affected people.
	Will PAPs be permitted to be identified by proxy in case of recorded absentees?		A 2nd party can only be captured as PAP upon receiving a consent (written or phone confirmation) from the 1st PAP that authorizes the second party to act as PAP, and also substantiated by the witnessing of the community leaders that the person representing an absentee PAP is known by them
	Who is the rightful claimant eligible for entitlement for land that has been leased out for crop farming?		The land owner is eligible for his land, while the farmer on the land is entitled to compensation for his/her crops
	How evaluation will be done to owners of fallow lands in terms of compensation entitlement?		Owners of fallow land are not entitled for compensation, except they hold some statutory rights
	Will the project create employment opportunity to engage the youths who are not gainfully employed?		The project will try to create employment directly and indirectly
	Will the project consider compensating landowners with statutory rights only or all owners of land irrespective title holding?		Landowners without statutory rights are only entitled to compensation for the value of improvement on the land (e.g. structures, etc.).
Social Infrastructure	There is a general concern regarding the provision of basic social infrastructure and amenities such as health facilities, schools, and potable water supply. These facilities are grossly inadequate in the affected communities	Affected Community Leaders	The participants were informed that the project would attract development to the communities.
Health and Safety	Concern on the likely problem for the neighbouring communities and the fear that the project would not generate additional problems like vibration, noise, EMF and gaseous emission	Affected Communities (Community Leader, Women Leader Youth Leader)	The interests and concerns of the community will be put into consideration. Their project will be executed with the highest standard and in a way that their safety and health will not be jeopardized.
	Concern on health hazard and EMF effect		
	Hoped that the substations would be built in line with the highest safety standards and would create the minimum disruption to communities		
Yafin Village	The corridor crossed two shrines, which cannot be moved and proposed site for Baale's Palace. Need to avoid them	Baale of Yafin	The line has been re-aligned and the sacred sites were avoided
Tohun Village	The corridor crossed the middle of the small community of Tohun	Baale of Tohun	The line was adjusted, to pass at the Southern side of the community, thereby minimizing houses affected
Igbele Village	The corridor affects palm oil factory and its plantations, which should be avoided considering people driving livelihood from the factory as workers	Community members	The line was adjusted to avoid the factory and its palm plantations.

Source: Goddira 2018, SEEMS 2018 and EEMS 2018

7-15 Actions to be Taken for RAP Implementation

(1) Establishment of Organizations for RAP Implementation

For implementation of the RAP, it is recommended that TCN will initiate the following:

- Selection of RAP Implementation Consultant (RIC),
- Establishment of Local Resettlement Committees (LRCs) in all LGA crossing the Project area, and
- Selection of Witness NGO that will have key roles for RAP implementation.

To ensure the appropriate implementation of roles and responsibilities of each organization, RIC will provide training to TCN, LRC and Witness NGO.

(2) PAPs Engagement

Based on the results collected during the study carried out to prepare the RAP, TCN will prepare compensation package for each PAP and explain and offer the compensation. Once the PAP accepts the compensation offer, TCN will provide full payment of compensation. At the same time, Certificate of Indemnity will be issued by PAPs.

(3) Local Consultation and Information Management

During the RAP implementation period, many types of information will be generated and these will need to be reported/shared to relevant organizations such as TCN PIU, JICA, RIC, LRC, Witness NGO etc. in a timely manner. Since the extent of the Project area is wide and the number of PAPs exceed eight thousand, data template and management protocol must be prepared by TCN PIU and RIC prior to the commencement of the RAP implementation.

(4) Livelihood Restoration

TCN is responsible for assisting PAPs' livelihood rehabilitation/improvement program.

(5) Monitoring

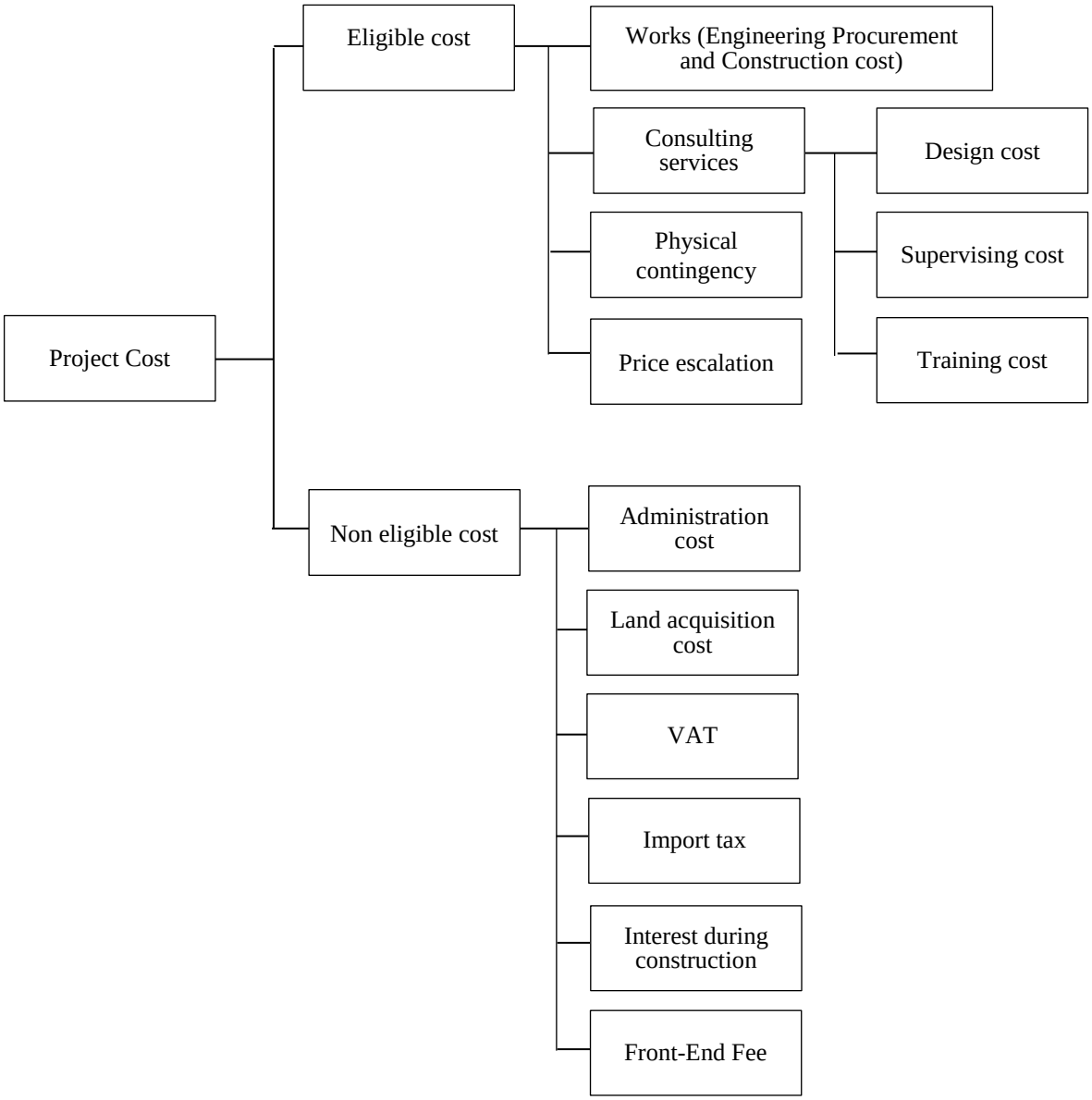
TCN will formulate not only an internal monitoring mechanism, but also an external monitoring mechanism. Through the monitoring mechanisms, PAPs' livelihood rehabilitation/ improvement mentioned above will be also assessed.

