



DEMOCRATIC REPUBLIC OF CONGO
MINISTRY OF INFRASTRUCTURE, PUBLIC WORKS AND RECONSTRUCTION
RAXIO DATA CENTER SAS



**ENVIRONMENTAL AND SOCIAL IMPACT STUDY
OF THE PROJECT FOR THE ERECTION OF A DATA CENTER ON
12th STREET LIMETE INDUSTRIAL IN THE CITY-PROVINCE OF
KINSHASA**

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TABLE OF CONTENTS

TABLE OF CONTENTS.....	i
LIST OF PAINTINGS	vii
LIST OF PHOTOS.....	x
LIST OF FIGURES	xi
LIST OF IMAGES.....	xii
LIST OF CARDS.....	xiii
LIST OF ACRONYMS AND ABBREVIATIONS	xiv
NON-TECHNICAL SUMMARY	xv
NON-TECHNICAL SUMMARY	xxi
BOKUSE YA LIKAMBO.....	xxvii
1. INTRODUCTION.....	1
1.1. CONTEXT AND RATIONALE.....	1
1.2. GOALS.....	1
1.2.1. Overall objective	1
1.2.2. Specific objectives	1
1.3. METHODOLOGY	2
1.4. SCOPE OF THE STUDY.....	4
1.5. PRESENTATION OF THE PROJECT PROMOTER AND RESEARCH OFFICE IN CHARGE OF THE PREPARATION OF THE ESIA.....	4
1.5.1. Presentation of the promoter	4
1.5.3. Presentation of the design office.....	5
1.6. STRUCTURING OF THE REPORT	5
2. INSTITUTIONAL, LEGAL AND LEGAL FRAMEWORK.....	7
2.1. INTRODUCTION	7
2.2. Institutional frame	7
2.2.1. Ministry of Posts, Telecommunications and New Technologies of Information and Communication	7
2.2.2. Ministry of Digital.....	8
2.2.3. Ministry in charge of Infrastructure and Public Works (MITP)	9
2.2.4. The Ministry in charge of Urban Planning and Housing	9
2.2.5. Ministry in charge of Employment, Labor and Social Welfare	9
2.2.6. Ministry of Public Health, Hygiene and Prevention	9
2.2.7. Ministry of Territorial Planning	10
2.2.8. National Solidarity Fund Against Covid19	10
2.2.9. Ministry of Water Resources and Electricity	10
2.2.10. City Province of Kinshasa (VPK).....	10
2.2.11. Ministry in charge of the Environment and Sustainable Development through the Congolese Environment Agency (ACE)	10

2.2.12.	The Municipalities of Limete.....	10
2.2.13.	control mission	11
2.2.14.	Company in charge of the works.....	11
2.2.15.	Non-Governmental Organizations (NGOs).....	11
2.3.	LEGAL AND LEGAL FRAMEWORK.....	11
2.3.1.	Legal texts applicable to the Project.....	12
	Decree No. 20/023 of October 1, 2020 on barrier measures to combat the COVID-19 pandemic in the Democratic Republic of Congo.	13
	Law No. 011 of June 17, 2014 relating to the electricity sector.....	13
2.3.2.	Legal texts relating to GBV.....	17
2.3.3.	International Agreements and Conventions applicable to the Project.....	17
2.4.	POLICIES AND PROGRAMS RELATED TO THE PROJECT.....	19
2.4.1.	Environmental policies and programs	19
2.4.1.1.	National Environmental Action Plan (PNAE).....	19
2.4.1.2.	National Strategy and Action Plan for Biological Diversity	19
2.4.1.3.	National Action Plan for Adaptation to Climate Change (PANA)	19
2.4.1.4.	Economic and social policies and programs	20
2.4.1.5.	Sanitation and environmental health policies	20
2.4.1.6.	Decentralization policy	20
2.4.1.7.	Strategic Framework for the Implementation of Decentralization (CSMOD, July 2009) 20	
2.5.	WORLD BANK ENVIRONMENTAL AND SOCIAL FRAMEWORK APPLICABLE TO THE PROJECT	21
2.5.1.	Environmental and Social Standards (ESS) applicable to the Project	21
3.	TECHNICAL DESCRIPTION OF THE PROJECT.....	25
3.1.	Data Center Description	25
3.2.	Administrative phase at the start of the works	25
3.3.	Construction phase:	25
3.4.	Closing phase of the construction site.....	25
3.5.	Consistency of work to be performed.....	26
3.5.1.	Mobilization and site preparation	26
3.5.2.	Civil engineering work	26
3.6.	Construction work.....	27
3.6.2.1.	Bearing structure.....	27
3.6.2.2.	Masonry.....	27
3.6.2.3.	Frames	27
3.6.2.4.	Cover	28

3.6.2.5. Paint.....	28
3.6.2.6. False ceiling.....	28
3.6.2.7. Wooden joinery	28
3.6.2.8. Metal joinery	28
3.6.2.9. Floor treatment and wall covering.....	28
3.6.2.10. electricity	29
3.6.2.11. Stormwater management on site	29
3.7. Withdrawal from the site and site clean-up after the works.....	29
3.8. ACTIVITIES SOURCES OF IMPACT IN THE THREE PHASES OF THE PROJECT	30
3.9. CHRONOGRAM OF ACTIVITIES	30
3.10. Sources of supply and places of storage of different materials.....	31
3.10.1. Work inputs.....	32
3.11. Quality, health, safety and environment procedures.....	32
4. DESCRIPTION OF THE PROJECT RECEIVING ENVIRONMENT	34
4.1. INTRODUCTION	34
4.2. BIO-PHYSICAL AND SOCIO-ECONOMIC CHARACTERISTICS OF THE PROJECT AREA	34
4.2.1. City-province of KINSHASA.....	34
4.2.1.1. Presentation of the city-province of Kinshasa	34
4.2.1.2. Physical characteristics.....	35
4.2.1.2.1. Climatic elements.....	35
4.2.1.2.2. Geomorphology.....	35
4.2.1.2.3. Ground and basement	35
4.2.1.2.4. The air.....	35
4.2.1.2.5. Hydrography	36
4.2.1.3. Biological characteristics	37
4.2.1.4. Socio-economic characteristics	42
4.2.2. Municipality of LIMETE	48
4.2.2.1. Geographical location of the municipality of Limete	48
4.2.2.2. Physical characteristics.....	48
4.2.2.2.1. Relief.....	48
4.2.2.2.2. Hydrography and soil	48
4.2.2.3. Biological characteristics	48
4.2.2.3.1. Flora.....	48
4.2.2.3.2. Conservation status of plant species listed in the perimeter.....	49
4.2.2.3.3. Wildlife	49

4.2.2.3.4.	Conservation status of wildlife species listed in the perimeter	50
4.2.3.	Presentation of the location of the RAXIO RDC Data Center.....	50
4.2.3.1.	Physical environment	50
4.2.3.2.	Biological environment.....	51
4.2.3.2.1.	Flora of the site	51
4.2.3.2.2.	Fauna of the site	52
4.2.3.3.	Socio-economic environment.....	53
4.2.3.4.	Sensitivity of the biophysical and socio-economic environment of the place of execution of the project.....	54
5.	ANALYSIS OF PROJECT VARIANTS	57
5.1.	INTRODUCTION	57
5.2.	VARIANT WITHOUT PROJECT	57
5.3.	VARIANT WITH PROJECT.....	57
5.4.	DESCRIPTION OF THE “WITHOUT PROJECT” VARIANT AND THE “WITH PROJECT” VARIANT.....	57
5.5.	PROJECT VARAINE SELECTION	58
6.	IDENTIFICATION, ANALYSIS AND EVALUATION OF IMPACTS	59
6.1.	Methodological approach	59
6.1.1.	Identification of impacts	59
6.1.2.	Characterization (analysis) of impacts	59
6.1.3.	Impact assessment.....	59
6.1.4.	Potential sources of impacts	61
6.1.5.	Identification of environmental components and impact analysis	62
6.2.	Positive Impacts.....	66
6.2.1.	Positive impacts in the preparation phases	66
6.2.2.	Positive impacts during the works phases.....	66
6.2.3.	Positive impacts during the operational phase.....	68
6.3.	Negative Impacts	72
6.3.1.	Negative impacts in the preparation phase	72
6.3.2.	Negative impacts during the Works phase	74
6.3.3.	Procedure in the event of a fortuitous discovery.....	79
6.3.4.	Negative impacts during the operational phase.....	81
7.	RISKS OF ACCIDENTS AND PREVENTION MEASURES.....	85
7.1.	METHODOLOGY	85
7.2.	Risk identification and assessment.....	85

7.2.1.	Risks during the construction phase.....	86
7.2.1.1.	Risks of accidents related to the movement of construction machinery and equipment	86
7.2.1.2.	Risks of fire and explosion in the site life base	87
7.2.1.3.	Risks related to the handling of loads.....	87
7.2.1.4.	Risks of falling related to work at height and excavation.....	88
7.2.1.5.	Risks related to collapses and falling objects.....	89
7.2.1.6.	Risks related to traffic and travel	89
7.2.1.7.	Risks of waste proliferation	91
7.2.2.	Risks in the operational phase.....	96
7.2.2.1.	Fire and Electrocution Hazards	96
8.	ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP).....	99
8.1.	Goals.....	99
8.2.	Content of the ESMP	99
8.3.	Responsibilities and implementation of the ESMP	99
8.4.	Measures to enhance positive impacts and mitigate negative impacts	100
8.4.1.	Regulatory measures (authorization and permits).....	100
8.4.2.	Positive impact enhancement measures	101
8.4.3.	Mitigation measures for negative impacts.....	104
	Labor recruitment risks	109
	Risks of social conflicts related to the recruitment of local labor	109
	Risk of chance discovery.....	109
	Withdrawal and dismantling of the construction site	110
8.5.	Environmental management of the construction site	112
8.6.	Environmental and social surveillance and monitoring program.....	128
8.6.1.	Environmental and social monitoring activities	128
8.6.2.	Environmental and social monitoring activities	131
8.7.	Site waste management	136
8.7.1.	Hazardous materials management.....	136
8.7.2.	Management of household, non-hazardous and other site waste	137
8.8.	Worksite Hygiene, Health and Safety Plan.....	137
8.8.1.	Definitions and concepts relating to health, safety and environment aspects	137
8.8.2.	Hygiene, health, safety and environment (HSSE) policy.....	137
8.8.3.	Responsibilities for the implementation of the HSSE Plan.....	138
8.8.4.	Measures relating to health, hygiene and safety	138

8.8.5.	Compliance.....	142
8.8.6.	Inspections.....	142
8.9.	Circulation plan	142
8.10.	Sensitization on STI-HIV in the Project area.....	142
9.	PUBLIC CONSULTATION.....	144
9.1.	SUMMARY OF PUBLIC CONSULTATION	144
9.2.	CONSULTATION OBJECTIVES.....	144
9.3.	METHODOLOGY	144
9.4.	SUMMARY OF PUBLIC CONSULTATIONS	144
9.5.	SUMMARY OF THE PUBLIC CONSULTATION.....	146
9.5.1.	General opinion on the project.....	146
9.5.2.	Summary of concerns, fears and questions	146
9.6.	OVERALL COMMENTS FROM INTERVIEWS WITH POPULATIONS AND GROUPS.....	146
9.7.	CONCLUSIONS AND RECOMMENDATIONS OF THE CONSULTATIONS	147
10.	ESTIMATED BUDGET FOR THE IMPLEMENTATION OF THE ESMP	148
11.	GENERAL CONCLUSION	149
12.	PROMOTER COMMITMENT	150
13.	BIBLIOGRAPHY.....	151
14.	APPENDICES	153

LIST OF PAINTINGS

Table 1 : General information about RAXIO RDC.....	4
Table 2. General information on the Design Office	5
Table 3 . composition of the team in charge of developing the study.....	5
Table 4. Legal texts applicable to the project.....	12
Table 5. International environmental conventions ratified by the DRC applicable to the Project.....	18
Table 6 : Chronogram of activities	31
Table 7 : Fruit or food species	38
Table 8 : Ornamental species.....	39
Table 9 : Floristic list of the project perimeter	39
Table 10 : Adventist Species	42
Table 11. Synthesis of the socio-economic profile of the city of Kinshasa.....	42
Table 12. Fruit or food species	48
Table 13. Ornamental species.....	49
Table 14. Weed species	49
Table 15. Weed species	49
Table 16. Importance given to the issues identified	54
Table 17 : Analysis of the "without project" variant	58
Table 18 . Analysis of the "with project" variant.....	58
Table 19. Impact Significance Rating Grid.....	61
Table 20. Impact assessment grid.....	61
Table 21. Activities sources of impacts.....	62
Table 22 : Matrix of potential interactions	64
Table 23. Job Creation Impact Assessment Summary	66
Table 24. Job Creation Impact Assessment Summary	67
Table 25. Summary of the impact assessment related to business opportunities for private economic operators.....	67
Table 26. Summary of the assessment of the impact related to the payment of import taxes	68
Table 27. Small Business Impact Assessment Summary	68
Table 28: Summary of the evaluation of the impact linked to the increase in the reception capacity of the center	68
Table 29. Job Creation Impact Assessment Summary	69
Table 30: Summary of positive impacts during the preparation phase	70
Table 31: Summary of positive impacts during the construction phase.....	70
Table 32: Summary of positive impacts during the operational phase	71
Table 33 : Summary of the assessment of the impact related to the alteration of air quality ..	72
Table 34. Summary of noise impact assessment.....	73
Table 35: Summary of the assessment of the impact related to soil pollution by construction waste.....	73
Table 36. Biodiversity Loss Impact Assessment Summary.....	74
Table 37. Summary of the impact assessment related to general work accidents	74
Table 38 : Summary of the assessment of the impact related to the deterioration of air quality	75
Table 39. Summary of noise impact assessment.....	75

Table 40: Summary of the assessment of the impact linked to the obstruction of the ground by construction waste	76
Table 41 : Summary of the evolution of the impact to the modification of the structure and the texture of the soil	76
Table 42. Summary of landscape modification impact assessment	77
Table 43: Summary of the evaluation of the impact related to the degradation of the internal access road of the Center	77
Table 44. Summary of the traffic accident impact assessment	78
Table 45. Summary of the impact assessment related to general work accidents	78
Table 46. Summary of Chance Finding Risk Assessment	79
Table 47. Summary of the assessment of the impact linked to the withdrawal and dismantling of the site.....	81
Table 48. Summary of the impact assessment related to soil pollution by household and hazardous waste	81
Table 49. Summary of the assessment of negative impacts in the preparatory phase	82
Table 50. Summary of the assessment of negative impacts during the construction phase ..	83
Table 51 : Summary of the assessment of negative impacts during the operation phase	84
Table 52. Grid for Estimating Probability and Severity Levels	85
Table 53 . Criticality matrix	85
Table 54. Meaning of colors	86
Table 55. Risk assessment tool	86
Table 56: Risks of accidents related to the movement of construction machinery and equipment	86
Table 57 : Summary of the fire and explosion risk assessment in the living quarters	87
Table 58: Risks associated with handling loads.....	88
Table 59 : Summary of the assessment of fall risks linked to work at height and excavation	88
Table 60: Risks related to collapses and falling objects	89
Table 61: Risks related to traffic and travel.....	89
Table 62 : Summary of the evaluation of the risk of collision of machinery or vehicles in the work area	90
Table 63. Work Area Noise Accident Assessment Summary	91
Table 64. Summary of the risk assessment related to poisoning and allergy to chemical products	91
Table 65: Risk of waste proliferation.....	91
Table 66. Summary of Oil Pollution Risk Assessment	92
Table 67 : Summary of GBV/SEA/SH development risk assessment	93
Table 68: Summary of COVID-19 risk assessment.....	93
Table 69. Summary of the assessment of the risk of conflicts linked to the non-recruitment of local populations.....	94
Table 70. Summary of Child Labor and Discrimination/Violence Risk Assessment.....	94
Table 71. Summary of the assessment on the risk of work and discrimination and consideration against people with disabilities	95
Table 72 : Fire and Electrocution Hazards.....	96
Table 73. Summary of the fall risk assessment for working at height.....	97
Table 74. Summary of fire and explosion risk assessment	97
Table 75. Summary of the risk assessment related to insalubrity and lack of hygiene	98

Table 76 . Summary of the assessment of the risk of conflicts linked to the non-recruitment of local populations.....	98
Table 77: Regulatory compliance measures.....	101
Table 78. Summary of the main improvement measures during the preparatory and works phase	102
Table 79. Summary of the main improvement measures during the operation phase of the Limete center	103
Table 80. Negative Impact Mitigation Measures/Preparatory and Construction Phase	104
Table 81. Negative Impact Mitigation Measures /Operation Phase.....	110
Table 82. Environmental management of the site of the preparatory and construction phase of the project	113
Table 83: Environmental management of the construction site of the Operation phase of the project	124
Table 84: Implementation of the environmental and social monitoring plan	129
Table 85. Monitoring and performance indicators in the preparatory phase and works.....	132
Table 86. PPE required for the site and the types of work	140
Table 116 : Dates and places of consultations	145
Table 87. Summary of the major conclusions of the public hearings.....	147
Table 88: Estimation of ESMP implementation costs.....	148

LIST OF PHOTOS

Picture 1 . Bubulcus ibis common avian species rubbish loads	41
Picture 1 . data center site location views	50
Picture 2 . access routes on the data center site	51
Picture 3 . View of palm trees over the Data Center (photo taken 10/21/2022)	51
Picture 4 . View of a papaya tree (photo taken 21/10/2022)	52
Picture 5 . View of a mango tree (photo taken 21/10/2022)	52
Picture 6 . View of the site's ornamental flora.	52
Picture 7. View of the cats on the site.....	53
Picture 8 . Small restaurants (commonly called “Malewa”)	53
Picture 9 . Shops on the 12th avenue ^{rue} Limete	54
Picture 10 . 500m from the site, a SNEL substation.....	54
Picture 11 . Consultation with the Architect of the RAXIO RDC/Limete data center site.....	145
Picture 12 . Framing with the RAXIO RDC technical team.....	146
Picture 13. Public consultation with women vendors along the site.....	155
Picture 14 . Public consultation with a female seller along the site.....	155
Picture 15 . Public consultation with local youth.....	155
Picture 16 . Public consultation with the DATA CENTER site architect.....	155
Picture 17 . Public consultation with a female seller along the site.....	155

LIST OF FIGURES

Figure 1. Architectural plan of DATA CENTER RAXIO RDC	33
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LIST OF IMAGES

Picture 1. Geolocation of DATA CENTER RAXIO DRC.....	56
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LIST OF CARDS

Card 1. Map of Kinshasa	34
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LIST OF ACRONYMS AND ABBREVIATIONS

ACE	: Congolese Environment Agency
PCA	: Aluminum composite panels
ARPTC	: Regulatory Authority for Posts and Telecommunications of Congo
BM	: World Bank
EMC	: Electromagnetic Field
SEA/HS	: Sexual Exploitation and Abuse/ Sexual Harassment
EDT	: Territorial and Decentralized Entity
ESIA	: Environmental and Social Impact Study
EMC	: Environmental and Marketing Consulting
US	European Union
GSM	: Global System Mobiles
ICNIRP	: International Commission for Non-ionizing Radiation Protection
IEEE	: Institute of Electrical and Electronics Engineers
STI	: Sexually Transmitted Infections
MEDD	: Ministry of Environment and Sustainable Development
NES	: Environmental and Social Standards
MPTNTIC	: Ministry of Posts, Telecommunications and New Information and Communication Technology
NTIC	: New Information and Communication Technology
WHO	: World Health Organization
NGO	: Non-Governmental Organization
ESMP	: Environmental and Social Management Plan
FRP	Fiber Reinforced Plastic
GRP	Glass fiber reinforced plastic
RCCM	: Register of Commerce and Personal Property Credit
ground floor	: Democratic Republic of Congo
REGIDESO	: Water distribution board
RNI	: Non-Ionizing Radiation
AIDS	: Acquired immune deficiency syndrome
SNEL	National Electricity Company
TIC	Information and Communication Technology
CPT	Pipe For Pipe
ITU	International Telecommunications Union
UMTS	Universal Mobile Telecommunications System
HIV	Human Immunodeficiency Virus

NON-TECHNICAL SUMMARY

Background and rationale for the study

This report of the ESIA for the construction of a data center (Data Center) in the municipality of Limete is in line with the logic of article 21 of law N ° 11/009 of July 09, 2011 on the fundamental principles relating to the protection of the environment and the provisions of Decree No. 14/019 of 02 August 2014 setting the operating rules of the procedural mechanisms for the protection of the environment, subject any project likely to have negative impacts on the balance of ecosystems and on human health to an environmental and social assessment together with its Environmental and Social Management Plan (ESMP), approved by the competent authority.

To increase the geographical coverage of high-capacity communication networks and reduce the costs of communication services throughout the national territory, RAXIO intends to organize a database for communication companies.

The objective of this mission is to carry out the Environmental and Social Impact Assessment (ESIA) of the project to erect a data center (Data Center) in the city of Kinshasa, whose erection activities and installations equipment could have negative effects on the environmental and social environment .

In this time marked by the Sustainable Development Goals (SDGs), no one is unaware that the realization of this project, as beneficial as it is from an economic point of view, will not be accomplished without impacts on the balance of ecosystems and human health. It is therefore necessary to assess the risk/benefit ratio to decide whether or not to carry out such a project.

Following the same logic, Article 21 of Law No. 11/009 of July 9, 2011 on fundamental principles relating to the protection of the environment and the provisions of Decree No. 14/019 of August 2, 2014 setting the operating rules of the procedural mechanisms for the protection of the environment, subject any project likely to have negative impacts on the balance of ecosystems and on human health to an environmental and social assessment accompanied by its Environmental Management Plan and Social (ESMP), approved by the competent authority.

It is in this perspective that the present study falls, which undoubtedly testifies to the constraint of the promoter to comply with the legislation in force in the DRC.

Objective of the Environmental and Social Impact Assessment (ESIA)

The overall objective of this study is to identify, analyze and assess the environmental consequences of the project in order to limit, mitigate or compensate for the negative impacts by proposing mitigation, mitigation, monitoring and follow-up measures relating thereto. , and enhance the positive impacts.