Chapter 8 Cost Estimation of the Project

Chapter 8 Cost Estimation of the Project

8-1 Components of project cost

The general components of the project cost are indicated in Figure 8-1.



Source: JICA Study team

Figure 8-1 General structure of the project cost

8-2 Cost estimation precondition

The cost estimation was conducted based on the following:

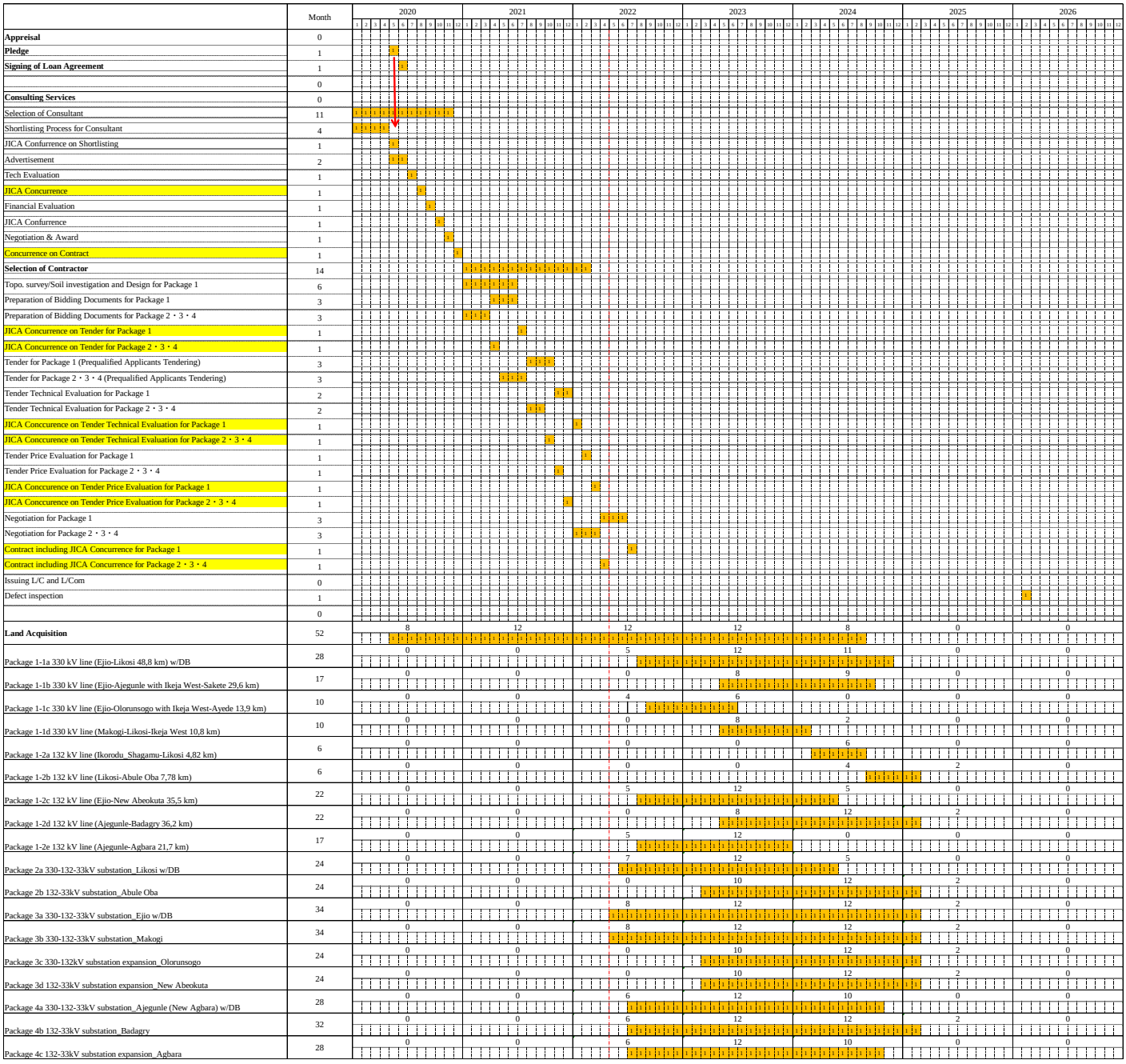
(1) Exchange rate

1) JPY/USD	USD 1 = 107 JPY
2) NGN/USD	USD 1 = 307 NGN
3) JPY/NGN	NGN 1 = 0.349 JPY

(2) Price escalation ratio
    1) Foreign Currency (FC) 1.72%/year
    2) Local Currency (LC) 4.64%/year
(3) Physical contingency
    Construction: 8%/year
    Consultant: 8%/year
(4) Cost estimation year and month
    November, 2019
(5) Interest during construction
    Construction: 1.15%/year
    Consultant: 0.01%/year
(6) Front-end fee
    0.2%
(7) VAT
    5%
(8) Import tax
    3.5%
(9) Others
    Interest during construction shall be included in the Non eligible cost.

8-3 Project implementation schedule

Project implementation schedule is shown in Figure 8-2. Prequalification is combined with the Tender in one-stage in order to shorten the project period.



Source: JICA Study team

Figure 8-2 Project implementation schedule

8-4 Estimated project cost

The project cost comprises the works cost, consultant (design, supervision and training) cost, physical contingency, project administrative cost, interest during construction, etc. Each cost is then broken down into foreign currency and local currency portions. Table 8-1 shows the cost estimate for the project.

Table 8-1 Project cost estimate

Unit: Mill. JPY

No.	Item	Contents	Amount
[1]	Works		
	(1)	Engineering	21,271*
	(2)	Procurement	
	(3)	Construction	
[2]	Consulting services		
	(1)	Design	1,509
	(2)	Supervision	
	(3)	Training	
[3]	Physical contingency		1,854
	Price escalation		1,907
[4]	Administration cost		1,454
[5]	Land acquisition		2,537
[6]	VAT		1,327
[7]	Import tax		815
[8]	Interest during construction		1,056
[9]	Front-End Fee		53
[10]	Total		33,783

*: Works (Construction) was calculated applying an LL-ACSR as conductor.
Source: JICA Study Team

Each item was calculated based on the following policy:

(1) The Works cost

The estimate of the works cost was based on the actual construction work prices obtained in Nigeria were adopted as a general rule. As for equipment considered to be procured from Japan, cost estimates were obtained from Japanese manufacturers.

The breakdown of the Works is shown in Table 8-2.

Table 8-2 Breakdown of the Works cost

Item	Foreign Currency (Mill. JPY)	Local Currency (Mill. NGN)	Total (Mill. JPY)	Remark
(1) Construction of substation and transmission equipment	**19,351**	**5,501**	**21,271**	**Base Cost**
Package 1	4,078	5,501	5,998	
Package 2	4,805	0	4,805	
Package 3	6,391	0	6,391	
Package 4	4,077	0	4,077	
(2) Price Escalation	**1,474**	**1,239**	**1,907**	
(3) Physical Contingency	**1,666**	**539**	**1,854**	
Total	**22,491**	**7,279**	**25,602**	

Source: JICA Study Team

(2) Consulting services cost

In principle, 3,246,000 JPY/MM for the Japanese consultant and 1,896,848 NGN/MM for a local

Consultants were applied and calculated based on the work schedule, before finally adding price escalation and physical contingency were added. The cost is under discussion with TCN, with a proposed consulting cost by TCN of 555 Mill. JPY

A breakdown of the Consulting services cost is shown in Table 8-3.

Table 8-3 Breakdown of Consulting services cost

Item	Foreign Currency (Mill. JPY)	Local Currency (Mill. NGN)	Total (Mill. JPY)	Remark
Design, supervision and training	**697**	**1,576**	**1,247**	**Base cost**
Price escalation	**45**	**301**	**150**	
Physical Contingency	**59**	**150**	**112**	
Total	**801**	**2,026**	**1,509**	

Source: JICA Study Team

(3) Physical contingency cost

8% of the physical contingency was calculated as the subtotal of the works and 8% for consulting services.

(4) Administrative cost

5% of the consulting service cost and the land acquisition cost was applied.

(5) Land acquisition cost

2,537 Mill. JPY will be required to acquire and pay compensation for the land for the project sites.

(6) VAT cost

Value-Added Tax (VAT) shall be borne by the Nigeria side, 5% of the works cost and the consulting service cost.

(7) Import tax

Import tax shall be borne by the Nigeria side, 3.5% of foreign currency portion of the works cost and the consulting service cost.

(8) Interest during construction cost (Tentative)

1.15% of the works cost and 0.01% of the consulting service cost are tentatively applied as the interest rate during the construction, compound interest calculation is applied.

8-5 Work scope

The work scope were planned as Table 8-4.

Table 8-4 Work scope

Pkg No.	Package Name	Description		QTY		ID
Package 1	Transmission lines construction	330 kV double circuit transmission lines (110.1 km)	Package 1-1a: Ejio (Arigbajo) S/S-Likosi (Ogijo) S/S line with turn-in at Likosi (Ogijo) S/S as below - Omotosho P/S line (4 circuits) - Egbin P/S via Paras Energy P/S line (2 circuits) - MAKOGI (MFM) S/S line (2 circuits)	48.8	km	EJ-LI
			Package 1-1b: Ejio (Arigbajo) S/S-Ajegunle (New Agbara) S/S line with turn in/out Ikeja West S/S-Sakete S/S line	29.6	km	EJ-AJ
			Package 1-1c: Ejio (Arigbajo) S/S-Olorunsogo P/S line with turn in existing Ejio (Arigbajo) S/S-Olorunsogo P/S line and turning in/out Ikeja West S/S-Ayede S/S line	13.9	km	EJ-OL
			Package 1-1d: MAKOGI (MFM) S/S-turn in/out Likosi (Ogijo) S/S-Ikeja West S/S line (Parallel Double Circuit Tower, length 5.4 km)	10.81 in Double circuit	km	MA-(IK-LI)
		132 kV double circuit transmission lines (105.4 km)	Package 1-2a: Likosi (Ogijo) S/S-turn in/out Ikorodu S/S-Shagamu S/S line (4-Circuit Tower, length 2.21 km)	4.82 in Double circuit	km	LI-(IK-SH)
			Package 1-2b: Likosi (Ogijo) S/S-Abule Oba (Redeem) S/S line	7.78	km	LI-AO
			Package 1-2c: Ejio (Arigbajo) S/S-New Abeokuta S/S line (4-Circuit Tower, length 6.0 km)	36.5 in Double circuit	km	EJ-NA
			Package 1-2d: Ajegunle (New Agbara) S/S-Badagry S/S line	36.2	km	AJ-BA
			Package 1-2e: Ajegunle (New Agbara) S/S-Agbara S/S line	21.7	km	AJ-AG
Package 2	Substations Construction (1)	Package 2a New construction of 330/132/33kV substation at Likosi(Ogijo)	330/132/33 kV 300 MVA transformer	2	No	-
			132/33 kV 100 MVA transformer	2	No	-
			330 bay - Ejio (Arigbajo) S/S-Likosi (Ogijo) S/S line (2 bays) - Omotosho P/S line (4 bays) - Egbin P/S via Paras Energy P/S line (2 bays) - MAKOGI (MFM) S/S line (2 bays)	10	No	-
			132 kV bay - Ikorodu S/S-Shagamu S/S line (4 bays) - Likosi (Ogijo) S/S-Abule Oba (Redeem) S/S line (2 bays)	6	No	-
			33 kV bay	6	No	-
		Package 2b New construction of 132/33kV substation at Abule Oba (Redeem)	132/33 kV 60 MVA transformer	2	No	-
			132 kV bay - Ajegunle (New Agbara) S/S-Badagry S/S line (2 bays)	2	No	-
			33 kV bay	6	No	-
Package 3	Substations Construction (2)	Package 3a New construction of 330/132/33kV substation at Ejio(Arigbajo)	330/132/33 kV 150 MVA transformer	2	No	-
			132/33 kV 60 MVA transformer	2	No	-
			330 kV bay - Ejio (Arigbajo) S/S-Likosi (Ogijo) S/S line (2 bays) - Ejio (Arigbajo) S/S-Ajegunle (New Agbara) S/S line (2 bays) - Ejio (Arigbajo) S/S-Olorunsogo P/S line with turn in existing Ejio (Arigbajo) S/S-Olorunsogo P/S line (4 bays) - Turning in/out Ikeja West S/S-Ayede S/S line (2 bays)	10	No	-
			132 kV bay - Ejio (Arigbajo) S/S-New Abeokuta S/S line (2 bays)	2	No	-
			33 kV bay	6	No	-
		Package 3b New construction of 330/132/33kV substation at Makogi(MFM)	330/132/33 kV 150 MVA transformer	2	No	-
			132/33 kV 60 MVA transformer	2	No	-
			330 kV bay - MAKOGI (MFM) S/S-turn in/out Likosi (Ogijo) S/S-Ikeja West S/S line (4 bays)	4	No	-
			132 kV bay	0	No	-
			33 kV bay	6	No	-