The specific objectives of this study are:

- Analyze the initial state of the sites and their environment (basic environmental and social characterization study);
- Assess the potential environmental and social risks related to the activities that will be carried out in the different phases of the project;
- Propose measures likely to eliminate, reduce and, if possible, compensate for the harmful consequences of the project on the environment;

- Evaluate the costs of applying the environmental and social management plan (ESMP) as well as the proposed environmental and social support measures.

Methodology used for the development of the ESIA

The multidisciplinary team that carried out this study used the ethnographic approach coupled with several techniques, in particular: the documentary technique, the direct observation technique, semi-structured interviews, the focus group and interviews with the public in order to collect information and opinions from all stakeholders.

This participatory approach thus made it possible to gradually integrate the opinions and arguments of the various actors. The work plan adopted was structured around the following areas of intervention:

- Analysis of project documents and other strategic and planning documents at national and local level;
- Visits to the site and its surroundings and technical analysis of the receiving environment (topography, pedology, hydrography, etc.), to assess the environmental, socio-economic and cultural issues of the project area;
- Surveys of populations and other beneficiary target groups to collect their opinions, concerns, expectations and fears in relation to the project;
- Meetings with the institutional actors mainly concerned by the project, particularly at the provincial and local levels;
- Analysis of information and drafting of the ESIA report.

Promoter of the study and the Office in charge of the development of the ESIA

The promoter of this project of the project to erect a data center (Data Center) in the city of Kinshasa , to comply with the law, legal texts as well as national environmental requirements in force in the Democratic Republic of Congo , has entrusted the Office specializing in environmental and social assessments, Environmental and Marketing Consulting EMC Sarl, with the preparation of this Environmental and Social Impact Study.

Institutional frame

From the institutional point of view, it is the MITPR which plays the key role in the implementation of this project, through the regulatory authority for posts and telecommunications. In addition, the Ministry of Environment and Sustainable Development (MEDD) is the State structure responsible for environmental management and environmental and social impact studies (ESIA) through the Congolese Agency for Environment (ACE).

In legal terms, the basis for the requirement to carry out a prior Environmental and Social Impact Assessment (ESIA) to ensure the normative compliance of a project in environmental matters is Law No. 11/009 of the 09 July 2011 laying down fundamental principles relating to the protection of the environment. This is supplemented by implementing measures such as Decree No. 14/019 of August 2, 2014 setting the operating rules for procedural mechanisms for environmental protection. In addition, other national texts were visited, including the Labor Code.

Technical description of the project

The planned project is the erection of a connected data center which will serve as the basis for the African digital economy. These centers will be built on a total area of 6500m².

The main steps will be as follows:

- The administrative phase at the start of the works
- The building phase
- The transversal phase: Work monitoring
- The closing phase of the construction site

Description of the project receiving environment

The project that is the subject of this environmental and social impact study concerns the erection of a data center (Data Center) in the municipality of Limete at number 9/11, Boulevard Lumumba, 12th Rue Limete Industriel, ^{city} province of Kinshasa

The main characteristics of the project area, which is the city-province of Kinshasa, are as follows:

The climate of the project area is of the humid tropical type, with an alternation of eight (8) months of rainy season and four (4) months of dry season. It should be noted that during the rainy season it is hot, while during the dry season it is cold. The average daily temperature varies little throughout the year: from 23 to 25° in the dry season and from 26 to 27° in the rainy season, on average it is around 25°C. However, recent studies have just shown that the last decade has seen an average increase of 2.1°C in Kinshasa, both in the rainy season and in the dry season.

The vegetation of Kinshasa consisted of forests, savannahs and semi-aquatic and aquatic formations of the Pool Malebo valleys (COMPERE, 1970 and PAIN, 1984. The fauna of the city of Kinshasa is very little diversified. It includes species that were formerly abundant but which, nowadays, are subject to the effect of anthropic activities, major causes of destruction of the habitats of animals. Among the most frequent species of fauna, we find birds and fish.

The project being in a concession, this construction does not encroach on any private property, nor on any property belonging to an individual.

Variant analysis

This part has established the possibilities of choosing variants that are advantageous on the technical, environmental and social levels.

Two main variants were weighed in the process of design, study and implementation of this project. This is the “ *without project* ” and “ *with project* ” variant . An analysis based on technical, socio-economic and environmental considerations was carried out to support the choice of the project.

The "without project" alternative is a situation which makes it possible to maintain the current configuration on the architectural level, with the consequence of the non-existence of a network of connected data centers, as well as the dilapidation of the site.

On the other hand, the implementation of the project will have a proven impact in terms of positive impacts in the initiatives for the erection of a connected data center whose implementation of the project will offer the following opportunities: (i) the basic management of Africa's Connected Data ; (ii) providing the technical bases for innovation ; (iii) supporting the growth and digitization of the African economy ; (iv) landscaping and aesthetic improvement of the site.

Conclusion

Taking into account the above-mentioned reasons, the erection of a data center connected to this site at 12th Street is imperative and a priority. Thus, the Study chose the alternative of carrying out the work as soon as possible. To this end, this ESIA has identified and analyzed the potential impacts related to the works and has proposed the various measures of the negative effects and impacts of the project.

Identification, analysis and evaluation of impacts

After the description of the immediate environment of insertion of the project, the correlation of the activities associated with the works and the elements of the environment made it possible to identify the interactions likely to generate the impacts which could result from the implementation of the project.

The most significant positive impacts during the works are the creation of direct and indirect jobs, the development of small income-generating activities around the project area due to the presence of workers on the site, the improvement of the quality of the telecommunications service, the fluidity of telecommunications services.

Regarding the negative impacts, they will be observed in different phases of the project:

- *During the pre - construction of the site:* the alteration of the quality of the air in the environment, the modification of the structure of the soil, the pollution of the soil as well as work and traffic accidents due to the development of the site, transportation and storage of equipment and other materials;
- *During the construction of the project :* alteration of the quality of the air in the environment, modification of the texture and structure of the soil, soil pollution, visual discomfort, noise pollution, respiratory diseases, bodily injuries, risk of spreading HIV/AIDS, GBV risk including SEA/ SH, COVID-19 risk. job creation as well as work and traffic accidents;
- *During project operation:* Risks of transmission of STIs/HIV AIDS; Risk related to GBV, including EAS/HS, soil pollution, noise pollution and work and traffic accidents following the operation of infrastructure and equipment, the operation of the network by users, the various interventions techniques (maintenance and repair) as well as dismantling (end of life and lifting of cables if necessary)

Environmental and Social Management Plan

The environmental and social management plan makes it possible to enact corrective or improvement measures according to the potential impacts identified. The following environmental and social measures have been proposed to mitigate the negative impacts:

During pre-construction:

- Develop a dust and other atmospheric emissions control plan;
- Water the site, cover vehicles transporting materials likely to generate dust with a tarpaulin, respect the recommended speed for driving in a given area, maintain vehicle engines according to the schedule established in the garage;
- Circumscribe and limit the movements of machinery, please backfill stripped surfaces, avoid using very heavy machinery, restore the base camp;
- Collect and treat liquid and solid waste, place bins with lids to dispose of waste;
- Avoid putting the materials in disorder;

- Recruit local labor, favor local labor in the event of equal competence, respect the clauses of contracts with employees;
- Provide and require workers to wear Personal Protective Equipment, set up an emergency evacuation plan in the event of an accident, train workers on the implementation of safety rules during work.

During construction:

- Develop a noise control plan;
- Develop a dust and other atmospheric emissions control plan;
- Water the site, cover vehicles transporting materials likely to generate dust with a tarpaulin, respect the recommended speed for driving in a given area, maintain vehicle engines according to the schedule established in the garage;
- Stop the engines of parked vehicles, carry out maintenance and control of vehicles respecting the calendar time or mileage;
- Circumscribe and limit the movements of machinery, respect the recommendations made by the engineers during the geotechnical studies of the soil, plant the lawn around the sites to avoid erosion phenomena;
- Avoid the rejection of solid and liquid waste on the ground, place bins on the site;
- Properly classify the materials and avoid putting them in disorder, properly park the vehicles transporting the materials;
- Significantly reduce noise, sprinkle water in work areas to prevent dust from rising, provide appropriate PPE to workers handling cement;
- Organize awareness raising on HIV/AIDS with NGOs specializing in the subject for workers and the local population;
- Ensure compliance with internal regulations and have staff sign the code of good conduct related to GBV/EAS/SH;
- Sensitize women against the risk of GBV and domestic violence ;
- Organize seminars to upgrade the workforce used; use local labor for all work, widely advertise the positions and qualifications sought;
- Emergency evacuation to the nearest health center the various cases of accident, set up a follow-up team for the implementation of health and safety precautions on the site, require the wearing of protective equipment (PPE), put up a security fence to prevent access by unauthorized persons to the work site.

During operation:

- Instruct the maintenance teams not to dump polluting food on the ground, instruct the personnel who frequent the work site on the respect and practice of hygiene, not to leave/abandon electronic equipment on the ground;
- Develop the Hazardous Products Management Plan;
- Turning off the engines of parked or stationary machinery and vehicles in inhabited areas, ensuring regular maintenance of machinery according to the manufacturer's instructions;
- Perpetuate the merits of this project;
- Use personal and collective protective equipment if necessary (PPE and CPE, safety belts) during antenna maintenance work at height, train the agents in charge of regular maintenance on safety at work, respect the safety instructions supplied by the manufacturers of the various equipment.

The application of the measures retained in the ESMP must be implemented by the company and ensured by its environmentalist or a specialized office for the implementation of environmental and social clauses.

All these measures are contained in the ESMP, the monitoring and implementation of which involves an estimated cost of 105,300 USD (One Hundred and Five Thousand Three Hundred US Dollars), as for the ACE monitoring costs, they are set in accordance with the 'Order establishing monitoring costs .

Public consultation

The public consultation report demonstrates that people living near the sites enthusiastically welcome the advent of this project. Thus, it will be necessary to take into account the opinions and grievances mentioned above.

The analysis of the above results makes it possible to draw certain conclusions on the perception of the populations and groups consulted in relation to the project to erect the Data Center of the RAXIO RDC Company. We can cite, among others, that:

- The project is a social necessity and comes at the right time given the scale of the proliferation of telecommunications activities.
- The populations see the project as a priority in the field of local economic development.
- The use of local labor should strengthen the fight against poverty and promote social acceptance of the project in the community;
- Taking into account mitigation measures with the involvement of all project stakeholders would be an achievement;
- The system of compensation and compensation for losses, according to local authorities, should be selective to discourage anarchy and, in turn, strengthen the authority of the state.

Conclusion

This project raises a lot of expectations on the one hand, from the Government of the Democratic Republic of Congo and Provincial of Kinshasa in general and on the other hand, from the population of Kinshasa in particular in order to solve the problems of digital communication and manage them. in an appropriate way.

From the above, it is clear that the positive impacts that this project will generate at the socio-economic level are inestimable compared to the negative environmental and social setbacks which, moreover, are completely controllable. Hence, we can say that this project can be deployed taking into account the requirements of this Environmental and Social Impact Assessment (ESIA) in order to integrate harmoniously into its receiving environment.

As a result, the RAXIO RDC Company is obliged to ensure the implementation of all the environmental measures recommended in the ESMP, so as to prevent all environmental risks that could affect the viability of the project.

Background and rationale for the study

This report of the ESIA of the erection of a data center in Limete townshp is in line with the logic of article 21 of law N° 11/009 of July 09, 2011 on fundamental principles relating to the protection of the environment and the provisions of Decree No. 14/019 of August 2, 2014 setting the operating rules of the procedural mechanisms for the protection of the environment, subject any project likely to have negative impacts on the balance of ecosystems and on human health to an environmental and social assessment together with its Environmental and Social Management Plan (ESMP), approved by the competent authority.

To increase the geographical coverage of high-capacity communication networks and reduce the costs of communication services throughout the national territory, RAXIO intends to organize a database for communication companies.

The objective of this mission is to carry out the Environmental and Social Impact Assessment (ESIA) of the project to build a data center in the Kinshasa town, whose construction activities and equipment installations could have negative effects on the environmental and social environment.

In this time marked by the Sustainable Development Goals (SDGs), no one is unaware that the realization of this project, as beneficial as it's from an economic point of view, will not be accomplished without impacts on the balance of ecosystems and human health. It's therefore necessary to assess the risk/benefit ratio to decide whether or not to carry out such a project.

Following the same logic, Article 21 of Law No. 11/009 of July 9, 2011 on fundamental principles relating to the protection of the environment and the provisions of Decree No. 14/019 of August 2, 2014 setting the operating rules of the procedural mechanisms for the protection of the environment, subject any project likely to have negative impacts on the balance of ecosystems and on human health to an environmental and social assessment accompanied by its Environmental Management Plan and Social (ESMP), approved by the competent authority.

It is in this perspective that the present study falls, which undoubtedly testifies to the constraint of the promoter to comply with the legislation in force in the DRC.

Objective of the Environmental and Social Impact Assessment (ESIA)

The overall objective of this study is to identify, analyze and assess the environmental consequences of the project in order to limit, mitigate or compensate for the negative impacts by proposing mitigation, mitigation, monitoring and follow-up measures relating thereto. , and enhance the positive impacts.

The specific objectives of this study are:

- Analyze the initial state of the sites and their environment (basic environmental and social characterization study);
- Assess the potential environmental and social risks related to the activities that will be carried out in the different phases of the project;
- Proposes measures likely to eliminate, reduce and, if possible, compensate for the harmful consequences of the project on the environment;

- Evaluate the costs of applying the environmental and social management plan (ESMP) as well as the proposed environmental and social support measures.

Methodology used for the development of the ESIA

The multidisciplinary team that carried out this study used the ethnographic approach coupled with several techniques, in particular: the documentary technique, the direct observation technique, semi-structured interviews, the focus group and interviews with the public in order to collect information and opinions from all stakeholders.

This participatory approach thus made it possible to gradually integrate the opinions and arguments of the various actors. The work plan adopted was structured around the following areas of intervention:

- Analysis of project documents and other strategic and planning documents at national and local level;
- Visits to the site and its surroundings and technical analysis of the receiving environment (topography, pedology, hydrography, etc.), to assess the environmental, socio-economic and cultural issues of the project area;
- Surveys of populations and other beneficiary target groups to collect their opinions, concerns, expectations and fears in relation to the project;
- Meetings with the institutional actors mainly concerned by the project, particularly at the provincial and local levels;
- Analysis of information and drafting of the ESIA report.

Promoter of the study and the Office in charge of the development of the ESIA

The sponsor of this project of the erection project of a data center in the Kinshasa town, to comply with the law, the legal texts as well as the national environmental requirements in force in the Democratic Republic of Congo, has entrusted the Office specializing in environmental and social assessments, Environmental and Marketing Consulting EMC Sarl, with the preparation of this Environmental and Social Impact Study.

Institutional framework

From the institutional point of view, it is the MITPR which plays the key role in the implementation of this project, through the regulatory authority for posts and telecommunications. In addition, the Ministry of Environment and Sustainable Development (MESD) is the State structure responsible for environmental management and environmental and social impact studies (ESIA) through the Congolese Agency for Environment (ACE).

In legal terms, the basis for the requirement to carry out a prior Environmental and Social Impact Assessment (ESIA) to ensure the normative compliance of a project in environmental matters is Law No. 11/009 of the 09 July 2011 laying down fundamental principles relating to the protection of the environment. This is supplemented by implementing measures such as Decree No. 14/019 of 02 August 2014 laying down the operating rules of procedural mechanisms for environmental protection. In addition, other national texts were visited, including the Labor Code.

Technical description of the project

The project envisaged is the erection of a network of connected data centers which will serve as the basis for the African digital economy. These centers will be built on a total area of 6500m².

The main steps will be as follows:

- The administrative phase at the start of the work
- The building phase
- The transversal phase: Work monitoring
- The closing phase of the construction site

Description of the project receiving environment

The project that is the subject of this environmental and social impact study concerns the erection of a data center (Data Center) in the municipality of Limete at number 9/11, Boulevard Lumumba, 12th Rue Limete Industriel, Kinshasa's province province.

The main characteristics of the project area, which is the Kinshasa's province province, are as follows:

The climate of the project area is of the humid tropical type, with an alternation of eight (8) months of rainy season and four (4) months of dry season. It should be noted that during the rainy season it is hot, while during the dry season it is cold. The average daily temperature varies little throughout the year: from 23 to 25° in the dry season and from 26 to 27° in the rainy season, on average it is around 25°C. However, recent studies have just shown that the last decade has seen an average increase of 2.1°C in Kinshasa, both in the rainy season and in the dry season.

The vegetation of Kinshasa consisted of forests, savannahs and semi-aquatic and aquatic formations of the Pool Malebo valleys (COMPERE, 1970 and PAIN, 1984. The fauna of the city of Kinshasa is very little diversified. It includes species that were formerly abundant but which, nowadays, are subject to the effect of anthropic activities, major causes of destruction of the habitats of animals. Among the most frequent species of fauna, we find birds and fish.

The project being in a concession, this construction does not encroach on any private property, nor on any property belonging to an individual.

Variant analysis

This part has established the possibilities of choosing variants that are advantageous on the technical, environmental and social levels.

Two main variants were weighed in the process of design, study and implementation of this project. This is the "*without project*" and "*with project*" variant. An analysis based on technical, socio-economic and environmental considerations was carried out to support the choice of the project.

The "without project" alternative is a situation which makes it possible to maintain the current configuration on the architectural level, with the consequence of the non-existence of a network of connected data centers, as well as the dilapidation of the site.

On the other hand, the implementation of the project will have a proven impact in terms of positive impacts in the initiatives to build a network of connected data centers whose implementation of the project will offer the following opportunities: (i) basic management connected data from Africa ; (ii) providing the technical bases for innovation ; (iii) supporting

the growth and digitization of the African economy ; (iv) landscaping and aesthetic improvement of the site.

Conclusion

Taking into account the above-mentioned reasons, the construction of a network of data centers connected to this site at 12th^{Street} is imperative and a priority. Thus, the Study chose the alternative of carrying out the work as soon as possible. To this end, this ESIA has identified and analyzed the potential impacts related to the works and has proposed the various measures of the negative effects and impacts of the project.

Identification, analysis and evaluation of impacts

After the description of the immediate environment of insertion of the project, the correlation of the activities associated with the works and the elements of the environment made it possible to identify the interactions likely to generate the impacts which could result from the implementation of the project.

The most significant positive impacts during the works are the creation of direct and indirect jobs, the development of small income-generating activities around the project area due to the presence of workers on the site, the improvement of the quality of the telecommunications service, the fluidity of telecommunications services.

Regarding the negative impacts, they will be observed in different phases of the project:

- *During the pre - construction of the site:* the alteration of the quality of the air in the environment, the modification of the structure of the soil, the pollution of the soil as well as work and traffic accidents due to the development of the site, transportation and storage of equipment and other materials;
- *During the construction of the project :* alteration of the quality of the air in the environment, modification of the texture and structure of the soil, soil pollution, visual discomfort, noise pollution, respiratory diseases, bodily injuries, risk of spreading HIV/AIDS, GBV risk including SEA/ SH, COVID-19 risk. job creation as well as work and traffic accidents;
- *During project operation:* Risks of transmission of STIs/HIV AIDS;
Risk related to GBV, including EAS/HS, soil pollution, noise pollution and work and traffic accidents following the operation of infrastructure and equipment, the operation of the network by users, the various technical interventions (maintenance and repair) as well as dismantling (end of life and lifting of cables if necessary)

Environmental and Social Management Plan

The environmental and social management plan makes it possible to enact corrective or improvement measures according to the potential impacts identified. The following environmental and social measures have been proposed to mitigate the negative impacts:

During pre-construction:

- Develop a dust and other atmospheric emissions control plan;
- Water the site, cover vehicles transporting materials likely to generate dust with a tarpaulin, respect the recommended speed for driving in a given area, maintain vehicle engines according to the schedule established in the garage;

- Circumscribe and limit the movements of machinery, please backfill stripped surfaces, avoid using very heavy machinery, restore the base camp;
- Collect and treat liquid and solid waste, place bins with lids to dispose of waste;
- Avoid putting the materials in disorder;
- Recruit local labor, favor local labor in the event of equal competence, respect the clauses of contracts with employees;
- Provide and require workers to wear Personal Protective Equipment, set up an emergency evacuation plan in the event of an accident, train workers on the implementation of safety rules during work.

During construction:

- Developed a noise control plan;
- Develop a dust and other atmospheric emissions control plan;
- Water the site, cover vehicles transporting materials likely to generate dust with a tarpaulin, respect the recommended speed for driving in a given area, maintain vehicle engines according to the schedule established in the garage;
- Stop the engines of parked vehicles, carry out maintenance and control of vehicles respecting the calendar time or mileage;
- Circumscribe and limit the movements of machinery, respect the recommendations made by the engineers during the geotechnical studies of the soil, plant the lawn around the sites to avoid erosion phenomena;
- Avoid the rejection of solid and liquid waste on the ground, place bins on the site;
- Properly classify the materials and avoid putting them in disorder, properly park the vehicles transporting the materials;
- Significantly reduce noise, sprinkle water in work areas to prevent dust from rising, provide appropriate PPE to workers handling cement;
- Organize awareness raising on HIV/AIDS with NGOs specializing in the subject for workers and the local population;
- Ensure compliance with internal regulations and have staff sign the code of good conduct related to GBV/EAS/SH;
- Sensitize women against the risk of GBV and domestic violence ;
- Organize seminars to upgrade the workforce used; use local labor for all work, widely advertise the positions and qualifications sought;
- Emergency evacuation to the nearest health center the various cases of accident, set up a follow-up team for the implementation of health and safety precautions on the site, require the wearing of protective equipment (PPE), put up a security fence to prevent access by unauthorized persons to the work site.