Pkg No.	Package Name	Description		QTY		ID
		Package 3c Expansion of 330 kV line bay at Olorunsogo power station	330 kV bay - Ejio (Arigbajo) S/S-Olorunsogo P/S line (2 bays)	2	No	-
		Package 3d Expansion of 132 kV line bay at New Abeokuta	132 kV bay - Ejio (Arigbajo) S/S-New Abeokuta S/S line (2 bays)	2	No	-
Package 4	Substations Construction (3)	Package 4a New Construction of 330/132/33kV substation at Ajegunle (New Agbara)	330/132/33 kV 150 MVA transformer	2	No	-
			132/33 kV 60 MVA transformer	2	No	-
			330 kV bay - Ejio (Arigbajo) S/S-Ajegunle (New Agbara) S/S line (2 bays) - Turn in/out Ikeja West S/S-Sakete S/S line (2 bays)	4	No	-
			132 kV bay - Ajegunle (New Agbara) S/S-Badagry S/S line (2 bays) - Ajegunle (New Agbara) S/S-Agbara S/S line (2 bays)	4	No	-
			33 kV bay	6	No	-
		Package 4b New construction of 132/33kV substation at Badagry	132/33 kV 60 MVA transformer	2	No	-
			132 kV bay - Ajegunle (New Agbara) S/S-Badagry S/S line (2 bays)	2	No	-
			33 kV bay	6	No	-
		Package 4c Expansion of 132 kV line bay at Agbara	132 kV bay - Ajegunle (New Agbara) S/S-Agbara S/S line (2 bays)	2	No	-

Source: JICA Study team

8-6 Consulting services implementation plan

Consulting services shall be utilized to facilitate and streamline the project; coordinated among the implementing agency, EPC contractor, JICA and overseas/local stakeholders. Hence, the selection of the consultant who possesses sufficient qualification and experiences should be carried out in conformity with JICA consultant selection guidelines fairly and promptly. The consulting services shall include the followings:

- Basic design (Design Build Portion) and Detail design (Works Portion)
- Preparation of the Employer's Requirements
- Tender Assistance
- Construction supervision (Quality, Process and Safety)
- Facilitation of implementation of Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP) and Resettlement Action Plan (RAP)
- Technology transfer

Chapter 9 Project Evaluation

Chapter 9 Project Evaluation

9-1 Preconditions

Preconditions for the Project include securing a budget, land acquisition and compensation etc. in line with the Project implementation schedule. Also, after the detailed design, TCN has to consider modifying the evaluation for the environmental impact and a resettlement action plan, if any changes occur.

In line with the Project implementation, there are two particular preconditions for environment social consideration and coordination with the power sector.

(1) Environment social consideration

Regarding the land acquisition required for this project, TCN has prepared a resettlement action plan (RAP) following consultation with affected people. Based on the RAP, there are plans to pay appropriate compensation according to the compensation policy before relocation and after sufficient explanation to the affected residents, land acquisition is expected to proceed as planned.

(2) Power sector

The precondition of power sector is as followings.

- Realization of Power generation plan

  The power generation plan of applied by power-flow analysis of this Project are based on the Master Plan Study on National Power Development in Nigeria which was formulated by JICA. In addition, the plan is also considered the actual power generation on 2018 and power generation forecast in Lagos and Ogun. Therefore it is expected that the power generation plan is high possibility.

- Expansion of power distribution capacity

  This Project increases transmission capacity, the increase result in increase of customer. The increase of customer is profitable for private power distribution company, therefore it is assumed that the company invests distribution facilities to expand the power distribution capacity as customer increases. Therefore it is expected that the expansion of power distribution capacity is high possibility.

- Realization of power demand plan

  The power demand plan applied by power-flow analysis of this Project is considered the Transmission Expansion Plan (TEP) by support of World Bank (WB) on 2016 which TCN formulated the demand forecast based on the actual demand of each distribution substation. In addition, the demand of this Project is also considered the actual demand on 2018 and demand forecast in Lagos and Ogun. Therefore it is expected that the realization of power demand plan is high possibility.

9-2 Necessary Inputs by Recipient Country to Achieve the Overall Project Plan

(1) Prior to Starting the Construction Work

- Prior to starting the construction work, TCN shall have completed the following items promptly. Also, to facilitate the smooth implementation of the Project, TCN shall promptly complete the cutting of trees, removal of buried objects, ground leveling and so on in the Project site.
  - Compensation procedures for persons conducting activities within the corridor of transmission routes and plots for the substation of the Project
  - Implementation of resettlement based on the Resettlement Action Plan
- In addition, prior to starting construction work, TCN shall have completed the same procedures as above for access roads.
- Prior to starting the construction work, to ensure the Project equipment and materials are delivered promptly to the Project sites before installation work, TCN shall have completed the preliminary procedures necessary for tax exemption and customs clearance.
- Prior to starting the construction work, as part of operation and maintenance, TCN shall have completed the minor repairs for existing equipment directly related to the Project due to deterioration.
- Prior to starting the construction work, TCN shall have completed the reconnection, etc. of power distribution systems to maintain power supply during the rehabilitation of existing substations.
- Prior to starting the construction work, operation of the New Abeokuta substation shall have started.

(2) During the Construction Work

- During the construction work, TCN shall conduct the scheduled power outages required for the Project in conformity with the schedule agreed between TCN and the Consultant and in a timely manner.
- During the construction work, TCN shall conduct environmental and social impact monitoring based on the Monitoring Form prepared during the Preparatory Survey carefully.
- During the construction work, the Government of Nigeria shall allocate the budget required for the Project, including the cost covered by the Nigerian side, promptly.

(3) After the Installation Work of the Project and Commencement of Operation

- After the installation work of the Project, TCN shall conduct the commissioning required for the function test or other related issues of the equipment of the Project promptly.
- After the installation work of the Project, TCN shall register the existing SCADA system at the

Osogbo National Control Center (NCC) so that the signals from the substations of the Project are properly displayed.

- After the installation work of the Project, TCN shall hold discussions with DisCo, the concession operator and other related parties so that the equipment of the Project is connected to the distribution system and the effects of the Project are promptly felt.

9-3 External Conditions

The following are considered external conditions of the Project to achieve and sustain the effects.

(1) For the Overall Goal

As mentioned in Chapter 2, Economic Recovery and Growth Plan 2017-2020: ERGP is considered the upper-level plan of the Project and "To secure sufficient and stable supply of electricity" is set as the key and most pressing issue to underpin economic development. If Nigerian Government policy is as described in ERGP, it will not be possible to maintain consistency between the upper-level plan and the Project. In addition, a stable political situation in Nigeria is essential to facilitate ERGP implementation.

- The electric power development policy shall remain unchanged.
- The government and economy shall remain stable.

(2) For the Project Objectives

The Project aims to improve the power supply conditions in the southwest of Nigeria, which is the center of the country's economic activity. Since the equipment on the transmission system functions as a network, as well as the Project equipment, other equipment related to the transmission system shall be kept in a sound conditions by daily maintenance work. Moreover, the security of the transmission facility shall be secured, since the power supply cannot continue if destroyed by wars or vandalism.

- Sustainable operation and maintenance shall be properly maintained.
- Security of the facilities shall be maintained.

(3) For the Expected Outcomes

One of the expected effects of the Project involves actually increasing the power supply to the consumers, as achieved through a distribution network connected to the transmission system. Conversely, power for the transmission system is supplied via the generation equipment. Therefore, to boost the actual power supply to consumers, the generation equipment located on the upper side and the distribution network located on the lower side of the transmission system shall remain in a stable operational condition. In addition, since the equipment of the Project shall also remain in a stable operational condition, the equipment of the Project shall be properly maintained in conformity with the maintenance schedule.

- Power generation facilities in the upper stream and power distribution facilities in the lower

stream shall operate properly.

- Operation and maintenance shall be properly and appropriately maintained.

9-4 Economic Evaluation

9-4-1 Objective and Methods

(1) Objective

In this economic analysis, economic viability of the Project is assessed from viewpoints of the national economy of Nigeria and a cost-benefit analysis is conducted to evaluate the magnitude of the economic benefits brought by implementing the Project through comparison with costs, i.e., value of resources used for the Project implementation shown in economic costs.

(2) Methods

Methods applied for the economic analysis are described below:

1) Indicators estimated in this analysis to show economic viability of the Project include economic internal rate of return (EIRR), benefit-cost ratio (B/C) and net present value (NPV).
2) Period for the economic evaluation is set as 31 years, from 2019 to 2049.
3) A cut-off rate of 10%, with which the EIRR of the Project is compared to appraise the economic viability of the investment, is conservatively applied in this analysis. Recently, the conventional cut-off rate of 12% has been used less frequently in favor of lower rates instead. The economic analysis for the "Electricity Transmission Project for the Federal Republic of Nigeria", assisted by the World Bank (WB), for example, applies a cut-off rate of 7% though the EIRR of the project is estimated as high as 46.7%.
4) Economic benefit of the Project counted in this analysis is derived from the increased power supply. Without implementation of the Project and related small rehabilitation works, electricity has to be supplied via existing facilities and equipment, with which future power supply will have to be limited to avoid overloads or power outages. With implementation of the Project and the related rehabilitation works, sufficient electric power will possibly be supplied to meet the demand in the target area. The difference between the power that can be supplied by existing facilities/equipment only and that demanded is estimated to calculate the economic benefit of the Project. The difference in the transmitted and distributed electricity (kWh) to customers through facilities/equipment constructed by the Project and the rehabilitation works is multiplied by the "willingness to pay" for the electricity (USD/kWh) to estimate the economic benefit.

   As the Project excludes the generation and distribution sub-sectors, the economic benefit is computed based on the proportion of the transmission tariff to the end-user tariff. According to the end-user tariff by DisCo defined Multi-year Tariff Order (MYTO) and the volumes of electricity supplied to respective DisCo, the weighted average customer tariff is calculated as

USD 0.188/kWh, while the transmission tariff is defined as USD 0.0170/kWh in MYTO. The share of the transmission tariff to the end-user tariff is assumed as 9%. Out of the total economic benefit of power supply, 9% is regarded as the Project benefit.

5) "Willingness to pay" for electricity in Nigeria is assumed as USD 0.20/kWh. Based on a recent survey of 835 households conducted in 2012, the WB estimated the "Willingness to pay" in Nigeria at USD 0.16/kWh at 2012 prices, which is converted to USD 0.18/kWh at 2016 prices by an appraisal mission of the WB in 2018. Meanwhile, the WB also introduced information indicating that the cost of self-generation had reached USD 0.20-0.30/kWh[1]. "Nigeria Power Baseline Report" issued by the Advisory Power Team in the Office of Vice President in August 2015 shows estimates of private generation cost at NGN 62-94/kWh, which can be converted to USD 0.30-0.45/kWh applying the exchange rate at the time. Considering that more than 40% of the electricity is used by commercial and industrial sectors in 2015 and the current self-generation cost is estimated to far exceed USD 0.20/kWh, the "willingness to pay" for electricity in this analysis is set conservatively as USD 0.20/kWh.

6) The average of the technical loss in power distribution sub-sector for 2018-2020 is assumed to be 12.5%, referring to the "Nigeria Power Baseline Report", while the loss rate is presumed to decrease by 0.25% per year during 2021-2030 and remain at 10% after 2030. Losses other than technical losses are not considered as the economic benefit occurs once the electricity is distributed to the consumers, even if the tariffs are not collected, which does not eliminate the need to improve revenue collection in the distribution sector.

7) As certain rehabilitation works are necessary for the transmission network to allow the required electricity to be transmitted to the distribution networks, the costs of the rehabilitation works are also added as costs of attaining the economic benefits.

8) O&M costs the transmission lines and substations are estimated at 1% and 1.5% of the construction costs, respectively, assuming 50% of foreign and local currency portions. Through a comparison of the costs for facilities/equipment O&M and budgeted or forecast operation expenditures required for transmission service provision (TSP), additional O&M cost of USD 4,825/GWh is estimated as other operation costs

9) Tax and duties, namely VAT and import tax, are removed to convert the financial costs to the economic ones. Standard Conversion Factor (SCF) applicable for converting the financial costs of the local currency portion to economic costs is set as 0.95 referring to the Consultancy Service Report of "WAPP North Core 330 kV Project" (December 2008).

10) Service life of the transmission facilities/equipment is assumed to be 35 years, while the residual values of the facilities/equipment at the end of the evaluation period are counted as negative costs in the final year. The overall land acquisition cost is also counted as a negative cost in the last year of the evaluation period.

[1] Project Appraisal Document for "Electricity Transmission Project" (January, 2018)

9-4-2 Results of the Economic Evaluation

(1) Estimated Indicators to Show the Economic Validity

The estimated economic internal rate of return (EIRR), benefit-cost ratio (B/C) and net present value (NPV) are shown in Table 9-1. The Project is economically viable and to be implemented to develop the national economy efficiently, as the EIRR exceeds the cut-off rate of 10%, the B/C surpasses 1.0 and the NPV is positive.

Table 9-1 Estimated Indicators on the Economic Validity of the Project

Economic Internal Rate of Return (EIRR)	15.4%
Benefit-cost Ratio (B/C)	1.32
Net present Value (NPV, at discount rate of 10%, USD million)	107

Source: JICA Study Team

(2) Results of Sensitivity Analysis

The EIRRs, B/Cs and NPVs given a 31% increase in investment and O&M costs and a 24% decrease in benefits are shown in Table 9-2. The Project would remain economically feasible, even if a 31% increase in costs or 24% decrease in benefit were to happen.

Table 9-2 Results of the Sensitivity Analysis

Case	EIRR	B/C	NPV
31% increase in costs	10.1%	1.00	USD 2.1 million
24% decrease in benefit	10.0%	1.00	USD 0.1 million

Source: JICA Study Team

The results of the economic analysis and the economic benefit and cost streams of the Project during the period of economic analysis are given in Table 9-3 for reference.