During operation:

- Instruct the maintenance teams not to dump polluting food on the ground, instruct the personnel who frequent the work site on the respect and practice of hygiene, not to leave/abandon electronic equipment on the ground;
- Develop the Hazardous Products Management Plan;
- Turning off the engines of parked or stationary machinery and vehicles in inhabited areas, ensuring regular maintenance of machinery according to the manufacturer's instructions;
- Perpetuate the merits of this project;

- Use personal and collective protective equipment if necessary (PPE and CPE, safety belts) during antenna maintenance work at height, train the agents in charge of regular maintenance on safety at work, respect the safety instructions supplied by the manufacturers of the various equipment.

The application of the retained measures in the ESMP must be implemented by the company and ensured by its environmentalist or a specialized office for the implementation of environmental and social clauses.

All these measures are contained in the ESMP, the monitoring and implementation of which involves an estimated cost of 105,300 USD (one hundred five thousand three hundred american dollars US dollars), as for the costs of monitoring the ACE, they are set in accordance with the Order setting follow-up costs .

Public consultation

The public consultation report demonstrates that people living near the sites enthusiastically welcome the advent of this project. Thus, it will be necessary to take into account the opinions and grievances mentioned above.

The analysis of the above results makes it possible to draw certain conclusions on the perception of the populations and groups consulted in relation to the project to erect the Data Center of the RAXIO RDC Company. We can cite, among others, that:

- The project is a social necessity and comes at the right time given the scale of the proliferation of telecommunications activities.
- The populations see the project as a priority in the field of local economic development.
- The use of local labor should strengthen the fight against poverty and promote social acceptance of the project in the community;
- Taking into account mitigation measures with the involvement of all project stakeholders would be an achievement;
- The system of compensation and compensation for losses, according to local authorities, should be selective to discourage anarchy and, in turn, strengthen the authority of the state.

Conclusion

This project raises a lot of expectations on the one hand, from the Government of the Democratic Republic of Congo and Provincial of Kinshasa in general and on the other hand, from the population of Kinshasa in particular in order to solve the problems of digital communication and manage them. in an appropriate way.

From the above, it is clear that the positive impacts that this project will generate at the socio-economic level are invaluable compared to the negative environmental and social setbacks which, moreover, are completely controllable. Hence, we can say that this project can be deployed taking into account the requirements of this Environmental and Social Impact Assessment (ESIA) in order to integrate harmoniously into its receiving environment.

As a result, the RAXIO RDC Company is obliged to ensure the implementation of all the environmental measures recommended in the ESMP, so as to prevent all environmental risks that could affect the viability of the project.

Context mpe justification ya boyekoli

Report oyo ya ESIA ya erection ya data center (Data Center) na municipality ya Limete ezali online na logic ya article 21 ya Law No. mpe mabongisi ya mobeko No. 14/019 ya mokolo ya 2 sanza ya mwambe 2014 oyo etali mibeko ya mosala ya ba mechanisms procedures ya bobateli zinga zinga, na boyokani na project nionso oyo ekoki kozala na ba impacts ya mabe na balance ya ba ecosystems mpe na health ya bato botali zinga zinga pe bomoi ya bato elongo na mwango na yango ya boyangeli zinga zinga pe bomoi ya bato (ESMP), oyo endimami na bokonzi oyo ezali na makoki.

Mpo na komatissa geographical coverage ya ba networks ya communication ya capacity makasi mpe kokitisa ba costs ya ba services ya communication na national territory mobimba, RAXIO ezali na mokano ya kobongisa database mpo na ba companies ya communication.

Tina ya mission oyo ezali ya kosala Environmental and Social Impact Assessment (ESIA) ya project ya kotonga data center (Data Center) na engumba Kinshasa, oyo misala na yango ya botongi pe ba facilities ya bisaleli ekoki kozala na ba negative effects na zinga zinga pe social.

Na tango oyo etiamaki elembo na mikano ya botomboli bomoi ya seko (ODS), moto moko te ayebi te ete bosali ya mosala oyo, lokola ezali na litomba na esika ya nkita, ekokokisama te soki ekozala na bopusi te na boyokani ya ba ecosystems pe bokolongono ya bato. Na yango esengeli kotala ya risk/benefit ratio pona kozua mokano soki esengeli kosala project ya boye to te.

Na kolanda logic moko wana, article 21 ya law n° 11/009 ya on July 9, 2011 oyo etali ba fundamental principles oyo etali bobateli zinga zinga mpe mabongisi ya decree n° 14/019 ya on August 2, 2014 oyo etali mibeko ya mosala ya ba mechanisms ya procedure pona bobateli zinga zinga, submitted project nionso oyo ekoki kozala na ba negative impacts na ba balance ya ba ecosystems pe na health ya bato na environmental and social assessment elongo na Plan na yango ya Environmental and Social Management (ESMP), oyo endimami na competent authority.

Ezali na perspective oyo nde studies oyo ezali kokweya, oyo na ntembe te ezali kotatola constraint ya promoter mpo na kotosa mibeko oyo ezali na nguya na DRC.

Ntina ya botali mbano ya zinga zinga pe bomoi ya bato (ESIA) .

Mokano ya monene ya boyekoli oyo ezali ya koyeba, kotala pe kotala mbano ya zinga zinga ya mosala na tina ya kopekisa, kokitisa to kofuta ba mbano ya mabe na kopesaka makanisi ya bokiti, bokiti, bolandi pe bolandi oyo etali yango., pe kotombola ba impacts ya malamu.

Mikano ya sikisiki ya boyekoli oyo ezali oyo:

- Kotala ndenge ya ebandeli ya bisika pe zinga zinga na yango (boyekoli ya moboko ya bizaleli ya zinga zinga pe ya bomoi ya bato);
- Kotala makama oyo ekoki kozala na zinga zinga pe bomoi ya bato oyo etali misala oyo ekosalema na biteni ndenge na ndenge ya mosala;
- Kopesa makanisi ya mikano oyo ekoki kosilisa, kokitisa pe, soki likoki ezali, kofuta mbano ya mabe oyo mosala ekosala na zinga zinga;

- Kotala ba ntalo ya kosalela mwango ya boyangeli zinga zinga pe bomoi ya bato (ESMP) lokola pe ba measures ya lisungi ya zinga zinga pe ya bato oyo esengami. Methodology oyo esalelami pona bokeli ESIA

Multidisciplinary team oyo esalaki boyekoli oyo esalelaki ethnographic approach elongo na ba ebele techniques, mingi mingi: documentary technique, technique ya direct observation, ba semi-structured interviews, focus groups pe ba interviews na public na tina ya kosangisa ba information pe ba opinions na bato nyonso oyo bazali na likambo yango.

Participatory approach oyo epesi bongo nzela ya kosangisa mokemoke makanisi pe makanisi ya ba actors ndenge na ndenge. Mwango ya mosala oyo ezwamaki ebongisamaki nzinganzinga ya bisika oyo ya intervention:

- Botalisi mikanda ya misala pe mikanda misusu ya mayele pe ya mwango na nivo ya ekolo pe ya mboka;
- Botali esika pe zinga zinga na yango pe botangi ya tekini ya zinga zinga ya boyambi (topography, pedology, hydrography, pe bongo na bongo), pona kotala makambo ya zinga zinga, ya nkita ya bomoi pe ya mimeseno ya esika ya mosala;
- Botangi ya ba people pe ba target groups misusu ya ba beneficiaries pona kosangisa makanisi na bango, mitungisi, bilikya pe bobangi na bango na oyo etali mosala;
- Bokutani na ba institutional actors oyo etali mingi mingi project, mingi mingi na provincial level pe local;
- Botalisi ya sango pe bokeli ya report ya ESIA.

Promoter ya studies mpe office oyo ezali responsible ya kobongisa ESIA

Promoter ya project oyo ya project ya construction ya data center (Data center) na city ya Kinshasa, mpo na kotosa mibeko, ba legal texts as well as ba national environmental requirements in force na Democratic Republic of Congo, atie confidence Specialized office na ba environmental and social assessments, Environmental and marketing consultancy EMC Sarl, na bobongisi ya Study oyo ya Environmental and social impact.

Framework ya institution

Na institutional point of view, ezali MITPR nde ezali na essential role na implementation ya oyo project, na nzela ya regulatory authority ya ba post na telecommunications. Lisusu, Ministele ya zinga zinga pe botomboli ya seko (MEDD) ezali ebongiseli ya Leta oyo ezali na mokumba ya boyangeli zinga zinga pe boyekoli ya bopanzani ya zinga zinga pe bomoi ya bato (ESIA) na nzela ya Congolese Environment Agency (ACE)).

Na maye matali mibeko, moboko ya bosenga ya kosala liboso ya botali mbano ya zinga zinga pe bomoi ya bato (ESIA) pona kosala summer mosala moko ezala na boyokani na ndenge ya mibeko na makambo ya zinga zinga ezali mobeko No 11/009 ya mokolo ya 09 sanza ya 7 mobu 2011 oyo ezali kolakisa mibeko ya moboko oyo etali yango mpo na kobatela zingazinga. Yango ebakisami na bosaleli mikano lokola mobeko No. 14/019 ya mokolo ya 2 sanza ya mwambe 2014 oyo etali mibeko ya bosaleli ya ba mechanisms procedures ya bobateli zinga zinga. Longola yango, batalaki makomi mosusu ya ekólo, na ndakisa Code ya mosala.

Boyebisi ya tekiniiki ya mosala yango

Project oyo ekanamaki ezali ya botongi network ya ba connected data centers oyo ekozala foundation ya african digital economy. Ba centers wana ekotongama na etando mobimba ya 6500m².

Makambo ya minene ekozala boye:

- Eteni ya administrative na ebandeli ya mosala
- Eteni ya botongi
- Transversal phase: Bolandi ya misala
- Eteni ya bokangami ya esika ya botongi

Boyebisi ya esika ya boyambi ya mosala

Project oyo ezali subject ya study oyo ya environmental and social impact etali erection to construction ya data center (Data center) na municipality ya Limete na number 9/11, Boulevard Lumumba, 12e Rue Limete Industriel, province ya city ya Kinshasa

Bizalela ya minene ya etando ya mosala, oyo ezali engumba-etuka ya Kinshasa, ezali boye:

Climate ya esika ya ezali project ya lolenge ya humid tropical, na alternation ya sanza mwambe (8) ya eleko ya mbula pe sanza minei (4) ya eleko ya kokauka. Esengeli koyeba ete na eleko ya mbula ezalaka molunge, nzokande na eleko ya kokauka ezalaka malili. Mwayene ya molunge ya mokolo na mokolo ekeseni mingi te na boumeli ya mbula mobimba: kobanda 23 kino 25° na eleko ya kokauka mpe kobanda 26 kino 27° na eleko ya mbula, na mwayene ezali pene na 25°C. Kasi, bolukiluki oyo euti kosalema kala mingi te euti komonisa ete mbula zomi oyo euti koleka emoni ete molunge emati na mwayene ya 2.1°C na Kinshasa, ezala na eleko ya mbula mpe na eleko ya kokauka.

Matiti ya Kinshasa ezalaki na bazamba, ba savannah pe ba semi-aquatic pe aquatic formations ya ba valleys ya Piscine Malebo (COMPÈRE, 1970 pe PAIN, 1984. The fauna of the city of Kinshasa is very little diversified. Esangisi ba species oyo kala ezalaki ebele kasi oyo, mikolo oyo, ezali na bopusi ya misala ya bato, bantina minene ya kobebisa bisika ya bofandi ya banyama. Na kati ya lolenge ya banyama oyo emonanaka mingi, tozali kokuta bandekε mpe mbisi.

Project oyo ezali na concession, construction oyo e encrocher te na ba private goods moko te, to pe na ba goods nionso oyo ezali ya mutu moko.

Analysis ya ba variants

Eteni oyo etie ba possibilities ya kopona ba variants oyo ezali advantageous na technical level, environmental pe social.

Ba variants mibale ya minene epesamaki weight na process ya design, studies pe implementation ya project oyo. Oyo ezali variant ya "without project" na "with project". Analysis oyo esalemi na ba technical, socio-economic pe environmental considerations esalemaki pona kosunga pona project.

Alternative "without project" ezali situation oyo epesaka nzela na current configuration ezala maintained architectural, na consequence ya non-existence ya network ya ba connected data centers, as well as dilapidation ya site.

Epayi mosusu, bosaleli ya mosala ekozala na mbano oyo emonanaki na oyo etali mbano ya malamumu na misala ya kotonga network ya ba centers ya ba oyo ekangami data oyo bosaleli na yango ya mosala ekopesa mabaku oyo: (i) boyangeli ya moboko ba oyo ekangami data uta Afrika; (ii) kopesa ba technical bases ya bokeli ya sika; (iii) kosunga bokoli pe botiami na nimeru ya nkita ya Afrika; (iv) bobongisi mabele pe bobongisi kitoko ya esika yango.

Maloba ya nsuka

Soki totali bantina oyo tolobeli awa na likoló, kotonga network ya ba data centers oyo ekangami na esika oyo na balabala 12 ezali na ntina mingi mpe ezali likambo ya libosoliboso. Na yango, Boyekoli yango eponi lolenge mosusu ya kosala mosala yango nokinoki. Pona yango, ESIA oyo emoni pe etali ba mbano oyo ekoki kozala oyo etali misala pe epesi makanisi ya ba measures ndenge na ndenge ya ba negative effects pe ba impacts ya project.

Boyebi, botali pe botali mbano ya mbano

After the description of the immediate environment of insertion of the project, the correlation of the activities associated with the works and the elements of the environment made it possible to identify the interactions likely to generate the impacts which could result from the implementation of the mosala.

Ba positive impacts ya motuya mingi na tango ya misala ezali bokeli misala ya semba pe ya semba te, bokeli misala ya mike mike oyo ekopesa mosolo nzinganzinga ya esika ya mpo project na bozali ya basali na esika ya mosala, bobongisi lolenge ya mosala ya telecommunications, ba fluidity ya ba services ya telecommunications.

Na oyo etali ba mbano ya mabe, ekomonana na biteni ndenge na ndenge ya mosala:

- Na tango ya botongi yambo ya esika: mbongwana ya lolenge ya mopepe ya zinga zinga, mbongwana ya ndenge ya mabele, bosoto ya mabele lokola pe makama ya mosala pe ya nzela na tina ya botomboli esika, bokumbi pe kobomba bisaleli mpe biloko mosusu;
- Na tango ya botongi mosala: mbongwana ya lolenge ya mopepe ya zinga zinga, mbongwana ya lolenge pe bokeli ya mabele, bosoto ya mabele, bozangi esengo ya komona, bosoto ya makelele, bokono ya mpema, bazoka ya nzoto, likama ya bopanzani ya HIV/ AIDS, Likama ya GBV including SEA/SH, risk ya COVID-19. kosala misala bakisa mpe makama ya mosala mpe ya mituka ;
- Na tango ya mosala ya project: Makama ya bopanzani ya ba ITS/AIDS;

Likama oyo etali GBV, bakisa pe EAS/HS, bosoto ya mabele, bosoto ya makelele pe makama ya mosala pe ya mobembo sima ya bosaleli ya ba infrastructures pe bisaleli, bosaleli ya network na basaleli, ba techniques ya ba interventions ndenge na ndenge (bobateli pe bobongisi) pe lisusu bopanzani (suka ya bomoi mpe kotombola bansinga soki esengeli)

Plan ya boyangeli zinga zinga pe ya bomoi ya bato

Mwango ya boyangeli zinga zinga pe bomoi ya bato epesi nzela ya kosala mibeko ya bobongisi to ya bobongisi engebene na mbano oyo ekoki kozala oyo ezuami. Misala ya zinga zinga pe ya bomoi ya bato oyo elandi epesami makanisi pona kokitisa ba mbano ya mabe:

Na ntango ya botongi liboso:

- Kosala Plan ya Control pona ba dust pe ba emissions misusu ya mopepe;

- Kokanga na pipe na esika, kozipa mituka oyo ememaka biloko oyo ekoki kobimisa mputulu na ba tarpaulins, kotosa mbangu oyo esengami mpo na kotambwisa motuka na esika moko boye, kosala bobateli ya engine ya motuka engebene na manaka oyo etiamaki na garage;
- Kosala riding mpe kopekisa ba movements ya ba machines, please tondisa sima ba surfaces oyo elongolami, koboya kosalela ba machines ya kilo mingi, zongisa base camp;
- Kosangisa pe kosala bosoto ya mayi pe ya makasi, kotia ba bins oyo ezali na ba lids pona kobwaka bosoto;
- Bokima kotya biloko yango na mobulu;
- Kozwa mosala ya mboka, kopesa maboko na mosala ya mboka soki makoki ekokani, kotosa ba clauses ya ba contracts na basali;
- Kopesa mpe kosenga na basali balata Bisaleli ya Bobateli Moto na moto, kosala mwango ya kobimisa bato na mbalakaka soki likama esalemi, kopesa mateya na basali na ntina ya kosalela mibeko ya bokengi na ntango ya mosala.

Na ntango ya botongi:

- Kosala mwango ya kopekisa makelele;
- Kosala Plan ya Control pona ba dust pe ba emissions misusu ya mopepe;
- Kokanga na pipe na esika, kozipa mituka oyo ememaka biloko oyo ekoki kobimisa mputulu na ba tarpaulins, kotosa mbangu oyo esengami mpo na kotambwisa motuka na esika moko boye, kosala bobateli ya engine ya motuka engebene na manaka oyo etiamaki na garage;
- Kotelemisa mituka ya mituka oyo eteleme, kosala maintenance mpe control ya mituka na kotalaka ngonga ya calendar to kilometers;
- Kosala constituency pe kopekisa ba movements ya ba machines, ko respect ba recommendations oyo ba engineers bapesaka na tango ya ba geotechnical studies ya mabele, kolona lawn zinga zinga ya bisika pona koboya ba phenomena ya erosion;
- Koboya koboya bosoto ya makasi pe ya mayi na mabele, tia ba dustbins na esika;
- Ko classify malamau biloko mpe koboya kotia yango na mobulu, kotelemisa malamau mituka oyo ezali komema biloko;
- Kokitisa makasi makelele, kosopela mayi na bisika ya mosala po mputulu emata te, kopesa PPE oyo ebongi na basali oyo basimbaka cement;
- Kobongisa bopanzi sango na ntina ya HIV/AIDS na ba ONG oyo ezali na mayele mingi na likambo yango mpo na basali mpe bato ya mboka;
- Kosala ete mibeko ya kati etosama mpe kosala ete basali batia maboko na mobeko ya bizaleli malamau oyo etali GBV/SEA/SH;
- Koyebisa basi na likama ya VIH mpe mobulu na ndako;
- Kobongisa ba seminaries pona kotombola ba workers oyo basalelaka; kosalela mosala ya mboka mpo na misala nyonso, kosala piblisite mingi ya bisika mpe makoki oyo bazali koluka;
- Bopanzani ya lombango na center ya bokolongono ya penepene na makambo ndenge na ndenge ya likama, kosala ekipi ya bolandi mpo na bosaleli ya mibeko ya bokolongono mpe bokengi na esika ya mosala, kosenga kolata bisaleli ya bobateli Bobateli ya moto ye moko (PPE), kotia lopango ya bokengi mpo na kopekisa bato oyo bapesameli ndingisa te bakota na esika ya mosala.

Na boumeli ya mosala:

- Kopesa malako na ba teams ya maintenance kobwaka bilei oyo ebebisaka na mabele te, kopesa malako na basali oyo bakendaka mingi na esika ya mosala na oyo etali

respect mpe practices ya hygiene, kotika/kosundola te bisaleli ya electronics na mabele;

- Kosala mwango ya boyangeli biloko ya likama;
- Kokanga mituka ya bamasini mpe mituka oyo etelemi to oyo etelemi na bisika oyo bato bafandi, kosala ete bábatela bamasini mbala na mbala engebene malako ya mosali;
- Kosala ete bolamu ya mosala oyo ezala na bomoi;
- Kosalela bisaleli ya kobatela moto na moto mpe ya lisanga soki esengeli (PPI mpe EPC, seat belts) na tango ya mosala ya bobateli antenna na bosanda, kopesa mateya na ba agents oyo bazali na mokumba ya bobateli mbala na mbala na ntina ya bokengi na mosala, kotosa malako ya bokengi oyo epesami na basali ya bisaleli ndenge na ndenge.

Bosaleli ya ba measures oyo ebatelami na ESMP esengeli esalelama na company pe esalama na mosalisi na yango ya zinga zinga to na specialized office pona bosaleli ya ba clauses ya zinga zinga pe ya bomoi ya bato.

Ba measures oyo nionso ezali na kati ya ESMP, bolandi pe bosaleli na yango esangisi motuya oyo ekanisami ya 105.000 USD (nkoto nkama moko na mitano na nkama misato ya dolare ya Amerika), lokola pona ba ntalo ya bolandi ACE, etiamaki engebene na bobongisi ya Order ba fresh ya bolandi.

Bosololi na bato banso

Lapolo ya boyokani na bato banso emonisi ete bato oyo bafandaka pene na bisika yango basepeli na esengo nyonso ndenge mosala yango ebimi. Na yango, ekosenga kotalela makanisi mpe komilelalela oyo tolobeli awa na likoló.

Botalisi ya mbano oyo elobami likolo epesi nzela ya kozwa mwa bosukisi na ntina ya makanisi ya ba populations pe bituluku oyo etunamaki na oyo etali mosala ya kotonga Data center ya Société RDC RAXIO. Tokoki kotánga, kati na makambo mosusu, summer:

- Project ezali social necessity pe eyaka na tango esengeli na kotalaka scale ya proliferation ya misala ya telecommunication.
- Ba populations bamonaka lokola project priority na domain ya local economic development.
- Bosaleli mosala ya bisika esengeli kolendisa etumba ya bobola pe kolendisa bondimi ya bato ya mosala na zinga zinga;
- Botali mikano ya bokitisami na bosangisi ya bato banso oyo bazali na mosala ekozala bosalisi;
- System ya kofuta pe kofuta ba losses, engebene na bakonzi ya mboka, esengeli kozala ya kopona pona kolembisa anarchy pe na bopanzi, kolendisa bokonzi ya Leta.