Table 9-3 Result of the Economic Analysis and Benefit-cost Stream in Base Case

Indicators on Economic Viability	
EIRR	15.4%
B/C	1.32
NPV (10% Discount, USD million	107

Discount Rate 10%

Cost Bebefit Stream (UDS million at constant prices of 2018)						Discounted Benefit and Costs				
Year	Economic Benefit	Costs			Balance	Economic Benefit	Costs			Balance
		Initial Investment	Rehabili-tation	O&M			Initial Investment	Rehabili-tation	O&M	
2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2020	0.0	3.2	0.0	0.0	-3.2	0.0	2.6	0.0	0.0	-2.6
2021	0.0	8.0	0.0	0.0	-8.0	0.0	6.0	0.0	0.0	-6.0
2022	0.0	63.3	0.0	0.9	-64.1	0.0	43.2	0.0	0.6	-43.8
2023	0.0	82.0	0.0	1.9	-83.9	0.0	50.9	0.0	1.2	-52.1
2024	0.0	73.4	23.9	3.2	-100.5	0.0	41.5	13.5	1.8	-56.7
2025	45.2	22.1	38.4	28.7	-44.0	23.2	11.3	19.7	14.7	-22.6
2026	90.6	5.3	0.0	28.7	56.6	42.3	2.5	0.0	13.4	26.4
2027	90.9	0.0	0.0	28.7	62.1	38.5	0.0	0.0	12.2	26.4
2028	91.1	0.0	0.0	28.7	62.4	35.1	0.0	0.0	11.1	24.1
2029	91.4	0.0	0.0	28.7	62.7	32.0	0.0	0.0	10.1	22.0
2030	91.7	0.0	0.0	28.7	62.9	29.2	0.0	0.0	9.2	20.0
2031	91.7	0.0	0.0	28.7	62.9	26.5	0.0	0.0	8.3	18.2
2032	91.7	0.0	0.0	28.7	62.9	24.1	0.0	0.0	7.6	16.6
2033	91.7	0.0	0.0	28.7	62.9	21.9	0.0	0.0	6.9	15.1
2034	91.7	0.0	0.0	28.7	62.9	19.9	0.0	0.0	6.3	13.7
2035	91.7	0.0	0.0	28.7	62.9	18.1	0.0	0.0	5.7	12.4
2036	91.7	0.0	0.0	28.7	62.9	16.5	0.0	0.0	5.2	11.3
2037	91.7	0.0	0.0	28.7	62.9	15.0	0.0	0.0	4.7	10.3
2038	91.7	0.0	0.0	28.7	62.9	13.6	0.0	0.0	4.3	9.4
2039	91.7	0.0	0.0	28.7	62.9	12.4	0.0	0.0	3.9	8.5
2040	91.7	0.0	0.0	28.7	62.9	11.3	0.0	0.0	3.5	7.7
2041	91.7	0.0	0.0	28.7	62.9	10.2	0.0	0.0	3.2	7.0
2042	91.7	0.0	0.0	28.7	62.9	9.3	0.0	0.0	2.9	6.4
2043	91.7	0.0	0.0	28.7	62.9	8.5	0.0	0.0	2.7	5.8
2044	91.7	0.0	0.0	28.7	62.9	7.7	0.0	0.0	2.4	5.3
2045	91.7	0.0	0.0	28.7	62.9	7.0	0.0	0.0	2.2	4.8
2046	91.7	0.0	0.0	28.7	62.9	6.4	0.0	0.0	2.0	4.4
2047	91.7	0.0	0.0	28.7	62.9	5.8	0.0	0.0	1.8	4.0
2048	91.7	0.0	0.0	28.7	62.9	5.3	0.0	0.0	1.6	3.6
2049	91.7	-63.4	-17.1	28.7	143.4	4.8	-3.3	-0.9	1.5	7.5
Total	2,242.4	193.9	45.2	724.5	1,278.8	444.7	154.7	32.3	150.8	106.8

Source: JICA Study Team

9-5 Financial Evaluation

9-5-1 Objective and Methods

(1) Objective

In this financial analysis, financial soundness of the Project is assessed by comparing the investment and O&M costs and revenues for the power transmitting entity.

(2) Methods

Methods applied for the financial analysis are described below:

1) Indicators estimated in this analysis to show financial feasibility of the Project include financial rate of return (FIRR), benefit-cost ratio and net present value (NPV).

2) Period for the financial analysis is set as 31 years, from 2019 to 2049, as for the economic evaluation.

3) A cut-off rate of 9%, with which the FIRR of the Project is compared to appraise financial feasibility of the investment, is adopted in this analysis. According to the WB database, the average real interest rate, i.e., the lending interest rate of the banks for financing private sector needs and adjusted by the GDP deflator, was 8.6% for 2011-2017 in Nigeria.

4) Increased revenue for the transmission company from implementing the Project is calculated as financial benefit by multiplying the incremental transmitted power estimated corresponding to the increased power supply with the transmission tariff provided in MYTO 2015. The increase in electricity transmitted through facilities/equipment developed by the Project and related rehabilitation works is calculated based on difference in the volumes between electricity transmitted only via existing facilities/equipment and transmitted to meet the demand in the target area.

5) Transmission tariff for 2018 provided in MYTO 2015 effective since February 2016 is applied to estimate the revenue. The prices and charges are converted to USD based on the exchange rates applicable when setting the tariff.

6) As the transmission charge, defined as Transmission Use of System (TUOS) Charge, includes that for the System Operator (SO) and the Market Operator (MO), etc., Transmission Service Provider (TSP) Charge, which excludes the portions for SO, MO and others, is applied to estimate the increased transmission revenue for consistency with the cost estimation, which only includes investment and O&M costs of the transmission facilities/equipment to be constructed by the Project and the rehabilitation required to supply to meet the electricity demand of the target area..

7) Investment and O&M costs of the Project and supplemental rehabilitation works to enable the required electricity to meet the demand are also counted as costs corresponding to the revenue increase. O&M costs and other operation costs are estimated in the same way as done in the economic analysis except conversion of the financial costs to the economic ones.

8) As done in the economic analysis, service life of the facilities/equipment is set as 35 years and their residual values at the end of the analytical period are counted as negative costs in the final year thereof. The entire land acquisition cost is also counted as negative in the final year of the evaluation period.

9-5-2 Results of the Financial Analysis

(1) Estimated Indicators to Show Financial Feasibility

As shown in Table 9-4, the Project is financially feasible and to be implemented as the FIRR

exceeds the cut-off rate of 9%, the B/C surpasses 1.0 and the NPV is positive.

Table 9-4 Estimated Indicators on the Financial Validity of the Project

Financial Internal Rate of Return (FIRR)	16.1%
Benefit-cost Ratio (B/C)	1.43
Net present Value (NPV, at discount rate of 9%, USD million)	173

Source: JICA Study Team

(2) Results of the Sensitivity Analysis

Financial indicators in the following cases are estimated as part of the sensitivity analysis.

1) Increase in the investment and O&M costs by 43%
2) Decrease in the revenue of TSP Charge by 30%.

Results of the sensitivity analysis are shown in Table 9-5. The Project would remain financially feasible, even the two cases.

Table 9-5 Results of the Sensitivity Analysis

Case	FIRR	B/C	NPV
43% increase in costs	9.0%	1.00	USD 1.1 million
30% decrease in revenue	9.1%	1.00	USD 1.2 million

Source: JICA Study Team

The results of the financial analysis and revenues and costs of the Project during the period of financial analysis are given in Table 9-6 for reference.

Table 9-6 Result of the Financial Analysis and Revenue and Cost in Base Case

Indicators on Financial Viability

FIRR	16.1%
B/C	1.43
NPV (9% Discount, USD million)	173

Discount Rate 9%

Cost Bebefit Stream (UDS million at constant prices of 2018)						Discounted Revenue and Costs				
Year	Increased Revenur	Costs			Balance	Economic Benefit	Costs			Balance
		Initial Investment	Rehabili-tation	O&M			Initial Investment	Rehabili-tation	O&M	
2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2020	0.0	3.3	0.0	0.0	-3.3	0.0	2.8	0.0	0.0	-2.8
2021	0.0	8.5	0.0	0.0	-8.6	0.0	6.6	0.0	0.0	-6.6
2022	0.0	68.5	0.0	0.9	-69.4	0.0	48.5	0.0	0.7	-49.2
2023	0.0	88.9	0.0	2.1	-91.0	0.0	57.8	0.0	1.3	-59.1
2024	0.0	79.6	25.8	3.5	-108.9	0.0	47.5	15.4	2.1	-64.9
2025	51.4	24.0	42.0	31.7	-46.2	28.1	13.1	23.0	17.3	-25.3
2026	102.8	5.8	0.0	31.7	65.3	51.6	2.9	0.0	15.9	32.8
2027	102.8	0.0	0.0	31.7	71.0	47.3	0.0	0.0	14.6	32.7
2028	102.8	0.0	0.0	31.7	71.0	43.4	0.0	0.0	13.4	30.0
2029	102.8	0.0	0.0	31.7	71.0	39.8	0.0	0.0	12.3	27.5
2030	102.8	0.0	0.0	31.7	71.0	36.5	0.0	0.0	11.3	25.3
2031	102.8	0.0	0.0	31.7	71.0	33.5	0.0	0.0	10.4	23.2
2032	102.8	0.0	0.0	31.7	71.0	30.8	0.0	0.0	9.5	21.3
2033	102.8	0.0	0.0	31.7	71.0	28.2	0.0	0.0	8.7	19.5
2034	102.8	0.0	0.0	31.7	71.0	25.9	0.0	0.0	8.0	17.9
2035	102.8	0.0	0.0	31.7	71.0	23.7	0.0	0.0	7.3	16.4
2036	102.8	0.0	0.0	31.7	71.0	21.8	0.0	0.0	6.7	15.1
2037	102.8	0.0	0.0	31.7	71.0	20.0	0.0	0.0	6.2	13.8
2038	102.8	0.0	0.0	31.7	71.0	18.3	0.0	0.0	5.7	12.7
2039	102.8	0.0	0.0	31.7	71.0	16.8	0.0	0.0	5.2	11.6
2040	102.8	0.0	0.0	31.7	71.0	15.4	0.0	0.0	4.8	10.7
2041	102.8	0.0	0.0	31.7	71.0	14.2	0.0	0.0	4.4	9.8
2042	102.8	0.0	0.0	31.7	71.0	13.0	0.0	0.0	4.0	9.0
2043	102.8	0.0	0.0	31.7	71.0	11.9	0.0	0.0	3.7	8.2
2044	102.8	0.0	0.0	31.7	71.0	10.9	0.0	0.0	3.4	7.6
2045	102.8	0.0	0.0	31.7	71.0	10.0	0.0	0.0	3.1	6.9
2046	102.8	0.0	0.0	31.7	71.0	9.2	0.0	0.0	2.8	6.4
2047	102.8	0.0	0.0	31.7	71.0	8.4	0.0	0.0	2.6	5.8
2048	102.8	0.0	0.0	31.7	71.0	7.7	0.0	0.0	2.4	5.4
2049	102.8	-82.4	-18.6	31.7	172.1	7.1	-5.7	-1.3	2.2	11.9
Total	2,517.7	196.2	49.1	799.8	1,472.7	573.8	173.5	37.1	189.9	173.3

Source: JICA Study Team

9-6 Project Evaluation

9-6-1 Relevance

As shown below, the relevance of this Project is considered high, as it will help achieve Nigeria's transmission plan and power policies and benefit public facilities and residents, including impoverished

people in the target area.

(1) Relevance in Terms of Technical Aspects

In Nigeria, although the development of power sources proceeds based on abundant national hydropower resources, it is having difficulty reconciling its costly power distribution network with the growing demand for power. The Project is intended to strengthen transformation equipment in the Lagos and Ogun areas, where power shortages have emerged due to inadequate transmission capacity.

The Project components have been specified on the system plan in 2025 as the target evaluation year while securing consistency with the Master Plan Study on National Power Development in Nigeria which was formulated by JICA.

The degree of contribution for Project components concerning 330 and 132 kV transmission lines, 330/132/33 kV substations and 132/33 kV substations is shown according to the Project target evaluation year (2025) in Table 9-7. Increase of transmission capacity through the Project components is approximately 2,886 MW.

Table 9-7 Degree of Contribution of the Project Component to Lagos and Ogun Areas in the Project Target Year (2025)

Item	Average flow per 1 cct [MW]	increase of transmission capacity through the Project components [MW]	Degree of contribution
330 kV transmission lines	Approx. 322 MW	Approx. 2,886 MW	41%
132 kV transmission lines	Approx. 57 MW		46%

Source: JICA Study Team

(2) Benefit in the Project Area

Electric power is imperative as a form of energy to underpin self-reliant and sustainable socioeconomic growth of a nation. Particularly when spearheading the country's economic activity, development projects are one of the key forms of economic infrastructure development to establish a secure and efficient power distribution network.

The Project aims to improve electric power distribution in the Lagos and Ogun States in Nigeria in response to serious power system problems caused by supply capacity shortages, due, in turn, to recent rapid economic growth. Enhancing the current insufficient supply capacity of power distribution facilities represents a fundamental solution to the loss of opportunity gain due to disrupted supply and is thus highly beneficial.

(3) Operation and Maintenance Capabilities

Despite struggling with large-scale capital investments such as the current cooperation project,

TCN does have a certain level of technical capacity in system operations and has handled O&M for the national power transmission network.

The transmission and substation facilities planned under this project have already been installed and gone into operation in Nigeria. As Nigeria has already introduced them and the skills required for operation methods, system protection functionality and other O&M issues do not significantly exceed the technical levels for equipment used in the country, although the internal structure of the switchgear and other equipment to be introduced may differ from traditional units. As such, manufacturing technicians will be used for O&M technology transfers, offering guidance on initial and standard operations based on the characteristics, features and specifications of the equipment. Assuming that the technology transfer of differing operation methods for each delivering manufacturer proceeds smoothly, there should be no issues in terms of O&M capabilities on the Nigerian side for the delivered equipment.