Maloba ya nsuka

Project oyo ebimisi ba expectations ebele na ngambo moko, epayi ya Government ya Democratic Republic ya Congo pe na Provincial ya Kinshasa in general pe na ngambo mosusu, epayi ya population ya Kinshasa in particular pona ko solve ba problems ya digital communication pe kotambwisa bango.na ndenge oyo ebongi.

Na oyo tolobeli likolo, ezali polele ete ba positive impacts oyo project oyo ekosala na socio-economic level ezali na motuya mingi soki tokokanisi yango na ba negative environmental setbacks pe socials oyo, lisusu, ezali fully controllable. Na yango, tokoki koloba ete project oyo ekoki kozala deployed na kotalaka ba prescriptions ya oyo ya Environmental and Social Impact Assessment (ESIA) na tina ya kosangana na boyokani na zinga zinga na yango ya boyambi.

Na yango, Société RAXIO RDC ezali na mokumba ya kosala been misala nyonso ya zinga zinga oyo esengami na ESMP esalema, po na kopekisa makama nyonso ya zinga zinga oyo ekoki kozala na bopusi na bomoi ya mosala.

1.1. CONTEXT AND RATIONALE

This report of the ESIA of the erection of a data center (Data Center) in the municipality of Limete is in line with the logic of article 21 of law N ° 11/009 of July 09, 2011 on fundamental principles relating to the protection of the environment and the provisions of Decree No. 14/019 of August 2, 2014 setting the operating rules of the procedural mechanisms for the protection of the environment, subject any project likely to have negative impacts on the balance of ecosystems and on human health to an environmental and social assessment together with its Environmental and Social Management Plan (ESMP), approved by the competent authority.

To increase the geographical coverage of high-capacity communication networks and reduce the costs of communication services throughout the national territory, RAXIO intends to organize a database for communication companies.

The objective of this mission is to carry out the Environmental and Social Impact Assessment (ESIA) of the project to erect a data center (Data Center) in the city of Kinshasa, whose construction activities and equipment could have negative effects on the environmental and social environment.

The realization of this study also testifies to the will of the promoter, to conform to the policies of the World Bank as well as to the Congolese legislation relating to the protection of the environment in particular, that of the Law n° 11/009 of 09 July 2011 on fundamental principles relating to the protection of the environment which stipulates in its article 21 that " **any development, infrastructure or exploitation project of any industrial, commercial, agricultural, forestry, mining, telecommunications or other likely to have an impact on the environment is subject to a prior environmental and social impact study, together with its duly approved management plan**". The operator RAXIO RDC has therefore embarked on a clean, civic-minded approach that brings hope on the environmental and social level through the development of an ESIA of the said project.

1.2. GOALS

1.2.1. Overall objective

The overall objective of this study is to identify and assess the environmental consequences of the project in order to limit, mitigate or compensate for the negative impacts by proposing related attenuation, mitigation, monitoring and follow-up measures, and enhance the positive impacts.

1.2.2. Specific objectives

The specific objectives of this study are:

- Analyze the initial state of the sites and their environment (basic environmental and social characterization study);
- Assess the potential environmental and social risks associated with the activities of the pre-installation, installation and post-installation works of the project;
- Consider measures likely to eliminate, reduce and, if possible, compensate for the harmful consequences of the project on the environment;
- Propose mitigation, compensation and mitigation measures for the environmental and social impacts generated by the project;
- Evaluate the costs of applying the environmental and social management plan (ESMP) in acronym as well as the proposed environmental and social support measures.

1.3. METHODOLOGY

The methodological approach of the consultant was based on the concept of a systemic approach, in consultation with all the actors and partners concerned by the project, in particular (i) The local political and administrative authorities, the local populations, and the NGOs . (ii) Visits were also made to the project site. The consultant conducted the study in a participatory manner on the basis of the consultation of the various partners in order to promote a common understanding of the problem, discuss the advantages and disadvantages of the project at the environmental and social level. To carry out this field study, the following steps were required:

- a) Preparing the mission;
- b) Studying the field and collecting information (including situation reports and field surveys) ;
- c) Prepare the public consultation report;
- d) Develop the Environmental and Social Impact Assessment (ESIA);
- e) Write reports (inception, interim and final).

Step 1: Mission preparation

The consultant organized the tasks prior to the study, in particular the field reconnaissance operations.

This included:

- Field study;
- The Description of the site;
- The availability of the various existing documents on the project, national and international regulatory texts of the World Bank; various reports;
- Preparation of the activity schedule (Chronogram);
- The deployment of the consultation team on the ground;
- Support from the consulting team in collaboration with RAXIO technicians to enable identification of proposed work sites and contact with local authorities;
- Meetings and interviews with stakeholders.

The mission was mobilized on the ground and the operationalization of this mission was carried out as follows:

➤ **The documentary review**

The documentary review consisted in collecting and analyzing the various documents available on the project such as: the regulations, the guide and the directives governing the conduct of environmental and social impact studies in the DRC; World Bank Operational Policies.

The consultant also took note of the content of the national legislation, in particular the law n ° 11/009 of July 09, 2011 on fundamental principles for the protection of the Environment which constituted the main references taken into account in the development of the ESIA without forgetting the main relevant texts, in particular the provisions governing the quality of the environment, health, safety and working conditions.

Step 2: Field study and information gathering (including status reports and field surveys)

a) Field visits by the consultant

This is a mixed session during which the experts of the RAXIO Operator on the ground accompanied the Consultant and his team on the field of study for a reconnaissance of the site of the planned works of the subsequent zones (causes and impacts). This outing also allowed us to

make contact with the local authorities. A Global Positioning System (GPS) was used to geolocate the area of the project right-of-way. Also, this field visit guided the consultant to:

- Become familiar with the biophysical and human environment of the project site,
- Situate and define the limits of the project;
- Identify the establishments, infrastructures, equipment and activities of local residents,
- Meet the services in charge of the areas in the field;
- Assess the environmental sensitivity of the project site;
- Establish the social and environmental profile of the project site;
- Identify the dangers and risks of accidents related to work on a construction site;
- Estimate the potential damage and its frequency for each risk;
- Prioritize the risks to determine the priorities of the action plan;

b) Public consultations

The consultant held participatory interviews with the local populations.

In addition, personal contacts took place with opinion leaders such as political-administrative authorities, representatives of NGOs and community structures of civil society in the project integration area.

The consultant also undertook a series of public consultations in the said site, in order to identify the concerns, needs and aspirations of the population.

The various interviews and consultations (in public or in focus groups) made it possible to collect relevant information on the project as well as the opinions and concerns of the population, mainly with the project stakeholders (resident populations, local authorities and NGO.).

The steps below were necessary to gather all the available and existing information from the populations, they are:

a. Contact the Local Political-Administrative Authorities

This contact made it possible to give them information relating to the project and to ask for their authorization for its execution.

b. Define an information and communication strategy

By this communication strategy, it was a question of guaranteeing the social acceptability of the project on the basis of an interview allowing a better knowledge of the project by the population and the other actors by the knowledge of the concerns of the populations bordering the project.

Meetings were organized with project beneficiaries and administrative and technical authorities. These meetings mainly concerned:

- ✓ Local authorities (Burgmestre);
- ✓ Women, young people, opinion leaders;

In addition, this communication also consisted in mobilizing and sensitizing the local populations and NGOs in the project area in order to:

- Identify the target groups on the project site and their organizational capacity,
- Identify measures to control and minimize unavoidable and irreversible impacts, during works as well as during operation,
- Identify the measures to be taken for management and monitoring during the works and the operational phase. These measures will be integrated into the Environmental and Social Management Plan (ESMP).

1.4. SCOPE OF THE STUDY

Raxio RDC envisions offering its customers an optimized environment for their IT equipment within a state-of-the-art modular facility, fully equipped with the industry's leading technology, security, AC/DC power compatibility and redundancy. This will facilitate Internet traffic between local content providers and make the Internet experience faster, more reliable and more affordable for all digital users.

The erection of a RAXIO data center could have impacts and effects (positive and negative) on the environment. In order to minimise, reduce and optimize these impacts and effects, this project requires the preparation of an Environmental and Social Impact Assessment (ESIA), in accordance with national legislation. The Environmental and Social Management Plan (ESMP), resulting from this ESIA will define mitigation and enhancement measures, but also safety, monitoring and environmental surveillance to be included in the works. It will also determine the institutional arrangements to be made during the implementation of the project, including those relating to communication and capacity building.

1.5. PRESENTATION OF THE PROJECT PROMOTER AND RESEARCH OFFICE IN CHARGE OF THE PREPARATION OF THE ESIA

1.5.1. Presentation of the promoter

The promoter of this data center erection project is RAXIO RDC , the information of which is given in Table 1 below.

Table 1: General information about RAXIO RDC

Promoter Name	RAXIO
Name of Representative	Yannick Sukakumu
Address	8053 June 30 Boulevard / Tabu Ley Avenue; Quartier Golf, Commune of Gombe, Kinshasa, DR Congo
Telephone and e-mail	yannick@raxiogroup.com
RCCM	CD/KNG/RCCM/21-B-03028
Nat ID	Nat ID 01: H5300N92615F
Tax number	A2283835A

1.5.2. Presentation of the design office

To comply with the legal provisions and national environmental requirements in force in the Democratic Republic of Congo, the Operator RAXIO DRC has entrusted the development of this ESIA to the Environment and Marketing Consulting design office in the acronym EMC Sarl whose references are included in the table below.

Table 2. General information on the Design Office

Design office name	Environmental and Marketing Consulting SARL (EMC)
Name of Representative	Marc Kilenge
Address	N°1, Avenue Colonel EBEYA, Commune of Gombe/Kinshasa, DRC
Telephone and e-mail	+243 894156948 / 999964042 / 823333165, E-mail: contact.emc2018@gmail.com , marckilenge@gmail.com , contact@emc-rdc.org , Website: www.emc-rdc.org
National identification numbers	01-83-N25498P
RCCM	17-B-01387
tax number	A1720965H
Approval number	077/CAB/MIN/AAN/MBL/SAA/2018

The EMC design and services office specializes in environmental assessments and is approved by the Ministry of the Environment through the Congolese Environment Agency. For the realization of this study, EMC has aligned the experts whose names, qualifications and mandates are detailed in the table below.

Table 3. composition of the team in charge of developing the study

NOUNS	QUALIFICATIONS	MANDATES IN THE PREPARATION OF THE STUDY
Marc KILENGE TOKO	Master in Environmental Communication	Chief ESIA Coordinator, Public Consultation; Non-technical summary
Guy MUNSAYONGO	Environmental Engineer;	Technical description of activities, analysis of interactions between the project and the receiving environment Description of biological environments Analysis and management of the impacts of the biological environment
Orelis KATO NZITA	Socio-economist expert	Preparation of minutes of the public consultation Report compilation and printing
Christian PUNGI	Sociologist Expert	Public consultation
Grandpa MUPANI	Degree in law	Description of the legal and institutional framework

1.6. STRUCTURING OF THE REPORT

In addition to the non-technical summary, introduction and conclusion, this report includes the following parts:

- Contents ;
- List of abbreviations and acronyms;
- List of tables, images, photos and figures;
- 0. Non-technical summary;
- 1. Introduction ;
- 2. Institutional, legal and legal framework,
- 3. Technical description of the project;
- 4. Description of the receiving environment of the project;
- 5. Analysis of project variants;
- 6. Identification, analysis and evaluation of impacts;
- 7. Project Environmental and Social Management Plan;
- 8. Waste management plan;
- 9. Security emergency plan;
- 10. Public consultation;
- 11. Conclusion ;
- 12. Commitment of the promoter;
- 13. Bibliography;
- 14. Appendices.

2. INSTITUTIONAL, LEGAL AND LEGAL FRAMEWORK

2.1. INTRODUCTION

This chapter describes the institutional, legal and legal framework of the project to erect a network of a data center in Kinshasa, 12th rue Limete Industriel, in which the environmental and social assessment falls. In this part we will present the legal and legal texts, in force in the Democratic Republic of Congo, in connection with the development of this study. We will also present the various institutions involved directly or indirectly in this project.

2.2. Institutional frame

This project to erect a network of a data center in Kinshasa, 12th^{Limete} street in the city-province of Kinshasa in the DRC is, by its objectives, under the supervision of the Ministry of Posts, Telecommunications and New Technologies of Information and Communication; a special presentation will be reserved for him. Like any other project, its ramifications suppose a greater or lesser involvement of other Ministries and Institutions whose attributions will also be detailed.

Below are the institutions involved in the project and their attributions are mentioned according to Ordinance n ° 22/003 of January 7, 2022 fixing the attributions of the Ministries in the Democratic Republic

2.2.1. Ministry of Posts, Telecommunications and New Technologies of Information and Communication

This ministry has the following mission and attributions:

- Design and propose to the Government the general policy to guide the development of the sector;
- Implement the policy defined by the public authorities in the field of national and international telecommunications for the aspects which come under this law;
- Set the administrative and police regulations relating to telecommunications and set the related taxes;
- Define and update the general regulatory framework of the sector;
- Ensure, in collaboration with the ministries and services of the State in charge of justice, the interior, national defense and security, in accordance with the laws and regulations in force, the general surveillance and the police of the sector;
- Represent the country's interests with sub-regional, regional and international organizations by ensuring the application of international agreements and treaties in the telecommunications sector.

➤ Regulatory Authority for Posts and Telecommunications of Congo (ARPTC)¹

The Regulatory Authority for Posts and Telecommunications of Congo (ARPTC) is a body dependent solely on the Presidency of the Republic with legal personality. According to Law No. 014/2002 of October 16, 2002, the ARPTC's mission is to:

- Ensure compliance with laws, regulations and conventions in the field of posts and telecommunications;
- b) contribute to defining and adapting, in accordance with the guidelines of government policy, the general legal framework within which postal and telecommunications activities are carried out;

¹ October 16, 2002. – LAW 014-2002 establishing the Post and Telecommunications Regularization Authority (Presidency of the Republic)

- c) cooperate with other national and foreign authorities having the same object, contribute to the preparation of the Congolese position in international negotiations and participate in the representation of the Democratic Republic of the Congo in international organizations in the field of posts and telecommunications;
- d) examining concession application files, issuing, suspending or withdrawing authorizations, receiving declarations, drawing up specifications corresponding to authorizations, ensuring compliance with the obligations contracted by their holders, periodically fixing the number of new operators eligible for the benefit of a concession or authorization;
- e) define the principles of interconnection and pricing of public postal and telecommunications services;
- f) issue technical standards for equipment and terminals and carry out the approvals required by law;
- g) manage and control the frequency spectrum, assign the frequencies necessary for the operation of any sound and television broadcasting station;
- h) develop and manage the national numbering plan;
- i) ensure continuity of service and protect the general interest;
- j) analyze and study in a prospective way the evolution, at the national and international levels, of the social, economic, technical and legal environment of the activities of the sector;
- k) suggest any legislative or regulatory changes that it deems necessary for the development of the postal and telecommunications sectors and the development of competition;
- l) protect the interests of consumers and operators in the postal and telecommunications market by ensuring the existence and promotion of effective and fair competition and taking all necessary measures to restore competition in consumer benefit;
- m) contribute to the designation of the authorized operator, apart from the public operator, for the purpose of installing and operating part of the reference network;
- n) define and enact the standards for the installation of all radio and television broadcasting stations for collective reception or reception for the purpose of redistribution;
- o) give, on an exceptional basis, authorization to the operator of an independent network to transmit or receive, even free of charge, private correspondence, signals or communications of any kind on behalf of or for the benefit of third parties;
- p) give the Minister, together with the public operator, the prior notice to authorize a public telecommunications service concession operator to carry out its own interurban traffic and to have its own international exit routes, under various conditions fixed by law;
- q) ensure that universal service funds are used to ensure the provision of universal service in the postal and telecommunications fields;
- r) ensure that citizens benefit from the services provided using new information and communication technologies.

2.2.2. Ministry of Digital

The attributions of this Ministry are:

Concept, proposal and implementation of government policy in the digital sector;

Regulation, promotion and monitoring, within the limits of its powers, of activities and services in the digital sector;

Promotion, in collaboration with the sectoral ministries, of the transformation towards the digital economy and the development of national innovation;

Development of the national plan for the integrated counting of the integrated administration of the administration and public services and management of its implementation, in collaboration with the administrative regulations with the sectoral ministries;

Issuance of administrative and police regulations relating to digital activities and services and proposal of duties, taxes and royalties relating thereto;

Design and initiation of public investment programs in the digital sector;

Preparation, in collaboration with the sectoral ministries and State services, of technical specifications for public programs and projects in the digital sector and coordination of their implementation;

Design of planning tools for public programs and projects in the digital sector;

Establishment and management of infrastructures, in particular national data centers (Data centers) in collaboration with the ministries having scientific research in their attributions;

Design of business applications adapted to all administrations, taking into account their specificities.

2.2.3. Ministry in charge of Infrastructure and Public Works (MITP)

This Ministry has the latitude of Design, construction, modernization, development, development and maintenance of road, port, airport, rail, hydroelectric infrastructures not conceded.

It ensures the creation and approval of real estate agencies and brokers, including the promotion of social housing. It develops standards for the construction of human settlements, etc. ; building permits.

2.2.4. The Ministry in charge of Urban Planning and Housing

This ministry has the following mission and attributions:

- Development of urban space in terms of town planning and housing;
- Management and administration of real estate assets in the private domain of the State;
- Study and promotion of local building materials;
- Implementation of the National Housing Plan;
- Police of the rules of Urban Planning and Habitat; Provision of permanent technical assistance for self-construction;
- Development and promotion of the construction of human settlements by both the public and private sectors;
- Study and promotion of financial organizations and housing banks in collaboration with the Ministry having Finance in its attributions;
- Development of standards for the construction of human settlements;
- Creation and approval of real estate agencies and brokers;
- Promotion of social housing.

2.2.5. Ministry in charge of Employment, Labor and Social Welfare

The Ministry in charge of Employment, Labor and Social Welfare oversees the application of labor laws, in particular compliance with minimum wages, compliance with model employment contracts and worker protection measures.

2.2.6. Ministry of Public Health, Hygiene and Prevention

The action of this Ministry in the Project consists in setting up an awareness program to fight against HIV/AIDS, STIs and the different methods of prevention, as well as the medical management of cases of GBV.

In addition, the Ministry of Public Health, Hygiene and Prevention has set up a multisectoral response committee (CMR) against COVID-19 in the DRC and has just set up the National Solidarity Fund against Covid-19 (FNSSC).) whose mission is to seek and collect financial means intended to be used in the form of aid, assistance or support for natural or legal persons, medical care personnel, medical or hospital services.

2.2.7. Ministry of Territorial Planning

The Ministry of Territorial Planning within the framework of this sub-project: will play an important role in monitoring the implementation of activities for the development of public spaces, the rehabilitation of roads and other public buildings.

2.2.8. National Solidarity Fund Against Covid19

The National Solidarity Fund against Covid-19 (FNSSC) was created by Ordinance No. 20/018 of April 6, 2020.

It is responsible for financially supporting local health and community workers so that they have access everywhere to the latest scientific information so that they can protect themselves, prevent infection, stem its spread and provide care to those in need so as to reduce the impact of COVID-19 on the population, especially the vulnerable. The sub-project will benefit from its support in the event of COVID declared among the stakeholders

2.2.9. Ministry of Water Resources and Electricity

For the implementation of this Project, the Ministry of Water Resources and Electricity will play the role in supplying electricity to the Vocational Training Center through UCM and SNEL .

2.2.10. City Province of Kinshasa (VPK)

City Hall of Kinshasa represents the Government of the DRC. It participates in public awareness and social mobilization activities. It will set up the Local Development Committee which will ensure close monitoring of the implementation of project activities and the recommendations of the ESIA.

2.2.11. Ministry in charge of the Environment and Sustainable Development through the Congolese Environment Agency (ACE)

ACE is a technical establishment of the Ministry in charge of the Environment, created by Decree No. 14/030 of November 18, 2014 setting the Statutes of a Public Establishment called the Congolese Environment Agency, in acronym " ACE", and responsible for conducting and coordinating the environmental and social assessment process in the DRC. The main tasks of the ACE are:

Validate Environmental and Social Impact Assessments (ESIAs), Environmental and Social Impact Diagnoses (DIES), Environmental and Social Management Plans (ESMP) and Environmental and Social Compliance Plans (PMCES);

Carry out administrative and technical monitoring of ongoing projects (analysis of field reports, inspection and environmental audit).

2.2.12. The Municipalities of Limete

It will intervene through the Municipal Services (Town Planning, Environment, Land Affairs, etc.) which will monitor the environmental and social aspects relating to the construction work of the data center on the site of 12 th rue Limete. These services will coordinate the dissemination of information relating to the ESIA. They will participate in public awareness and social mobilization activities. The project will set up the Local Development Committee which will ensure close monitoring of the implementation of project activities and the recommendations of the ESIA and the measures contained in the ESMP and will be involved in the grievance management mechanism. .

2.2.13. control mission

The Control Mission that will be recruited will be responsible for monitoring and controlling the implementation of the project from a technical and environmental point of view. He will ensure the application of the environmental clauses contained in the Call for Tenders Document (DAO), as well as the follow-up of certain GBV/SEA/SH prevention measures developed by the Action Plan, among others, the participation of workers in GBV training and signing of the code of good conduct.

2.2.14. Company in charge of the works

It will be in charge of the physical execution of the erection works of the data center center on the site of 12th street Limete. It will have to implement the environmental and social obligations contained in the contract.

With regard to the fight against SEA/HS, the company will promote a work environment that totally discourages behaviors likely to create and/or exacerbate SEA/HS, and will severely sanction any incidents in accordance with the established code of good behavior.

2.2.15. Non-Governmental Organizations (NGOs)

In the DRC, the activities of NGOs are governed by Law No. 004/2001 of July 20, 2001 on general provisions applicable to non-profit associations and public utility establishments. It should be mentioned that NGOs in GBV and mobilization of stakeholders will be called upon to support the project in the fight against GBV during the implementation of the project.

2.3. LEGAL AND LEGAL FRAMEWORK

The general legal framework is composed of legislative and regulatory texts of the DRC as well as international conventions ratified or signed by the Congolese State and automatically forming an integral part of the country's legal arsenal.

2.3.1. Legal texts applicable to the Project

addition to the Law, Decrees and Orders cited above, the legal texts applicable to this Project are listed in Table 4 below.

Table 4. Legal texts applicable to the project

Legal texts	Description	Relevance
Constitution of the Democratic Republic of Congo as amended by Law No. 11/002 of January 20, 2011 revising certain articles of the Constitution of the Democratic Republic of Congo of February 18, 2006.	The Constitution obliges the Congolese State to protect the environment (article 53) and refers to the domain of the law for the determination of the environmental protection regime (article 123, point 15).	This law is relevant for this ESIA because it protects the biophysical and human environment of the project site against the impacts and nuisances that may be generated by the project activities. Within the framework of this ESIA, measures to mitigate these impacts have been taken for the protection of the environment.
Law No. 11/009 of July 9, 2011 on fundamental principles relating to the protection of the environment	Article 21 of this law requires all development projects that may have an impact on the environment to present an environmental and social impact study accompanied by an environmental and social management plan.	This law is important because it allows the project to be provided with an environmental and social impact study including an environmental and social management plan to finally manage the various impacts and nuisances arising from the project.
Law No. 09/001 of January 10, 2009 on the protection of children in the DRC	This law presents the condition of the child in the world and in the DRC because of its vulnerability, its dependence on the environment, its lack of physical, intellectual and emotional maturity, requiring special care and special protection. ceased to challenge the international and national community for some time.	This law is relevant to fight against the worst forms of child labor on the construction site. This ESIA recommends mitigation measures in accordance with national legislation. The project will ensure strict compliance with this law.
Organic Law No. 08/016 of October 7, 2008 on the composition, organization and functioning of Decentralized Territorial Entities, their relations with the State and the Provinces	Articles 3 and 5, give the quality of City-Province to Kinshasa and the status of Capital of the country by its article 4.	In the implementation of the ESIA, the city of Kinshasa has the responsibility through its urban development unit , and also also, it is the receiving environment of the project.
Law No. 004/2002 of February 21, 2002 on the Investment Code	The Code obliges any investor to comply with national regulations covering environmental protection, nature conservation and employment.	This law is relevant to the activities of this ESIA through the protection of the environment of the project site and encourages the creation of jobs (THIMO).
Law No. 16/010 of July 15, 2016 amending and supplementing Law No. 15/2002 of October 16, 2002 on the Labor Code.	This law aims, among other things, to protect the health and safety of workers, to provide medical service, to guarantee the legal minimum wage in the DR Congo and to regulate working conditions. The project must ensure compliance with the Labor Code in the use of personnel during the works.	Given the hiring of the workforce necessary for the execution of the project, this law is very relevant for the health and safety protection of workers, their medical care as well as compliance with the labor code in general and the SMIG application in particular .
Law 78-022 of August 30, 1978 on the new Highway Code	This law regulates road traffic ; road signs ; police traffic violations ; and findings of miscellaneous offenses and penalties . Its field of application is traffic on public roads,	This law is relevant for the activities of the project to erect the RAXIO DRC data center given the activities of transporting materials and equipment in order to limit the

	pedestrians, vehicles, as well as draft, load or saddle animals and cattle.	various violations of the highway code resulting in traffic accidents.
Decree No. 20/023 of October 1, 2020 on barrier measures to combat the COVID-19 pandemic in the Democratic Republic of Congo.	Article 1 ^{of} the Decree provides: "sets the barrier measures to be observed throughout the national territory in order to combat the spread of COVID-19 after the lifting of the state of health emergency".	The law is relevant, it allows the project to fight against COVID-19 during implementation, given the influx of labor.
Law No. 011 of June 17, 2014 relating to the electricity sector	This Law instituted the liberalization of the electricity sector, abolished the monopoly of SNEL, which nevertheless remains the predominant operator and admits private operators in the electricity sector. It has also decentralized and distributed competences between the central government and the provinces. This Law provides in its Article 2, first paragraph: "This law applies to the activities of production, transport, distribution, import, export and marketing of electrical energy carried out by any operator".	This law is very important because the project proposes 3 types of supply of the center in Electricity namely: the connection with the existing line of the SNEL, the photovoltaic and the generator.
Law No. 06/018 amending and supplementing the Decree of June 30, 1940 on the Congolese Penal Code and Law No. 06/019 amending and supplementing the Decree of August 6, 1959 on the Congolese Code of Criminal Procedure (Law on violence based on gender and protecting vulnerable people)	This law lists the different types of sexual violence and the rs.	This law is relevant because it allows the project through the ESIA to fight against all forms of gender-based violence.
Law 73 – 021 of July 20, 1973 relates to the general property regime, land and real estate regime and securities regime	This law stipulates that the land belongs to the State and specifies that any decision of expropriation falls within the competence of the executive power.	The law is relevant for this ESIA, as it allows the acquisition of the INPP site.
Ordinance No. 22/003 of January 7, 2022 setting the powers of the Ministries	This Ordinance defines the common and specific attributions of all the Ministries in the DRC.	The law is relevant given the various institutional stakeholders in the implementation of the project.
Ordinance No. 74/098 of June 06, 1974 relating to the protection of the national workforce against foreign competition	This Ordinance relates to the protection of the national workforce against foreign competition. The project must ensure that this Ordinance is respected in the use of local labor during the works.	It is relevant because of the protection of local labor, because this project advocates the use of labor for THIMO works.
Ordinance No. 20/014 of March 24, 2020 proclaiming a state of health emergency to deal with the COVID-19 epidemic	This Ordinance provides on health measures for the protection of protection against the CODID-19 pandemic.	During public consultations, this ordinance was strictly applied in the context of this ESIA, with regard to respect for social distancing and the number of people in the room.
Ordinance-law n°71-016 of March 15, 1971 relating to the protection of cultural property	This Ordinance-Law provides that the discoveries of immovable remains or objects that may be of interest to art, history or archaeology, whether they are made during	Following the earthworks and excavation work recommended by the project which may lead to a fortuitous

	excavations or whether they are fortuitous, must be declared immediately by the inventor or the owner to the administrator of the territory or to the first mayor, who notifies the Minister of Culture. The Minister may, by decree, prescribe all useful measures for the conservation of the remains or objects discovered. During the work, it is possible to accidentally discover cultural remains. In this case, the project must comply with the requirements of this Ordinance-Law.	discovery, the project will apply the law in the event of a fortuitous discovery.
Ordinance No. 41/48 of 12 February 1953 on dangerous, unhealthy or inconvenient establishments	This Ordinance included in the list appended to this Ordinance and arranged in two classes may only be erected, transformed, moved or operated under the terms of an operating permit.	Given the various classified establishments retained in the law which may be the basis of insalubrity and inconvenience (garage, restaurant, quarries, wood depot, etc.); this law will apply.
Decree No. 13/015 of 29 May 2013 regulating classified installations.	Article 11, paragraph 2 of this decree conditions the prior realization of an environmental and social impact study in accordance with article 71 of Law n°11/009 of July 09, 2011 on fundamental principles relating to the protection of the environment.	Given the various classified establishments retained in the law which may be the basis of insalubrity and inconvenience (garage, restaurant, quarries, wood depot, etc.); this law will apply.
Decree No. 14/019 of August 2, 2014 setting the operating rules of procedural mechanisms for environmental protection.	Article 8 of this Decree agrees with Article 21 of Law No. 11/009 of July 9, 2011 on the fundamental principles relating to the protection of the environment.	This decree is applicable within the framework of this ESIA. The erection works of the Limete data center are preceded by the preparation of this ESIA
Decree No. 14/030 of November 18, 2014 establishing the statutes of a public establishment called the Congolese Environment Agency, in acronym	The Decree ensures that environmental protection is taken into account in the execution of any development project, infrastructure or operation of any industrial, commercial, agricultural, forestry, mining, telecommunications or other activity, likely to have an impact on the environment.	This decree is relevant and applies to this ESIA, because this ESIA will be sent to ACE as a public institution whose role is to validate ESIA's and monitor the implementation of the project's ESMP.
Ministerial Order No. 070/CAB MINENER/2006 of December 9, 2006 amending and supplementing Ministerial Order No. E/SG/0/0133/C2/93 of March 17, 1993 setting the conditions for obtaining the operating license natural surface or ground water.	This Order sets the conditions for obtaining authorization to exploit natural surface or underground water for industrial, commercial, domestic, hydroelectricity or mixed purposes. The authorization is granted by the Minister in charge of energy management.	This decree is relevant because it will allow the project to have the authorization during the realization of water drilling for the supply of the data center with drinking water.
Ministerial Order No. 001/CCE/DECNT/86 implementing measures for Ordinance No. 41-48 on dangerous, unhealthy or inconvenient establishments.	The Establishments included in the list annexed to this Ordinance and classified in two classes may only be erected, transformed, moved or operated under the terms of an operating permit. This Order contains the implementing measures relating to the operating permit.	Given the various classified establishments retained in the law which may be the basis of insalubrity and inconvenience (garage, restaurant, quarries, wood depot, etc.); this law will apply.

<p>Edict n° 003/2013 of 09/09/2013 relating to sanitation and environmental protection of the City-Province of Kinshasa.</p>	<p>This Edit deals with general sanitation measures (management of solid waste, wastewater, hospital and industrial waste) and environmental protection measures (ESIA, audit, fight against pollution and nuisances), etc.</p>	<p>Account of the production of waste generated by the project during the different phases (works and operation), the law will be strictly applied</p>
<p>Order No. CAB.MIN/IND/CJA/10/10/2020 of October 27, 2020 adopting Congolese national standards on cosmetics and detergents, lubricants and petroleum products, cements, paints and varnishes, electrical engineering, information technology and security, road safety management and supply, sanitation, environment, wastewater and boreholes and their application.</p>	<p>Article 1^{of} this Order provides: "Standards on cosmetics and detergents, lubricants and petroleum products, cements, paints and varnishes, electrical engineering, information technology and safety, management road safety and supply, sanitation, environment, wastewater and drilling specified in the annex to this Order are adopted as Congolese national standards.</p>	<p>Given the use of hazardous products for the project, namely: lubricants and petroleum products, cements, paints and varnishes, etc. The project will apply the different standards required by law.</p>
<p>Ministerial Order No. CAB/MIN-ATUHITPR/006/2014 of April 4, 2014 regulating the granting of building permits in the Democratic Republic of Congo</p>	<p>This decree stipulates in its article 1 as follows: Any person wishing to undertake a real estate development, an urban innovation, a construction or a work of any kind, in durable materials and according to the rules of the art, on the whole extent of the territory of the Democratic Republic of Congo, is required to first obtain a Building Permit from the competent Town Planning and Housing administration according to the procedure established in this Order, and in accordance with the requirements of the work site for which permission to work is sought.</p>	<p>Given the anarchic constructions noted on the national territory, this law will apply;</p>
<p>Law No. 15/005 of March 17, 2015 on the insurance code</p>	<p>On the one hand, this law contributes to the safety of families and the sustainability of businesses by compensating for the consequences of accidents that threaten their assets or the security of their income; and on the other hand, it generates collective savings which, being invested in the service of the national economy, contributes strongly to the development of the latter.</p>	<p>This law is relevant for this ESIA because in the event of an accident, the owner having been in order with his insurance will benefit from compensation for lost goods and effects.</p>
<p>Framework Law No. 013/2002 of October 16, 2002 on Telecommunications in the DRC</p>	<p>This law governs the telecommunications sector in the Democratic Republic of Congo. As such, it sets the conditions for the ownership, installation and operation of telecommunications throughout the national territory, guarantees the harmonious and integrated development of telecommunications networks and services and facilitates the mobilization of financial resources through the private sector participation in the development of telecommunications in a fair competitive environment.</p>	<p>This law is relevant for this ESIA in that it sets the terms for the possession, installation and operation of telecommunications throughout the national territory,</p>

<p>Law No. 17/001 of February 08, 2017 setting the rules applicable to subcontracting in the private sector</p>	<p>This law aims to make the subcontracting of ancillary and related activities of the main activity compulsory and to reserve it, whatever its nature, for Congolese companies with Congolese capital in order to ensure their promotion and thus encourage the emergence of a Congolese middle class</p>	<p>This law is relevant for this ESIA for the protection of the workforce of subcontracting companies, the creation of employment for nationals and the broadening of the tax base for the benefit of the public treasury.</p>
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2.3.2. Legal texts relating to GBV

Law No. 11/002 of January 20, 2011 revising certain articles of the Constitution of the Democratic Republic of Congo of February 18, 2006, through articles 12, 13, and 14, and 15, advocates the need to implement promotes equal rights, opportunities and gender between Congolese men and women, as well as the obligation to eliminate all forms of violence against women in public and private life. To implement the above constitutional provisions, it was necessary to promulgate the laws below:

- Law No. 15/013 of August 1, 2015 on the modalities for the application of women's rights and parity;
- Law No. 06/018 of July 20, 2006 amending and supplementing the Decree of January 30, 1940 on the Congolese Penal Code criminalizes sexual violence and increases the penalties against perpetrators;
- Law No. 09/001 of January 10, 2009 on child protection;
- Law No. 08/011 of 14 July 2008 protecting the rights of people living with HIV/AIDS and affected people, integrating gender issues;
- Law amending and supplementing Law No. 015-2002 on the Labor Code, abolishes marital authorization for married women seeking employment;
- The Law on the terms and conditions for the application of women's rights and parity (Law No. 15/013 of August 1 2015);
- The promulgation of the law on the amended and supplemented family code, integrating the gender dimension (law no. 16/008 of July 15, 2016).

2.3.3. International Agreements and Conventions applicable to the Project

The DRC is a signatory to a number of international agreements and conventions regarding environmental management, working conditions and human rights. Table 5 below specifies for information purposes the different dates of ratification by the DRC of the said international agreements and conventions.

Table 5. International environmental conventions ratified by the DRC applicable to the Project

Agreement Name	Country or city By adoption	date of Signature	Relevance for the sub-project
Convention on the conservation of fauna and flora in their natural state.	London (England), January 14, 1936.	-	This Convention is relevant for activities related to the biological component (Flora and Fauna) in the preparation and construction phases because the biodiversity of the Sub-project area will have to be protected.
African Convention on the Conservation of Nature and Natural Resources.	Algiers, (Algeria), September 15, 1968.	November 13, 1976	Similarly for this agreement, it relates to the activities of the preparatory and construction phases against erosion to ensure the protection of the ecosystem of the project area.
United Nations Convention on Climate Change.	Rio de Janeiro (Brazil) June 4, 1992. Then COP 21 Paris 2015	December 8, 1994	The fired brick manufacturing activities are dependent on tree cutting and excavation. This being so, it is envisaged within the framework of this project, the fight against erosion and deforestation likely to induce climate change. Mitigation measures have been taken to compensate for this deforestation .
Convention on Biological Diversity.	Rio de Janeiro (Brazil) June 4, 1994.	September 15, 1994	Preparedness phase activities pose a threat to biological diversity. The measures were taken in the ESIA in accordance with ESS n°6.
Convention No. 150 concerning labor administration: role, functions and organization.	Concluded in Geneva on 26 June 1978 ratified on 03/04/1987	April 03, 1987	The activities of the preparatory and construction phases will require the recruitment of local labor (THIMO) and the organization of work while involving the ILO in the establishment of bidding documents for the recruitment of the company, this Convention is relevant in that it provides guidelines for the system of labor administration.
Convention No. 182 concerning the prohibition of the worst forms of child labor and immediate action for their elimination.	Concluded at Geneva on 17 June 1999	June 20, 2001.	This convention is relevant to fight against the worst forms of child labor on the construction site. This ESIA recommends mitigation measures in accordance with national legislation and ESS 2. The Sub-project will ensure strict compliance with this Agreement.
Convention No. 138 on minimum age for admission to employment.	Concluded in 1999	June 20, 2001	Convention No. 138 sets 18 as the minimum age for hazardous work. This ESIA has recommended mitigation measures in accordance with national legislation and ESS 2. The Sub-project will ensure strict compliance with this Agreement.
Convention No. 121 on benefits in the event of accidents at work and occupational diseases.	of 1964 (table I amended in 1980) ratified on 05/09/1967	September 05, 1967	This Convention is relevant to activities in the preparation, construction and operation phases. This ESIA recommends mitigation measures in accordance with national legislation and ESS 4. The Sub-project will ensure strict compliance with this Agreement.
Convention No. 111 concerning discrimination (employment occupation)	from 1958	June 20, 2001	Discrimination means: - Any distinction, exclusion or preference based on race, color, sex, religion, political opinion, national extraction or social origin, which has the effect of destroying or impairing equality of opportunity or treatment in respect of employment or profession;

			<p>- Any other distinction, exclusion or preference having the effect of destroying or altering equality of opportunity or treatment in matters of employment or profession, which may be specified by the Member concerned after consultation with the representative organizations of employers and of workers, if any, and other appropriate bodies.</p> <p>Limete data center erection activities advocates for mitigation measures and will ensure strict compliance with the Covenant in accordance with national legislation and World Bank CES ESS 2.</p>
Convention on the Elimination of All Forms of Discrimination against Women or the Declaration on the Elimination of Violence against Women.	Was adopted on December 18, 1979 by the General Assembly of the United Nations. It was signed in 1980 and ratified in 1986 by the DRC. It entered into force on September 3, 1981 after being ratified by 20 countries.	nineteen eighty one	This convention is relevant because it fights against all forms of discrimination against women. The preparation and construction phases will hire men and women in its execution. This project will comply with the Convention, national legislation and the recommendations of the Note of good practice to combat sexual exploitation and abuse and sexual harassment and has taken this convention into account in this study in taking the measures prevention, mitigation and response to EAS/HS risks related to the project

2.4. POLICIES AND PROGRAMS RELATED TO THE PROJECT

2.4.1. Environmental policies and programs

2.4.1.1. National Environmental Action Plan (PNAE)

The PNAE drawn up in 1997 places particular emphasis on soil degradation and erosion due to poor farming practices, air and atmosphere pollution originating, to varying degrees, from agricultural and energy activities of classified installations. and industries, deforestation, illegal logging, intensive poaching and uncontrolled mining in some protected areas.

The PNAE stresses the urgency of drawing up the legal framework for environmental protection and developing procedures relating to environmental impact studies. The project is challenged by this policy because the construction of the trenches could lead to soil degradation and erosion, air and atmosphere pollution.

2.4.1.2. National Strategy and Action Plan for Biological Diversity

The National Strategy and Action Plan for Biological Diversity, drawn up in 1999 and updated in October 2001, constitute a frame of reference for the sustainable management of biological resources in the DRC. It thus defines different strategies that can put an end to human activities that have a negative impact on natural ecosystems, namely: the harvesting of woody fuels, the practice of slash-and-burn agriculture, the exploitation of timber and industry, the harvesting of non-timber forest products, the practice of bush fires and logging.

2.4.1.3. National Action Plan for Adaptation to Climate Change (PANA)

With regard to climate change, the Government of the DRC, with the assistance of development partners (GEF, UNDP) developed the National Action Plan for Adaptation to

Climate Change (NAPA) in 2007. The NAPA has Among other things, it was possible to establish an inventory of the most common climate risks as well as their trends and the appropriate urgent adaptation measures to be considered.

2.4.1.4. Economic and social policies and programs

The second generation Growth and Poverty Reduction Strategy Paper (DSCR2P) (drafted in September 2011) is the only unifying framework for all macroeconomic and sectoral policies for the next five-year period (2011-2015). To ensure lasting stability and support strong growth, this strategy is based on four (4) pillars, each comprising clear strategic axes and priority actions for their implementation. Thus, based on the vision of DSCR2P 2, pillars have been built as follows: Pillar 1 “Strengthen governance and peace”; Pillar 2 “Diversifying the economy, accelerating growth and promoting employment”; Pillar 3 “Improving access to basic social services and strengthening human capital”; Pillar 4 “Protect the environment and fight against climate change”.

The ESIA refers to this policy because the implementation of the project will interfere with temporary jobs.

2.4.1.5. Sanitation and environmental health policies

The goal of the National Health Development Plan (PNDS 2011-2015) which has just been completed was to contribute to the well-being of the Congolese population in 2015. The intervention strategy comprises four strategic axes which are: (i) the development of Health Zones, (ii) support strategies for the development of Health Zones, (iii) strengthening of leadership and governance in the sector and, (iv) strengthening of intersectoral collaboration. This intersectoral concept is necessary because of the impact of other sectors on improving the health of populations and the multisectoral nature of primary health care.

2.4.1.6. Decentralization policy

The constitution of February 18, 2006 prescribes decentralization as a new mode of organization and management of public affairs. It defines the Decentralized Territorial Entities (ETD) in its article 3. These are “the city, the municipality, the sector and the chiefdom”. The same article 3 of the Constitution stipulates that they have legal personality and are managed by local bodies, just like the provinces. They enjoy free administration and independent management of their economic, human, financial and technical resources. They thus hold a level of responsibility and power of their own and are parallel to the central government and the provinces. While the commune is a subdivision of the city, the sector and the chiefdom are ETDs erected in rural areas. The project is challenged by this policy, because its implementation strongly involves the municipalities.

2.4.1.7. Strategic Framework for the Implementation of Decentralization (CSMOD, July 2009)

The purpose of implementing decentralization is to contribute to the promotion of sustainable human development and the prevention of conflict risks.

It is also about creating the best conditions for the development and rooting of local democracy. The strategic axes that will guide the implementation of the strategic framework for decentralization are: effective ownership of the decentralization process, progressiveness of the process, capacity building, development of planning tools, harmonization of decentralization and deconcentration, coordination between the central state and the provinces and the financing of decentralization.

2.5. WORLD BANK ENVIRONMENTAL AND SOCIAL FRAMEWORK APPLICABLE TO THE PROJECT

The Underground Fiber Optic Link Project will be carried out in accordance with the World Bank's new Environmental and Social Framework (CES), which entered into force on October 1, 2018. The CES describes the Bank's commitment to promoting sustainable development in through a policy and set of environmental and social standards designed to support borrowing country projects with the aim of ending extreme poverty and promoting shared prosperity.

The Environmental and Social Standards thus set out the obligations of Borrowers with regard to the identification and assessment of the environmental and social risks and effects of projects supported by the Bank through Investment Project Financing .