Low-Loss (LL) conductors introduced in the Project constitute a new technology for TCN. LL conductors can be LL-ACSR or LL-TACSR conductors, which do not entail different installation methods of support hardware from ACSR conductors conventionally adopted by TCN and the technical level is such that the technology can be transferred during the installation works period of the Project. In addition, since key work processes such as stringing and tension line work are the same as for conventional conductor types, the new technology will not exceed the technical levels of TCN. Accordingly, assuming that the technology transfer regarding the differing methods of fitting support hardware goes smoothly, there should be no issues in terms of O&M capabilities on the Nigerian side.

(4) Project to Contribute to Upper-Level Plans

Concerning upper-level plans, the “Master Plan Study on National Power Development in Nigeria” and “Transmission Expansion Plan (TEP)” are the Grid Development Plan and consistency between this and the network plan of the Project, with 2025 as the target year, has been secured following dialog during the preparatory survey. Henceforth, assuming TCN advances the development of power distribution equipment based on plans made consistent through the preparatory survey, it is anticipated that the Project will manifest the effectiveness described later and certainly contribute to the upper-level plan.

(5) Consistency with Japan’s ODA policy

In the “ODA policy to the country of Nigeria”, Japan has prioritized maintaining relations with Nigeria from the perspective of stabilizing efforts to secure energy resources and promote trade and investment by Japanese companies and set out the following ODA policies:

Basic policy (Goal): Promoting sustainable economic and social development

Priority fields (Medium Target):

- ✓ Consolidation of core infrastructure
- ✓ Promotion of social development centered on urban areas

The Project is intended to help reinforce and rehabilitate power distribution facilities as part of the key socioeconomic infrastructure in the metropolitan area that supports the national society and economy and complies entirely with the assistance goal of "wide-area infrastructure development (electric power)" as stipulated in the "ODA policy to the country of Nigeria,"

As shown above, the Project is deemed consistent with the Government of Japan's ODA policy for Nigeria and highly relevant as a Japanese Loan Project.

9-6-2 Effectiveness

The following impacts are expected from implementing the Project:

(1) Quantitative

The Project aims to improve the transmission network in Lagos and Ogun areas and comprises 330 kV transmission lines, a 132 kV transmission line, 330/132/33 kV substations and 132/33 kV substations.

The actual load-to-capacity rate of the equipment is defined as the utilization rate of the equipment and that figure for the Project in the target years is applied as the evaluation indicator of the Project.

< Operation Indicators of the Project >

Components	Equipment	Unit Capacity [MVA]	Number of Units and circuits	Capacity [MVA]	Length [km]	Load [MVA]	The target year of the Project evaluation 2025 [%]
Lot 1 330 kV Line	-	777	2	1554	110.1	322	21%
Lot 1 132 kV Line	-	125	2	250	105.4	57	23%
Lot 2a 330/132/33kV substation_Likosi (Ogijo)	330/132/33 kV Transformer	270	2	540	-	494	91%
	132/33 kV Transformer	60	2	120	-	86	72%
Lot 2b 132/33kV substation_Abule Oba (Redeem)	132/33 kV Transformer	60	2	120	-	81	68%
Lot 3a 330/132/33kV substation_Ejio (Arigbajo)	330/132/33 kV Transformer	120	2	240	-	241	100%
	132/33 kV Transformer	60	2	120	-	121	100%
Lot 3b 330/132/33kV substation_Makogi (MFM)	330/132/33 kV Transformer	120	2	240	-	110	46%
	132/33 kV Transformer	60	2	120	-	108	90%
Lot 4a 330/132/33kV substation_Ajegunle (New Agbara)	330/132/33 kV Transformer	120	3	360	-	314	87%
	132/33 kV Transformer	60	2	120	-	111	93%
Lot 4b 132/33kV substation_Badagry	132/33 kV Transformer	60	2	120	-	88	73%

Note: Round down to the nearest decimal

Source: JICA Study Team

(2) Qualitative Impacts

Effect Item	Project Countermeasures (Loan Project)	Extent of Project Effects and Improvement (Current Conditions and Problems)
1. Accumulation of technology for enhancing flexibility of equipment planning and system operation	➢ Introduction of Low-Loss (LL) conductors	➢ By introducing Low-Loss (LL) conductors, technology concerning power transmission planning utilizing such technology will be accumulated.
2. Promotion of utilization of 330 kV transmission lines for power supply in the metropolitan area	➢ Construction of 330/132/33 kV Key substations -Likosi (Ogijo) -MFM -Ajegunle (New Agbara) -Ejio (Arigbajo)	There are plans to construct a 330 kV transmission line with the objective of reinforcing the power supply in Nigeria and 330/132/33 kV substation capacity will be greatly strengthened concerning supply to Lagos-Ogun area, which consumes a large proportion of national power.
3. Realization of a project consistent with the "Master Plan Study on National Power Development in Nigeria" and "Transmission Expansion Plan (TEP)"	➢ Review of the Transmission Expansion Plan (TEP) ➢ Compilation and implementation of Project components in line with the above review	In the preparatory survey of the Project, a system plan was compiled based on review of the TCN's Transmission Expansion Plan (TEP) with the objective of resolving fundamental power supply development issues in the southwest power system in Nigeria. This specifically entails effectively utilizing 330 kV transmission lines and introducing Low-Loss overhead conductors. Since the components have been selected based on the same, not only will Project implementation improve power supply in the areas around the Project equipment, it will also improve the composition of the Southwest power system allowing it to respond to optimum power transformation and transmission plans from a long-term perspective.

Source: JICA Study Team

(3) Estimated Greenhouse Gas Emission Reductions

The Project aims to improve the transmission system in Southwest Nigeria. The project will also ensure 330 kV transmission lines are used effectively and elicit reduced transmission losses on the power system in the southwest area, meaning energy utilization can be rationalized. Since the reduction in transmission loss results in a reduction in primary energy such as fossil fuel consumed by power generation equipment, it will help reduce emissions of greenhouse gases (GHG) such as carbon dioxide.

The input data and calculation results of the amount of GHG reduction based on the result of power flow analysis from transmission loss reduction with/without projects are shown in Table 9-8.

Table 9-8 Reduction in GHG

Data	Value	Unit
Emission reduction	19,958	tCO_2/year
Baseline emission	61,918	tCO_2/year
Amount of electricity to the transmission system in the year 2025	5,431,901	MWh/year
Transmission loss rate of the baseline transmission system in the year 2025	1.99	%
CO_2 emission factor of electricity	0.573	tCO_2/MWh
Project emission	41,960	tCO_2/year
Annual electricity loss of the project transmission system	73,229	MWh/year
CO_2 emission factor of electricity	0.573	tCO_2/MWh

Source: JICA Study Team