In view of the preliminary environmental and social assessment carried out, the level of environmental and social risk of the implementation of the sub-project relating to the underground connection works by Metropolitan Optical Fiber in the city of Kinshasa is considered moderate.

2.5.1. Environmental and Social Standards (ESS) applicable to the Project

The World Bank Environmental and Social Standards that apply to the project activities are: ESS no 1 (Assessment and management of environmental and social risks and effects), ESS no 2 (Employment and working conditions), ESS no 3 (Rational use of resources and pollution prevention and management), ESS no. 4 (Human health and safety), ESS no. 5 (Land acquisition, restrictions on land use and involuntary resettlement), ESS no. Biodiversity and Sustainable Management of Biological Natural Resources), ESS No. 7 (Indigenous Peoples/Historically Disadvantaged Traditional Local Communities of Sub-Saharan Africa), ESS No. 8 (Cultural Heritage), and ESS No. 10 (Stakeholder Mobilization and Information) . Indeed, eight out of the ten Environmental and Social Standards (ESS) were deemed relevant for this project. It is :

ESS 1 (Assessment and management of environmental and social risks and effects) : it sets out the Borrower's responsibilities for the assessment, management and monitoring of the environmental and social risks and effects associated with each stage of a supported project. by the World Bank through the Financing of Investment Projects (IPF) mechanism, with a view to achieving environmental and social results consistent with the Environmental and Social Standards;

ESS 2 (Employment and working conditions) : recognizes the importance of job creation and income-generating activities for the purpose of reducing poverty and promoting inclusive economic growth. Borrowers can promote good labor relations and improve the development impact of a project by treating project workers fairly and providing them with healthy and safe working conditions.

The scope of ESS 2 depends on the type of relationship between the Borrower and the project workers. ESS 2 applies to full-time, part-time, temporary, seasonal and migrant workers, who may be direct project workers, contract workers, persons employed or recruited by primary suppliers, members of the community recruited to work on the Project (community workers). Among other things, it advocates: (i) non-discrimination and equal opportunity; (ii) Professional organizations; (iii) the prohibition of child labor outside the minimum age set by the standard

or the national law of the country; (iv) prohibition of forced labour, the possibility for workers to be able to complain, etc.

In the context of the COVID-19 pandemic, the Company shall develop and implement measures aimed at preventing or minimizing the risks of spreading the pandemic, indicating what should be done if a worker get sick.

Regarding ***the management of suppliers and service providers*** , the Project will require that all suppliers and service providers involved in its project comply with the provisions of ESS 2, including the provisions of the labor management procedures.

With regard to GBV risks, a few actions to be taken at company level deserve to be singled out, namely: (i) clearly defining GBV requirements in a note to workers; (ii) include and clearly explain Codes of Conduct requirements in the notice to workers, provide a sample Code of Conduct; (iii) include GBV activities in the contract (e.g. occupational health and safety); (iv) include all GBV responsibilities in the contract specifics; (v) workers must sign the Project Code of Conduct; (vi) workers must attend and be made available for GBV training; (vii) specify the number of training days and frequency; (viii) Assess the company's proposed GBV response as part of the bid evaluation (moderate risk).

ESS 3 (Resource Efficiency and Pollution Prevention and Management) : Recognizes that economic activity and urbanization are often the cause of air, water and soil pollution, and deplete already limited resources. These effects can threaten people, ecosystem services and the environment at local, regional and global scales, including current and projected atmospheric concentrations of greenhouse gases (GHGs) that threaten the well-being of current generations. and future.

ESS 3 is applicable in the preparatory and construction phases in a risk-based approach in accordance with good international practices in the sector of activity (BPISA) and in particular with the Environmental, Health and Safety Directives

ESS 4 (People's Health and Safety) : recognizes that project activities, materials and infrastructure may increase their exposure to the risks and adverse effects associated with the project. In addition, those already experiencing the impact of climate change may experience an acceleration or intensification of these as a result of the project.

ESS 4 addresses project risks and effects on the health, safety and security of project-affected populations, including GBV risks, and the country's responsibility to avoid or minimize these. risks and effects, paying particular attention to groups which, due to their particular situation, may be considered vulnerable. It also gives guidelines to be followed with regard to traffic and road safety, design and safety of infrastructure and equipment, as well as guidelines to be followed when using security personnel.

ESS 5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement) : Recognizes that project-related land acquisition and the imposition of restrictions on its use may adversely affect communities and populations. Acquisition of land or imposition of restrictions on use may result in physical displacement (relocation, loss of residential land or housing), economic displacement (loss of land, assets or access to such assets , which results in particular in a loss of source of income or other means of subsistence), or both. "Involuntary

resettlement” refers to these effects. Resettlement is considered involuntary when affected individuals or communities do not have the right to refuse the acquisition of land or restrictions on its use that is causing the displacement. It should be noted that a RAP will be prepared in accordance with ESS No. 5 to identify all property and people affected by the Project.

ESS 6 (Preservation of biodiversity and sustainable management of biological natural resources): it recognizes that the protection and preservation of biodiversity and the sustainable management of biological natural resources are fundamental for sustainable development. Biodiversity refers to the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species and between species, as well as that of ecosystems. Because biodiversity often underpins ecosystem services valued by humans, adverse effects on biological diversity and the potential impact on livelihood activities can negatively impact these services.

It applies to activities in the preparatory phase of erosion and flood control likely to have an impact on biodiversity or habitats, as determined by the environmental and social assessment, whether positive or negative, direct or indirect, the success of which depends on the state of biodiversity. It also applies to projects that provide for primary production activities and/or the exploitation of biological natural resources.

ESS 8 (Cultural Heritage): recognizes that cultural heritage provides continuity between past, present and future in a tangible or intangible way. Individuals identify with their cultural heritage as the reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. In its many aspects, cultural heritage is important as a source of valuable scientific and historical information, an economic and social asset for development, and an integral part of the cultural identity and practice of a people. ESS 8 sets out measures to protect cultural heritage throughout the life cycle of the project.

ESS 10 (Stakeholder engagement and information): recognizes the importance of open and transparent collaboration between the Borrower and project stakeholders, an essential element of international good practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, build project buy-in, and contribute significantly to successful project design and implementation. The recommendations of the Note on good practices to combat **sexual exploitation and abuse and sexual harassment** in the context of the financing of investment projects involving major civil works (World Bank, September 2018, revised in February 2020) will be taken into account for the enrichment of measures to prevent, mitigate and respond to SEA/SH risks related to the project.

In addition to these eight standards, the Project applies operational policy PO/PB 7.50 "International Watercourses Project", which has not been modified with the new CES: The objective of this policy is to so that projects financed by the World Bank likely to affect international watercourses cannot affect: (i) relations between the World Bank and its borrowers and between States (members or not of the World Bank); and (ii) international watercourses are used and protected effectively. The policy applies to the following types of projects: (a) hydroelectric, irrigation, flood control, navigation, drainage, sewage, industrial and other projects involving the potential use or pollution of international watercourses; and (b) detailed studies and design of projects under point (a) above, including those carried out by the World Bank as executing agency or in any other capacity. This policy will not be triggered

because the Limete data center construction work will not impact international water sources (River-Congo).

Dissemination : The project sent a notification to the riparian states with all the information on the project including those on the impact studies of the project activities on this watershed. The recipient of notification in this Project is the International Commission of the Congo-Oubangui-Sangha Basin (CICOS).

3. TECHNICAL DESCRIPTION OF THE PROJECT

3.1. Data Center Description

Raxio RDC intends to offer its customers an optimized environment for their IT equipment within a state-of-the-art modular facility, fully equipped with the industry's leading technology, security, AC/DC power compatibility and redundancy. This will facilitate Internet traffic between local content providers and make the Internet experience faster, more reliable and more affordable for all digital users.

Thus, the planned project is the erection of a connected data center which will serve as the basis for the African digital economy . This center will be built on a total area of 6500m².

The main steps will be as follows:

- The administrative phase at the start of the works
- The building phase
- The transversal phase: Work monitoring
- The closing phase of the construction site

3.2. Administrative phase at the start of the works

Before starting, the company must carry out all the on-site surveys that it will need to draw up the execution documents which will be validated beforehand by the Contracting Authority. It will provide:

- the referenced detailed execution plans approved by the Control Mission (including organization and scheduling of work to reduce nuisance);
- the calculation notes approved by the Control Mission;
- the detailed technical note of the procedure for carrying out the work;
- the necessary administrative authorizations;
- the lists of known or envisaged suppliers and/or subcontractors;
- the administrative qualifications required .

3.3. Construction phase:

The construction work will mainly consist of:

- Stripping and stump removal
- Realization of the excavations and earthworks of the new building
- Construction of the foundations according to the result of the soil study carried out,
- Construction of the new building

The building to be constructed will meet ecological conditions such as:

- The use of Aluminum Composite Panels (ACP);
- Using galvanized steel;
- The use of porcelain tiles
- The use of metal sheets (aluminum sheets)
- the use of biodegradable materials;
- the use of renewable energies (photovoltaic panels);
- rational use of water and electricity;
- reduction of CO₂ production;
- planting shrubs and greenery around the building.

3.4. Closing phase of the construction site

At the end of the work, the contractor will develop:

- the end-of-site report approved by the Control Mission
- the file of works executed approved by the Control Mission

This phase will include:

- the dismantling of the installations,
- reconditioning and reassignment of equipment,
- reassignment or dismissal of staff;
- cleaning and/or restoration of sites
- the finalization of any complaint files,
- environmental and social audit,
- closing of the site accounts ;

3.5. Consistency of work to be performed

3.5.1. Mobilization and site preparation

All materials and equipment such as the dump truck, concrete mixer truck, concrete vibrators (electric), loader shovel, excavator and concrete mixer, etc. are transported to a warehouse located at strategic locations. It is from this warehouse that materials and equipment will be distributed to the work site.

3.5.2. Civil engineering work

The civil engineering works consist of the development of access roads for the transport of equipment to the site via the strategic warehouse, the installation of a container building for command and relaying equipped with air conditioning of the split including a sanitary room with sink and toilet, a filing cabinet, a small desk with two chairs, the layout of the assembly areas, as well as the assembly of the transport line. Execution of civil works depends on location, terrain, design and strategy.

In more of this container or building, the works genius civil will understand too :

- General earthworks and site installation (supply and removal of equipment, fence and demarcation of the work area) ;
- Infrastructure works (foundation, posts and beams);
- Superstructure work (frame, roof and waterproofing);
- Drinking water supply;
- The sanitation system;
- Sanitary plumbing and fire safety;
- Woodwork ;
- False ceilings;
- The cover;
- Electrification;
- Painting and coating.
- Air conditioning & Ventilation
- Computer science
- Fire safety.

The scope of the civil works includes, without limitation, the layout study, the approved referenced detailed working drawings, the calculation notes, the design, the excavation of the foundation, the setback of the site and the clean up of the site after works (everything to the satisfaction of the customer). Civil engineering works also include general earthworks and site installation (bringing in and folding of equipment, fencing and demarcation of the work area), infrastructure works (foundation, posts and beams), superstructure works (frame , roofing and waterproofing);

It should be noted that all engineering work will be carried out according to the rule of the art and safety, in particular the Fundamental and safety principles for the man-machine interface, marking and identification.

3.6. Construction work

The construction work will mainly consist of:

- Stripping and stump removal
- Realization of the excavations and earthworks of the new building
- Construction of the foundations according to the result of the soil study carried out,
- Building construction

3.6.1. General earthworks and site installation (supply and removal of equipment, fence and demarcation of the work area)

The earthwork will consist of:

- tree stripping and stump removal;
- site installation (blocks, site fencing, site panels, temporary networks, etc.) and reinforced concrete studies;
- general earthworks, including evacuation of rubble to the landfill and any shielding.

The height of the work creates risks of falling (tools, materials, workers) which will be taken into account in the environmental, health and safety section on the site.

The building to be constructed will meet ecological conditions such as:

- the use of biodegradable materials;
- rational use of water and electricity;
- reduction of CO2 production;
- planting shrubs and greenery around the building.

3.6.2. Choice of different materials

3.6.2.1. Bearing structure

For reasons of solidity and maintenance, we opted for post-beam-slab frame buildings with cement block brick filling for the administrative area and the annexes, the so-called "white zone" or the service area. servers will consist of a 100% recyclable removable metal structure, with metal cladding resting on a reinforced concrete base.

3.6.2.2. Masonry

The material to be used for the partitioning of the various rooms will mainly be "cement block brick" given the advantages it presents, in particular:

- High thermal inertia (it allows the ambient temperature to be regulated);
- The regulation of humidity (this material is hygrometric which prevents the appearance of mould);
- Ease of installation;
- Aesthetics.

There will also be light gyproc partitions in some rooms, gyproc walls are soundproofing and even achieve acoustic performance superior to that of solid walls. Fire resistance because it contains more than 20% crystallized water, released in the event of a fire. Gyproc plates have a very long life and are 100% recyclable. They are manufactured using state-of-the-art techniques according to the strictest environmental standards. Containing no harmful particles, Gyproc sheets are respectful of both man and nature .

3.6.2.3. Frames

The white zone consists of a metal frame resting on metal profiles. This one chosen for its ability to wait for long spans and being 100 % recyclable. The administrative building has a reinforced concrete flat roof.

3.6.2.4. Cover

The roofing of the buildings will be of the triangular alu-zinc tank type. This has the advantage of being stainless and delivered in a single cut.

3.6.2.5. Paint

The type of paint chosen for the interior of the premises will be of the WALLSCAPE PURE type which is a superior quality water-based paint for interior use, it offers advantages as it inhibits the growth of fungi, molds and bacteria that spread disease. It also provides excellent stain, steam and chip resistance and makes walls easy to clean. Virtually no odor and 10 times more washable than conventional water-based paints. Low VOC emissions less than 16g per litre. A hard-wearing wallcovering and hard-wearing matte finish. A water-based enamel paint.

The type of acrylic-based exterior paint that is more weather resistant. A quick-drying, one-component, modified mild solvent finish, specially reformulated for easy application. Provides slight resistance to a wide range of chemicals including acids, alkalis, inorganic salts, mineral oil and water.

As for the metal joinery, the project will use shiny enamel.

3.6.2.6. False ceiling

For aesthetic reasons, in order to guarantee good acoustic and thermal insulation, the project opted for gyproc derived from gypsum, which has the advantage of being continuously recycled without undergoing degradation.

Plain lay-in gypsum ceiling tiles 600x600x7mm with white paint finish. All panels are removable without the need for special tools, allowing easy access to the plenum for simple maintenance.

3.6.2.7. Wooden joinery

The interior joinery (doors) will be made of locally produced wood. This has the advantage of offering very good thermal and acoustic insulation and improving the interior comfort of the premises.

3.6.2.8. Metal joinery

With regard to exterior joinery (windows and anti-theft devices) the project opted for steel and painted aluminum which have the advantage of being reliable (solidity, thin and stable), ecological and safe. In addition, these joineries are very resistant and enhance the building.

3.6.2.9. Floor treatment and wall covering

For technical and architectural reasons, several types of coatings were chosen for the project, each according to its specificities, namely:

- **Vinyl Roll:** Acoustical and extremely durable heterogeneous vinyl flooring for commercial use. Excellent acoustic to indentation ratio with an indentation resistance of 17dB / 0.07mm. 72 embedded references. 25% reduction in maintenance and cleaning costs. Complete coordination of floor, walls and stairs. Generous 1.02 mm opaque wear layer on all references. The design has depth and remains extremely stable over time. Top Clean XP surface protection for extreme durability and economical maintenance. 100% phthalate free. Extreme strength with a 1.0mm wear layer.

- **Porcelain Stoneware:** Porcelain stoneware, solid and vitrified in the mass, consisting of a very fine body composed of precious clays with the addition of feldspars, quartz and kaolins,

obtained by pressing (450kg/cm² and more) of the atomized body then inserted at a temperature of approximately 1250°C. The complete verification of the slabs makes it possible to have average absorption rates of 0.02%, well below the limits prescribed by the European standard ISO 10545-3. Compact, frost-free, impact resistant, resistant to chemical and physical attack, to thermal shocks in bending.

- **Epoxy Resin:** Abrasion, impact and chemical resistant, aggregate filled, monolithic resin flooring designed to produce a seamless floor and integral skirting.

- **Carpet:** Carpeted flooring system with total product thickness: 0.247 in (6.2738 mm). Pattern Type: Textured. Main packaging: non-woven synthetic fibers. Face weight: 27 oz/square meter. Caliber: 1/10. Dots per inch: 9.0 dots/inch. Average pile height: 187 inches. Fiber system: Nylon TDX®. Dyeing method: 100% solution dyed. Soil/stain protection.

3.6.2.10. electricity

With regard to the electricity of the site, two systems are implemented, namely:

- Strong Current Electricity. Primary power will be supplied through the 20 kV utility loops of the national electricity company (SNEL). 20kV electricity must be supplied underground and it is forbidden to provide overhead conductors to serve the building. Electrical service must terminate inside the parcel in the HV switchgear located in the HV INT room of the HV switch room building.

The HV panel located in the INT HV room will supply power to the project's 20 kV HV panel located in the main HV room of the same building through an underground trench.

The planned design must be coordinated with the power company for approval.

HV rooms should have limited access and should only be accessible to Authority staff in accordance with local authority requirements.

- Back-up generator: Apart from the current, the project recommends the use of a low-voltage (400 V, three-phase) back-up generator of the covered type will be provided to safeguard the supply of all systems related to life safety thanks to an electromechanical switch inside the MDB between emergency power and normal power

3.6.2.11. Stormwater management on site

Good drainage of rainwater in the site is important to prevent water infiltration into the building. When water accumulates around a building, it runs down the foundation and may enter through cracks in the walls.

This is how gutters and downspouts are needed to reduce water damage to buildings.

All drains from the building will be collected in a septic tank with a minimum capacity of 7 days and the tank will be connected to the external urban drainage network.

The separate rainwater system shall be provided to collect all rainwater from the roof and release the jet into the main site stormwater system.

Rainwater from open areas and roads will be collected by a linear surface drain and will be connected to the main urban drainage network through a series of inspection chambers and manholes. To avoid the risk of rising sewers, non-return valves will be installed.

3.7. Withdrawal from the site and site clean-up after the works

Withdrawal is an important phase that is an integral part of the progress of a construction site. Depending on the means used during the works, the company will ensure the removal of all

temporary installations (living quarters, changing rooms, etc.), the cleaning and maintenance of equipment and machinery and the reassignment of all personnel to other projects or activities. The restoration of the premises does not only include the withdrawal of the site and the dismantling of the installations, but also more delicate operations such as the restoration of access roads, or even the cleaning and management of waste and other polluting elements.

3.8. ACTIVITIES SOURCES OF IMPACT IN THE THREE PHASES OF THE PROJECT

The realization of the project will undoubtedly require the accomplishment of a certain number of activities whose grouping, in phase, is detailed in the following lines .

1. Preparatory phase

- ✓ Installation of construction site and living bases;
- ✓ Land preparation;
- ✓ Supply of construction equipment and materials to the site
- ✓ Recruitment of workers

Choice, opening and use of borrow pits and quarries .

2. Work phase

- ✓ Earthworks and foundations;
- ✓ Elevation masonry in solid bricks;
- ✓ Concrete works (footings, stringers, beams, slabs, etc.);
- ✓ Coating work - Floor and wall covering;
- ✓ Metal and wooden carpentry works;
- ✓ Welding and thermal cutting work;
- ✓ Electrical work ;
- ✓ Photovoltaic energy works;
- ✓ Paint work ;
- ✓ Roofing works, waterproofing & False ceilings;
- ✓ Air Conditioning & Ventilation Works ;
- ✓ Plumbing, Sanitation and Sanitary Works;
- ✓ Roads and Miscellaneous Networks;
- ✓ Installation of equipment (furniture, workshop equipment, computers and machines, etc.);
- ✓ Withdrawal from the construction site.

3. Operation phase

- ✓ Operation of buildings and equipment;
- ✓ Upkeep and maintenance (buildings and equipment);
- ✓ Sanitation management.

3.9. CHRONOGRAM OF ACTIVITIES

The information from the technical studies made it possible to give the schedule of the works, the start date being conditioned by the entry into force of the Project, the works will last 9 months.

The lifetime in industrial and commercial operation of such an installation is of the order of more than 40 years.

Table 6: Chronogram of activities

Items	Activities	Month								
		1	2	3	4	5	6	7	8	9
1	Preparatory phase									
1.1	Obtaining authorizations from the authorities.	Red								
1.2	Installation of construction site and living bases;		Yellow							
1.3	Land preparation		Green							
1.4	Supply of construction equipment and materials to the site		Brown	Brown						
1.5	Recruitment of workers	Blue								
2	Phase of Works									
2.1	Earthworks and foundations;			Orange	Orange					
2.2	Elevation masonry in solid bricks;				Blue	Blue	Blue			
2.3	Concrete works (footings, stringers, beams, slabs, etc.);				Blue	Blue	Blue			
2.4	Coating work - Floor and wall covering;					Orange	Orange			
2.5	Metal and wooden carpentry works;						Dark Blue	Dark Blue		
2.6	Welding and thermal cutting work;						Green	Green		
2.7	Electrical work ;							Blue	Blue	
2.8	Photovoltaic energy works;							Red	Red	
2.9	Paint work ;							Red	Red	
2.10	Roofing works, waterproofing & False ceilings;									
2.11	Air Conditioning & Ventilation Works ;							Green	Green	
2.12	Plumbing, Sanitation and Sanitary Works;							Green	Green	
2.13	Roads and Miscellaneous Networks;								Blue	
2.14	Installation of equipment (furniture, workshop equipment, computers and machines, etc.);								Blue	
2.15	Withdrawal from the construction site.								Yellow	
3	Operation phase.									
3.1	Operation of buildings and equipment;									Green
3.2	Upkeep and maintenance (buildings and equipment);									Green
3.3	Sanitation management									Green

3.10. Sources of supply and places of storage of different materials

Most of the construction equipment cannot be supplied by DR Congo and will have to be imported from abroad (India, China, South Africa, EU, Turkey) by sea. This maritime transport is generally carried out through the port of Matadi , where the equipment must finally be loaded and transported by truck to the project site. Fragile equipment will be airlifted from Europe to Kinshasa.

3.10.1. Work inputs

The project inputs (natural materials necessary for the construction of the bases, reinforced concrete platforms) mainly concern crushed rock, sand and water.

- Borrow quarries : The project will require the opening of quarries which will have a negative impact on the soil. Nevertheless, it will be necessary to privilege as much as possible the careers already opened.
- Sands : the project will require sand to make the concrete used to pour the base to support the building. The supply of sand will be done in the various sand quarries of Kinshasa. The sand must not contain grains whose largest dimension exceeds 5 mm. Under the same conditions, earth from excavations containing no impurities, the largest dimension of which exceeds 5mm, may be used exclusively for backfilling trenches. The use of grinding sand is not permitted
- Water : The project will require water although the quantity is not large. The supply can be done directly in the rivers or the outcropping aquifer.
- Cements : Cements must meet the NF P 15300 and NF P 15301 standards. The cement used will be composed of CPJ class 45 or 55. The mixing water will have a hydrometric degree of less than 20 and will comply with the NF P 18303 standard:
 - ✓ The W/C ratio (water on cement) will in all cases be less than 0.50,
 - ✓ The sodium chloride content should be zero. The cement that will be used during the work will come from local industries in the Kongo-Central province. As for sand, gravel and rubble; they will be supplied from the quarries of Kinsuka, city of Kinshasa.

The project will use three transport routes to transport materials, equipment and equipment, including: the sea route, the road route and the air route. Storage of all project equipment will be on project sites, barricaded and secured by police or military contagion.

3.11. Quality, health, safety and environment procedures

The contractor will guarantee the certification of all the equipment, materials and materials that will be used on the site, through an approved organization. No equipment will be accepted on site if it does not have a certificate in accordance with the ISO 9000 standard, issued either by the supplier or by an approved body.

The materials and concretes will be subject to geotechnical tests in the civil engineering laboratory which will be set up by the builder. The Control Mission may therefore make a note to certify that the materials tested in situ after laboratory tests are compliant.

Therefore, the company will develop its Quality Assurance Plan manual, defining the various quality management procedures during the implementation of the project as well as its quality policy. For this, he will hire a quality manager and a quality controller for internal control. The external control will be carried out by the control mission and/or an approved body.

As for health, safety and the environment, the company must define its policy in this area before work begins. In addition, it will have to develop its HSE manual and action plans, defining all the procedures in this area in relation to the project's activities. As a result, the contractor will hire an HSE manager, who will manage, lead and monitor the site's environment.

Its HSE Management system must take into account the compliance of these equipment, materials and materials, the safety of personnel and the control of environmental impacts. The contractor must ensure compliance of the site with national and international codes and standards applicable to a construction site. In particular: national labor and environmental regulations and ISO 14000, 14001, and OHSAS 18001 and 18002 standards.

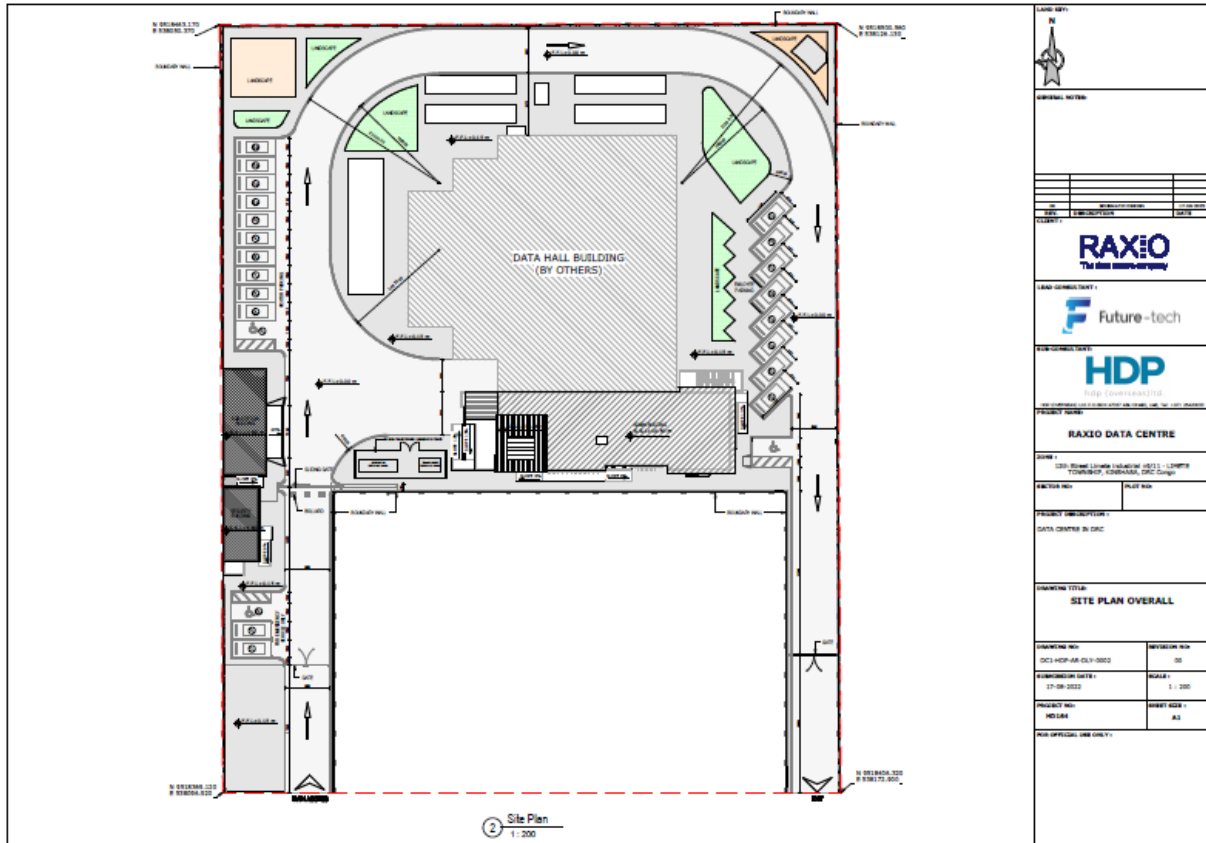


Figure 1 Architectural plan of DATA CENTER RAXIO RDC

4. DESCRIPTION OF THE PROJECT RECEIVING ENVIRONMENT

4.1. INTRODUCTION

The project that is the subject of this environmental and social impact study concerns the erection of a data center (Data Center) in the municipality of Limete at number 9/11, Boulevard Lumumba, 12th Rue Limete Industriel, city province of Kinshasa.

4.2. BIO-PHYSICAL AND SOCIO-ECONOMIC CHARACTERISTICS OF THE PROJECT AREA

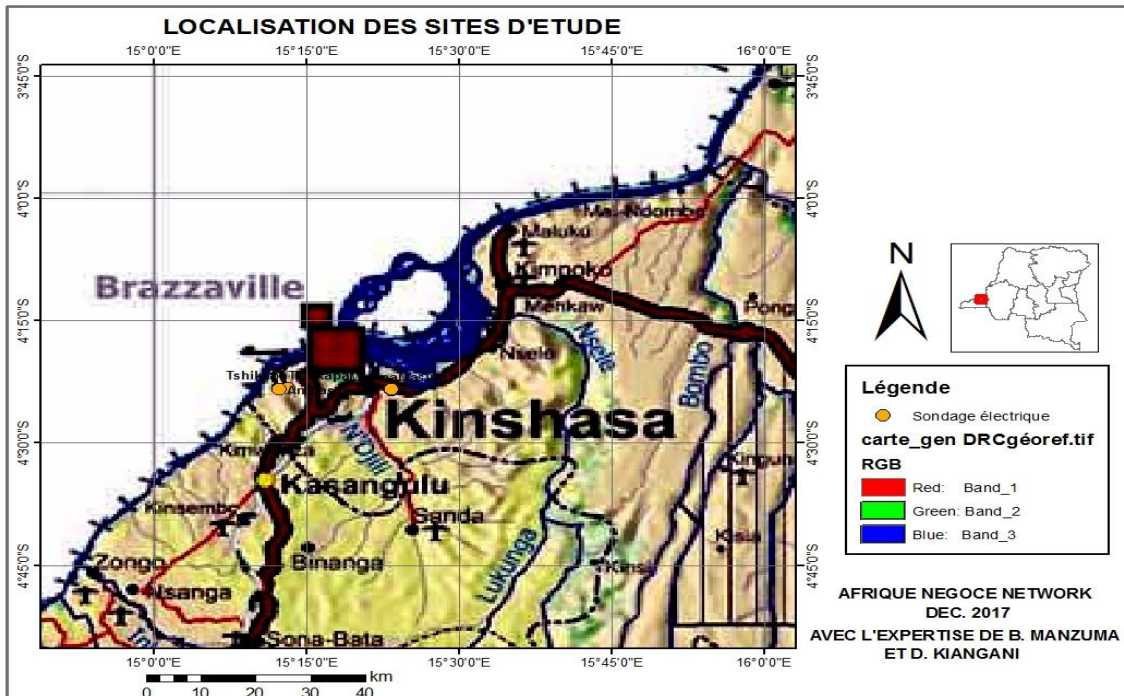
In this part, it will be a question of making a presentation of the physical, biological and socio-economic characteristics of the city-province of Kinshasa in general, that of the commune of Limete and as well as the place of erection of the data center in particular. .

4.2.1. City-province of KINSHASA

4.2.1.1. Presentation of the city-province of Kinshasa

Kinshasa is the capital and largest city of the Democratic Republic of Congo (DRC). With an estimated population of 12,071,000 inhabitants for the year 2016, over an area of 9,965 km² it is the third most populated city in Africa . Located on the south bank of the Congo River , at Pool Malebo , it faces the capital of the Republic of Congo , Brazzaville . Kinshasa has the administrative status of a city and is one of the 26 provinces of the country. Its inhabitants are called Kinois.

Card 1. Map of Kinshasa



4.2.1.2. Physical characteristics

4.2.1.2.1. Climatic elements

Kinshasa's climate is of the hot and humid tropical type (Sudano-Guinean) characterized by an eight-month rainy season from October to May and a four-month dry season from June to September.

The average annual rainfall is about 1500 mm, or an average of about 190 mm/month during the 8 continuous months of the rainy season. The dry five-year rainfall (exceeded 4 out of 5 years) is 1300 mm/year, while the wet five-year rainfall (exceeded only one year out of 5) is 1660 mm/year.

The average daily temperature varies little throughout the year: from 23 to 25° in the dry season, from 26 to 27° in the rainy season, on average it is around 25°C. Likewise, the relative humidity is high all year round and is around 70 to 80%. As for Evaporation, it is 1454 mm/year, with monthly values of 100 to 183 mm/month, the average duration of insolation is around 4.7 hours per day.

4.2.1.2.2. Geomorphology

The city-province of Kinshasa has two characteristic geomorphological compartments with very distinct lithologic facies. The first compartment formed of a quaternary alluvial filling dominating the lower plain with its alluvial terraces, leaning on the second compartment consisting of a pre-quaternary peripheral hilly series along its southern border.

Thus, we distinguish:

- The plain of Kinshasa and its alluvial terraces, represented by the expanse of Lemba, formed of sandy deposits with a thickness of 5 m, surmounting a slab of polymorphic sandstone with a power of 2 m, lining Meso-Cenozoic soft sandstones ;
- Between Ndjili and N'sele, the sandy cover is up to 10 m thick and directly overlies soft sandstone. On the lithological level, the sand of the entire plain of Kinshasa (Lemba and Ndjili - N'sele) has a homogeneous structure and without stratification, however, the differentiations reside only at the level of the granulometry and the variation of the colors which allows to identify the stratigraphy of these filling materials.

4.2.1.2.3. Ground and basement

The soil of Kinshasa is of the Arénoferrasol type, made up of fine sands with a clay content generally lower than 20%. They are characterized by a low organic matter content and a low degree of saturation of the absorbent complex.

As for the basement, Pain5 notes that it is characterized by a Precambrian basement. This comprises finely bedded and often feldspathic red sandstone rocks. It constitutes the upper part of the Schistogréseux system and outcrops at the level of the rapids at the foot of Mount Ngaliema and south of the N'djili River. This condensed rock is resistant to erosive action.

4.2.1.2.4. The air

Kinshasa suffers from poor air quality, characterized by **large amounts of nitrogen oxides (NO_x = NO and NO₂) and particulate matter (PM)** . This pollution is linked to the widespread use of domestic combustion of biomass for cooking and to the obsolescence of its vehicle fleet.

4.2.1.2.5. Hydrography

1. Waterways

The hydrographic network of the city-province of Kinshasa is made up of several rivers of various sizes which take their sources mainly from the hills, flow from south to north, bathe the plain and flow into the Congo River.

Among these the most important rivers are:

- The N'djili with a basin of 2000 km² drains the communes of N'djili, Matete, Kisenso, Masina and part of Limeté.
- La Funa / Kalamu – Yolo, Bumbu, which drains the communes or neighborhoods of the university, Mont -Ngafula, Selembao, Lemba, Ngaba, Makala, Bumbu, Ngiri-Ngiri, Kalamu, Kasa vubu, Lingwala, Ndolo and Limete.
- The Basoko- Lubodi- Makelele which drains the communes of Bumbu, Ngiri-Ngiri, Ngaliema, Bandalungua, Kintambo and Selembao.
- La Mampeza, which drains the municipality of Ngaliema,
- The Lukunga – Binza, which drains Ngaliema, Mama Mobutu city and part of Mount Ngafula;
- The Gombe and the Bitshaku-tshaku which drain the communes of Gombe and Barumbu
- The Mokali-Mango-Malemba which drains the communes of Kimbanseke and Masina.
- The N'selé with a basin of 6000 km² which drains the municipality of N'selé.
- The Congo River, which borders the city itself, remains the largest receiving environment for all the waters of different rivers. It should be noted that the Congo River, at the level of the city-province of Kinshasa, expands and reaches in some places more than 20 km in width, before the rapids of Kinsuka in the West.
- Some very small lakes are located on the outskirts of the Lukaya valley, including the lake of my valley and the green lake.

2. Groundwater

There are three major zones of hydrogeological potential, namely: the East, Center and West-South zone.

- The eastern zone goes from the N'djili river to the N'selé river; here the aquifer is subject to significant anthropogenic pollution;
- The central zone which occupies the lower part of the city is limited to the east by the N'Djili river and extends to the bay of Ngaliema.

There is a multilevel aquifer with a dominant sandy facies. The thickness of this aquifer varies from 20 to 60 meters.

It should be noted that the surface water table is located at less than 1 meter in certain places of this zone; in the rainy season the groundwater is flush with the surface.

- The western and southern area which includes the hilly part of the city is generally made up of more or less coherent sands which give rise to a morphology of gently sloping hills with erosive phenomena which develop in the bottom of the valleys.

4.2.1.3. Biological characteristics

The vegetation of Kinshasa consisted of forests, savannahs and semi-aquatic and aquatic formations of the Pool Malebo valleys (COMPERE, 1970 and PAIN, 1984).

➤ **Savanna vegetation**

The Kinshasa savannahs are grassy formations whose generally herbaceous upper stratum of at least 80 cm is sometimes sparse with isolated trees or shrubs or in groves which overhang a lower herbaceous stratum comprising hemicryptophytes, therophytes and geophytes (KIKUFI, 2006).

Considering the biotopic character, they can be divided into:

1° *Marsh savannas*

These are semi-aquatic or marshy savannas found in depressions with permanent or temporary flooding.

2° *Dry land savannas*

They are found on gravelly or concretionary, even indurated, schist-limestone soils, sometimes accompanied by limontic debris.

By considering the physiognomic aspect, in particular the size of woody plants and their density, three types of savannas can be distinguished, namely:

➤ **grassy savannah**

It is a continuous ground cover characterized by *Loudetia demeusei* (De Wild .) CE Hubb. and *Hyparrhenia diplandra* (Hack) Stapf.

➤ **shrubby savannah**

It is characterized by a shrub layer dominated by *Hymenocardia acida* Tul., *Annona senegalensis* Pers. or *Sarcocephalus latifolius* (Sm) EABruce.

➤ **wooded savannah**

This is characterized by an upper stratum about 7m high dominated in particular by the following characteristic species: *Crossopteryx febrifuga* Benth., *Hymenocardia acida* Tul. and *Albizia adianthifolia* (Schumach.) Wight.

➤ **Forest vegetation**

In the past, most of the hills around the Kinshasa site were covered with a semi-deciduous, meso-xerophilous forest corresponding to sandy and sandy-clayey soils (COMPERE, 1970).

Nevertheless, under the effect of the uncontrolled development of the habitat and the urban thrust, these forests have almost disappeared. They only survive today in the form of forest shreds, most of which are, moreover, deforested, especially when they are close to developed areas.

With regard to the forest types described by KIKUFI (2000), we can divide the forests of Kinshasa into:

1° Secondary forests

These are dense terra firma forest formations, very accessible, of which some species of the upper tree stratum lose their leaves during the dry season. Most of the constituents of the understory are evergreen and undergo anthropogenic degradation; which accelerates the degradation of these formations.

The main characteristic essences can be observed in the following synusia:

- **Upper tree stratum**
 - *Pentaclethra macrophylla* Benth.
 - *P. eetveldeana* De Wild & Th. Dur.
 - *Millettia laurentii* DeWild .
- **Lower tree stratum**
 - *Hymenocardia ulmoides* Oliv.
 - *Oncoba welwitschii* Oliv.
 - *Annonidium mannii* (Oliv.) Engl. & Diels.

To this group can also be attached fallow land and forest regrowth found in sloping land and the steep banks of rivers or streams.

2° Riparian and swamp forests

Riparian forests are riparian forests of small tributaries of the Congo River. They are in fact gallery forests which currently only exist in a very degraded relict form characterized in particular by *Berlinia bruneelii* (De Wild.) Torre & Hillc., *Alchornea cordifolia* (Schum. & Thonn.) Müll.Arg. and *Paramacrolobiumcoeruleum* (Taub.) J. Leonard. A fringe of these forests could still be observed, not long ago, along the N'sele river, particularly upstream of the bridge on the Kinshasa-Kikwit road.

Swamp forests are forest formations that occupy some of the shallow water table depressions. The actual forest part is surrounded by a marshy crown with herbaceous vegetation. As characteristic species we retain: *Alstoniacongensis* Engl., *Halleastipulosa* (DC) Leroy, *Raphia sese* De Wild, *Harunganamadagascariensis* Lam. ex Poir., *Lasimorpha senegalensis* Schott and *Aframomumangustifolium* (Sonner.) K.Schum.

Table 7: Fruit or food species

Scientific names	French names	Vernacular names
<i>I. involucrate</i>	Yam	Mboma
<i>Mangifera indic</i>	Mango	manga
<i>Percea Americana</i>	Lawyer	Lawyer
<i>Licopersicum sp</i>	Tomato	Tomatia
<i>carica papaya</i>	papaya tree	PayPal
<i>M. acuminata</i>	Banana tree	bitabe

Table 8: Ornamental species

Scientific names	Family	Vernacular names
<i>Paspalum notatum</i>	Poaceae	Paspalum
<i>Eucalyptus sp</i>	Mimosaceae	Bikalibitus
<i>Senna spectabilis</i>	Caesalpiniaceae	-
<i>Mirabilis jalapa</i>	Nyctaginaceae	-
<i>Bamboosa sp.</i>	Poaceae	Nzete ya bambu
<i>Albizia sp</i>	Mimosaceae	-
<i>Colocasia sp</i>	Araceae	-

➤ **Conservation status of plant species listed in the perimeter**

The floristic inventory carried out in the perimeter and its surroundings is shown in Table 9. Similarly, a conservation status according to the IUCN criteria (2019) is given for each species.

Examination of this table shows that the flora of the perimeter is made up of plants with no particular conservation status. Many of these are categorized as: Least Concern (LC).

Table 9: Floristic list of the project perimeter

SPECIES	FAMILIES	COMMON NAMES	VERNACULAR NAMES	IUCN STATUS (*)
<i>Abelmoschus esculentus</i> (L.) Moench	<i>Malvaceae</i>	Okra	Dongo-dongo	CL
<i>Acacia auriculiformis</i> A. Cunn. formerly Benth.	<i>Fabaceae</i>	Acacia	Acacia	CL
<i>Acmella uliginosa</i> (Sw.) Cass.	<i>Asteraceae</i>	Acmella		CL
<i>Aeschynomene elaphroxylon</i> (Guill. & Perr.) Taub.	<i>Fabaceae</i>			CL
<i>Ageratum conyzoides</i> L.	<i>Asteraceae</i>	ageratum		CL
<i>Albizia lebeck</i> (L.) Benth.	<i>Fabaceae</i>	Albizia		CL
<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	<i>Amaranthaceae</i>	Alternanthera		CL
<i>Amaranthus hybridus</i> L.	<i>Amaranthaceae</i>	Amaranth	Biteku tekú	CL
<i>Amaranthus viridis</i> L.	<i>Amaranthaceae</i>	Amaranth	Biteku tekú	CL
<i>Aneilema aequinoctiale</i> (P. Beauv.) G. Don	<i>Commelinaceae</i>	Anilema		CL
<i>Arachis hypogaea</i> L.	<i>Fabaceae</i>	Peanut	Nguba	CL
<i>Artocarpus heterophylla</i> Lam.	<i>Moraceae</i>	jackfruit		CL
<i>Bambusa vulgaris</i> Schrad. ex JC Wendl.	<i>Poaceae</i>	Bamboo	Nzete ya Bambu	CL
<i>Basella alba</i> L.	<i>Basellaceae</i>	Spinach	Pinard	CL
<i>Boerhavia released</i> L.	<i>Nyctaginaceae</i>	Boerhavia		CL
<i>Brassica oleracea</i> L.	<i>Brassicaceae</i>	Cabbage	Cabbage	CL
<i>Carica papaya</i> L.	<i>Caricaceae</i>	Papaya	pay-pay	CL
<i>Cenchrus biflorus</i> Roxb.	<i>Poaceae</i>	Cenchrus		CL
<i>Cenchrus purpureus</i> (Schumach.) Morrone Syn. <i>Pennisetum purpureum</i> Schumach.	<i>Poaceae</i>	elephant grass		CL

SPECIES	FAMILIES	COMMON NAMES	VERNACULAR NAMES	IUCN STATUS (*)
<i>Chrysopogonzizanioides</i> (L.) Roberty syn. <i>Vetiveriazizanioides</i> (L.) Nash	Poaceae	Vetiver		CL
<i>Cocosnucifera</i> L.	Arecaceae	Coconut tree	Cocoty	CL
<i>Colocasiaesculenta</i> (L.) Schott	Araceae	Taro	Mbala ya langa	CL
<i>Crotonhirtus</i> L'Her.	Euphorbiaceae	Croton		CL
<i>Cynodondactylon</i> (L.) Pers.	Poaceae	quackgrass		CL
<i>Cyperusalternifolius</i> L.	Cyperaceae	Cyperus		CL
<i>Cyperusdives</i> Delile	Cyperaceae	Cyperus		CL
<i>Cyperusesculentus</i> L.	Cyperaceae	Nutsedge		CL
<i>Cyperusiria</i> L.	Cyperaceae	Cyperus		CL
<i>Cyperus nigritanus</i> (CB Clarke) Lye Syn. <i>Kyllinga nigritana</i> CB Clarke	Cyperaceae	Cyperus		CL
<i>Daucus carota</i> L.	Apiaceae	Carrot	Carrot	CL
<i>Desmodium tortuosum</i> (Sw.) DC.	Fabaceae	Desmodium		CL
<i>Dioscorea alata</i> L.	Dioscoreaceae	winged yam	Mbala	CL
<i>Echinochloa pyramidalis</i> (Lam.) Hitchc. & Chase	Poaceae	Echinochloa		CL
<i>Eclipta prostrata</i> (L.) L. Syn. <i>Eclipta alba</i> (L.) Hassk.	Asteraceae	Eclipta		CL
<i>Eichhornia crassipes</i> (Mart.) Solms	Pontederiaceae	water hyacinth	Kongo ya sika	CL
<i>Elaeisguineensis</i> Jacq.	Arecaceae	Oil palm tree	Nzete ya mbila	CL
<i>Euphorbiahirta</i> L.	Euphorbiaceae	Euphorbia		CL
<i>Ficusumbellata</i> Vahl	Moraceae	Ficus		CL
<i>Heliotropium indicum</i> L.	Boraginaceae	Wart grass		CL
<i>Hibiscusacetosella</i> Welw. ex Hiern	Malvaceae	sorrel	Ngai-ngai	CL
<i>Ipomoeaaquatica</i> Forssk.	Convolvulaceae	water bindweed		CL
<i>Ipomoeabatatas</i> (L.) Lam.	Convolvulaceae	Yam	Mbala ya sukali	CL
<i>Irvingiasmithii</i> Hook. f.	Irvingiaceae	Irvingia		CL
<i>Jatrophamultifida</i> L.	Euphorbiaceae	Jatropha		CL
<i>Laporteaestuans</i> (L.) Chew.	Urticaceae	The Burning Reach		CL
<i>Ludwigiaabyssinica</i> A. Rich.	Onagraceae	Ludwigia		CL
<i>Lycopersiconesulentum</i> Mill.	Solanaceae	Tomato	Tomato	CL
<i>Mangifera indica</i> L.	Anacardiaceae	Mango	manga	CL
<i>Manihotesculenta</i> Crantz	Euphorbiaceae	Cassava	Manioko	CL
<i>Marsileaminuta</i> L.	Marsileaceae	marsilea		CL
<i>Musa x paradisiaca</i> L. Syn. <i>Musa x sapientum</i> L.	Musaceae	Banana tree	Nzete ya bitabe	CL
<i>Paspalumnotatum</i> Alain ex Flügge	Poaceae	Lawn	Paspalum	CL
<i>Perseaamericana</i> Mill.	Lauraceae	Lawyer	Nzete ya savocat	CL
<i>Persicariadecipiens</i> (R. Br.) KL Wilson Syn. <i>Polygonumsalicyfolium</i> Brouss. ex Willd.	Polygonaceae	Knotweed		CL
<i>Phyllanthusamarus</i> Schumach. & Thonn.	Phyllanthaceae	bitter phyllanthus		CL
<i>Phyllanthusmuellerianus</i> (Kuntze) Exell	Phyllanthaceae	Phyllanthus		CL
<i>Physalisangulata</i> L.	Solanaceae	Alkekengi		CL
<i>Pseudospondiasmicrocarpa</i> (A. Rich.) Engl.	Anacardiaceae	Pseudospondias		CL
<i>Psophocarpusscandens</i> (Endl.) Verdc.	Fabaceae	African square pea	Madesu	CL
<i>Ricinus communis</i> L.	Euphorbiaceae	Castor		CL

SPECIES	FAMILIES	COMMON NAMES	VERNACULAR NAMES	IUCN STATUS (*)
<i>Salviniamolesta</i> DS Mitch.	<i>Salviniaceae</i>	Salvinia		CL
<i>Sesamumindicum</i> L.	<i>Pedaliaceae</i>	Sesame	Wangila	CL
<i>Setariabarbata</i> (Lam.) Kunth	<i>Poaceae</i>	Setaria		CL
<i>AIDS sharpened</i> Burm. f.	<i>Malvaceae</i>	AIDS		CL
<i>Sieruela rutidosperma</i> (DC.) Roalson & JC Hall Syn. <i>Cleomerutidosperma</i> DC.	<i>Cleomaceae</i>	Cleome		CL
<i>Solanummacrocarpon</i> L.	<i>Solanaceae</i>	African eggplant	Solo	CL
<i>Solanumnigrum</i> L.	<i>Solanaceae</i>	black nightshade	Solo	CL
<i>Solanumtorvum</i> Sw.	<i>Solanaceae</i>	fake eggplant	Eggplant	CL
<i>Synedrellanodiflora</i> (L.) Gaertn.	<i>Asteraceae</i>	Synedrella		CL
<i>Syzygium malaccense</i> (L.) Merr. & LM Perry	<i>Myrtaceae</i>	pink apple tree		CL
<i>Terminaliacatappa</i> L.	<i>Combretaceae</i>	Badamier		CL
<i>Terminaliamantaly</i> H. Perrier	<i>Combretaceae</i>	Mantaly		CL
<i>Tridaxprocumbens</i> L.	<i>Asteraceae</i>	Tridax		CL
<i>Urochloa maxima</i> (Jacq.) RD Webster syn. <i>Panicum maximum</i> Jacq.	<i>Poaceae</i>	Guinea grass		CL
<i>Xanthosomasagittifolium</i> (L.) Schott	<i>Araceae</i>	caribbean cabbage	Cabbage	CL
<i>Zeamays</i> L.	<i>Poaceae</i>	But	Masangu	CL

➤ Wildlife of Kinshasa

The fauna of the city of Kinshasa is very little diversified. It includes species which were once abundant but which, today, are subject to the effect of human activities, major causes of destruction of animal habitats. Among the most frequent species of fauna are birds and fish.

Some species of birds

- *Bubulcusibis* (Linnaeus, 1758)
- *Ploceus cucullatus* (Staius Müller , 1776)
- *Corvus albus* Staius Müller , 1776
- *Passer griseus* (Vieillot , 1817).



Picture 1. *Bubulcus ibis* common avian species rubbish loads

Some species of fish

- Clarias gariepinus* (Burchell , 1822)
- Oreochromis niloticus* (Linnaeus , 1758)
- Gambusia affinis* (Baird & Girard , 1853)

The fauna of Kinshasa is essentially made up of mammalian domestic animals such as dogs, guinea pigs, cats, sheep and goats, lowland birds such as hens, ducks, etc. To these are added reptiles, insects and microfauna.

Table 10: Adventist Species

Scientific names	Names in French	Vernacular names	Family
<i>Annelida sp.</i>	(earthworms)	Mutshopi	Annelidae
<i>Tettigonia veridissima</i>	(green grasshopper)	Libanki	Tettigonidae
<i>Libellula quadripunctata</i>	(dragonfly)	Lipungupungu	Libellulidae
<i>Vespa sp</i>	(wasp)	Nzoyi ya mulayi	Vespidae
<i>Musca domestica</i>	(house fly)	Nzinzi	Muscidae
<i>Bufo b. regularis</i>	(toad)	Ligorodo	Bufo
<i>formica rufa</i>	(ants)		Formicidae
<i>Apis mellifera</i>	(bee)	Nzoyi	Apidae
<i>Agama sp.</i>	(lizards)	Muselekete	Agamidae
<i>Streptopelia semitorquata</i>	(pigeon)	Ebenga	Columbidae
<i>Bulbulcus ibis</i>	(heron)		Ardeidae
	(goat)	ntaba	
	(sheep)	Same	
	(dog)	Mbua	
	(cat)	Kondoko	
	(chicken)	soso	
	(duck)	Libata	
	(guinea fowl)	Kanga	
<i>Bubo africanus</i>	(owl)	Esulungutu	Strigidae
<i>Psittacus erythacus</i>	(parrot)	Tshaku	Psittacidae
<i>Hirundo sp</i>	(swallow)	Ndeke	Hirundinidae
<i>Pass griseus</i>	(blue sparrow)	Ndeke	Ploceidae
<i>Corvus albicollis</i>	(raven)	Yanganga	Corvidae

4.2.1.4. Socio-economic characteristics

Table 11. Synthesis of the socio-economic profile of the city of Kinshasa

SHUTTERS	DESCRIPTION
Populations	The province of Kinshasa alone represents 13.6% of the entire urban population of the DRC. Kinshasa is a very large city which attracts men/populations. Its current population is about 12 million ² . The population is made up of 50.5% men and 49.5% women, with a sex ratio of 102 men for every 100 women. People of Congolese nationality make up the vast majority of the Kinshasa population. "Foreigners", all nationalities combined, make up only 2.0% of the population. These foreigners come mainly (75%) from "bordering countries". The languages spoken are Lingala, Kikongo, Swahili, Tshiluba and French
Social structure (Traditional structure, ethnicities, indigenous population, vulnerable groups, food habits)	The pre-colonial agglomeration of Mpumbu had, throughout the process of settlement of what was to become the city of Kinshasa, three indigenous peoples: the Humbu, the Tekes and the Bamfununga considered as landowners: The Humbu; the Tekes, the Bamfununga, and the other ethnic groups: the Yaka, the Banunu Bobangi from the former Province of Bandundu as well as the Bayanzi. Migrations from the hinterland to Kinshasa, the "West Africans" or "Ndin-gari"). The Lari: originating from the Republic of Congo-Brazzaville. The Angolans, better known as "Bazombo". - Vulnerable groups

²MUZITO, A., "Kinshasa: from hell to paradise" in Phare, n°5114 of July 13, 2015

SHUTTERS	DESCRIPTION			
	N Vulnerable groups o. 1 Children in difficult circumstances 2 Women in difficult circumstances 3 People with Disabilities 4 Seniors 5 People living with HIV and descendants 6 War Displaced Persons 7 Victim of disasters and natural calamities 8 Children orphaned by HIV/AIDS 9 Others TOTAL	Workforce F H 4.419 4.297 2.441 - 1.014 927 426 289 5.511 572 255 423 5 491 3.363 2.935 5.697 2.935 23.131 12.111		TOTAL 8.716 2.441 1.941 715 6.083 678 496 8.632 8.632 35.242
Transport infrastructure	<p>Source: Ministry of Social Affairs, Report of the survey on the administrative count of vulnerable people in the City of Kinshasa under the supervision of Mr MBOSO KIAMPUTU, July 2004.</p> <ul style="list-style-type: none"> - Eating habits <p>The main diets of Kinshasa people:</p> <ul style="list-style-type: none"> - Cassava: consumed in different forms: cooked tubers, in the form of kneaded flour called "FUFU"; flour kneaded and wrapped on wild leaves; in the form of Chikwange. - Maize consumed in large quantities in Kinshasa. - Rice: The demand for rice in the city of Kinshasa is around 21.60% of the national volume in 1995 - Plantain banana: The plantain banana constitutes the basis of the diet of the inhabitants of the basin (Equateur, Mongala, Sud-Ubangi, Nord-Ubangi, Tshuapa, Ituri, Tshopo, Haut-Uélé and Bas-Uélé) as well as of the forest from Mayombe. However, all the other tribes are also apt to consume this food. - Bread: Without being a staple food, bread is nevertheless consumed by many Kinshasa people, all ethnic groups combined. The bakery industry is one of the most flourishing in the city. - Beans: The City of Kinshasa is short of beans <p>In Kinshasa, the transport and communication sector is operated by a multitude of carriers, individual and collective;</p> <ul style="list-style-type: none"> - By small, medium and large enterprises, public and private, in the formal and informal sectors; - In Kinshasa, as in the rest of the country, there are four modes of transport which share urban and interurban traffic. These are road transport, ii) rail transport, iii) river transport and iv) air transport. - Road transport: The road network of the City-Province of Kinshasa includes 5,109 km of urban roads, 362 km of national roads and 74 km of roads of provincial interest. <ul style="list-style-type: none"> - Of the 5,109 km of urban roads, 546.2 km are paved, or 9.4% of urban roads. The rest of the network is dirt and unmaintained and does not accommodate buses and heavy traffic - Waterways: The city of Kinshasa is bordered by the Congo River which serves it with various products from the interior of the country. Inside the city, there are small rivers (N'sele, N'djili, Kalamu,) no less important for the survival of the inhabitants. They would play a major role, particularly in terms of irrigation at certain times of the year. - Railways: Like the river sector, the railway sector is one of the least developed in the city for the simple reason that over the years, the capital's railway network has significantly crumbled. Many of the capital's railways are completely out of use. 			

SHUTTERS	DESCRIPTION																														
	<p>Urban rail transport only operates three major routes covering 92 km in length (Operation of three routes covering 92 km in length: Central Station – Ndjili Airport (20 km); Central Station – Kasangulu/Kongo Central (27 km) Central Station – Kinsuka via Kintambo (27 Km)</p> <p>- Air network: Kinshasa has three aerodromes of different classes according to the standards of the International Civil Aviation Organization. These are N'djili International Airport, Ndolo Airport and Maluku Airfield.</p>																														
Habitat	<table border="0"> <thead> <tr> <th>Habitat</th> <th>KINSHASA</th> <th>ground floor</th> </tr> </thead> <tbody> <tr> <td>Type of dwelling: house in the concession</td> <td>79.4%</td> <td>83.2%</td> </tr> <tr> <td>type of walls</td> <td></td> <td></td> </tr> <tr> <td>• Rammed earth wall</td> <td>0.9%</td> <td>38.7%</td> </tr> <tr> <td>• Adobe brick</td> <td>5.4%</td> <td>30.1%</td> </tr> <tr> <td>• Cement block</td> <td>83.1%</td> <td>10.3%</td> </tr> <tr> <td>• Baked brick</td> <td>6.5%</td> <td>8.5%</td> </tr> <tr> <td>Soil type</td> <td></td> <td></td> </tr> <tr> <td>• Clay or straw</td> <td>10.4%</td> <td>80.8%</td> </tr> <tr> <td>• Plank or cement</td> <td>79.5%</td> <td>16.7%</td> </tr> </tbody> </table> <p>Sources: 1-2-3 survey, INS.</p> <p>Housing in the city of Kinshasa is not uniform. It depends from one neighborhood to another and from one social class to another:</p> <ul style="list-style-type: none"> • Residential neighborhoods (Righini, Gombe, Limete, Ma Campagne Ngaliema, UPN). Here lodges the national bourgeoisie: there are no informal activities. The roads and pipes comply with standards and are operational; the density is low, with 20 inhabitants per Ha • Old cities (Kinshasa, Barumbu, Kintambo, Lingwala): the pipes are completely blocked, the density is very high; the jobs are informal, the plots super busy, sometimes with 10 households per plot • Planned cities (Lemba, Matete, Nd'jili, Kalamu, Bandal): they are well surveyed with urban conveniences but they have old pipes that are undersized or non-existent or out of order; the population level is average; housing is overcrowded, traffic is very heavy • Outlying neighborhoods (Masina, Kisenso, Selembao, Kimbanseke, Ngaba): self-built neighborhoods on flood-prone sites, "erodible" impracticable, not surveyed, with low-income populations. • Semi-rural neighborhoods (Maluku, Nsele, Mont Ngafula) occupy nearly 50% of the surface area of Kinshasa: agricultural, industrial, recreation and dormitory suburbs <p>More than 90% of households live in hard-built dwellings (concrete, cement or stone) and nearly 50% of Kinshasa households are not connected to electricity or drinking water. Only two out of ten households (20%) have access to flushing pits. The level of comfort is higher among "public households" and "formal private households" than among "unemployed or inactive households" and "informal households". Apart from television (54.9%), mobile phone (43.2%) or fan (44.0%) for which the rate of household equipment is quite high, access to other types of Equipment is generally poor: 11% of them have at least one refrigerator, 1.6% a landline telephone, 4.8% a car and 1.3% a computer</p>	Habitat	KINSHASA	ground floor	Type of dwelling: house in the concession	79.4%	83.2%	type of walls			• Rammed earth wall	0.9%	38.7%	• Adobe brick	5.4%	30.1%	• Cement block	83.1%	10.3%	• Baked brick	6.5%	8.5%	Soil type			• Clay or straw	10.4%	80.8%	• Plank or cement	79.5%	16.7%
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Land tenure	<p>The City-Province of Kinshasa is governed by two modes of land management and torn between customary law and written law. The management of customary property for the lands of the rural and semi-rural Communes of the City-Province of Kinshasa is declared void by law. However, despite this law, the Customary Chiefs of the said localities and Communes still believe that they hold the power to appropriate these</p>																														

SHUTTERS	DESCRIPTION
	lands. This dualism is at the origin of land and inheritance disputes of all kinds, particularly in cases of expropriation for reasons of public utility.
Education (Country schooling rate, and schooling rate for girls and boys)	<p>The city of Kinshasa has three urban divisions of primary, secondary and vocational education commonly referred to as the Kin-Ouest, Kin-Est and Kin-Centre Urban Divisions. This sector has 3,000 public and private schools as well as a large number of public and private higher and university institutes. The net primary school enrollment rate of 74.8% in Kinshasa against 55.0% for the DRC, literacy rate of 67.6% against 43.2% in the DRC. The net enrollment rate for girls seems to diverge from that for boys as the level of education rises. Going from 76% at the primary level, it drops to 45% at the secondary level then to 7.7% for the higher level. This sector is estimated at 3,000 public and private schools as well as a large number of higher and university institutes, public and private, among the most important of which are:</p> <ul style="list-style-type: none"> - University of Kinshasa, UNIKIN; - National Pedagogical University, UPN; - Catholic University of Congo, UCC. - Protestant University of Congo, UPC; - Simon Kimbangu University, USK; - Higher Institute of Applied Techniques, ISTA; - National Institute of Buildings and Public Works, INBTP; - Acadamy of Arts, - National Institute of Arts, INA - Higher Institute of Commerce, ISC.... - ISP/GOMBE... - Higher Institute of Statistics, ISS
Health (mortality rate, leading cause of death; child illness and death rate)	<p>Kinshasa has 6 health districts, 35 health zones and 355 health areas, including 197 health areas covered. The city's health coverage is based on the primary health care strategy. Private Health Centers belonging to religious denominations, NGOs, parastatal and private companies also provide quality health care.</p> <ul style="list-style-type: none"> - Malaria remains the major endemic and the leading cause of morbidity. - The resurgence of infectious and parasitic diseases, including malaria, reputed to be very deadly in the City of Kinshasa. The prevalence among children under 5 is estimated at 31.9% - The occurrence of diarrheal diseases, including typhoid fever, one of the diseases with very high lethality within the Kinshasa population. Overall, diarrheal diseases have a prevalence of around 20.9%; - The high frequency of endemic diseases (Tuberculosis); - the weak protection of children under 5 against childhood diseases (measles, tetanus, polio) and other acute respiratory infections, the prevalence of which is 3.6%.
Energy	<p>The city of Kinshasa is served mainly by hydrographic energy from the INGA and ZONGO dam, supplied by SNEL on the one hand, and by wood energy for a good part of households, because of the insufficiency of the supply of electrical energy, or following untimely and permanent power outages. This cut-off situation is the basis of the outbreak of generators in private homes for the production of energy.</p>
Potable water	<p>In Kinshasa, it is estimated that at most one out of two households has access to water from REGIDESO. Many districts of the capital continue to make do with rainwater, springs and wells, the quality of which has always been mediocre. However, modern (industrial) boreholes on deep aquifers offer the Kinshasa people of the periphery the possibility of access to drinking water. Old water pipes can no longer protect the water against contamination from all kinds of critters harmful to human health. Things are more deplorable when you want to use the water soon after a rain. In addition to these technological shortcomings, there are cuts lasting several days, which expose the pipes to corrosion and to the depletion of the chemical materials that the water needs to maintain its good condition. In the DRC, access to drinking water increased from 22% to 29% between 2005 and 2013, with large disparities between urban (37%) and</p>

SHUTTERS	DESCRIPTION
	rural and semi-urban (17.3%) areas. The objective for 2020 is to increase the service rate to 50% in towns and 47% in rural areas.
Sanitation	Landfilling (23.5%) is the main mode of garbage disposal for households in Kinshasa. But it is worrying to know that 22.3% of households opt for wild dumping and 8.2% of households in this province throw their garbage on public roads and pollute the environment. The road service is only used by 14.9% of households. Finally, although the majority of households report having toilets, it should be noted that most of these toilets are holes in the plot. It should also be noted that 1.1% of households in this province, or nearly 10,000 households, do not have a toilet. Thus, access to hygiene and sanitation is still very low in Kinshasa, is detrimental to health and leads to high morbidity and risks constituting a brake on the achievement of the millennium goals in the sector.
Poverty	The issue of poverty is closely linked to that of population, consumption, employment, income and access to basic needs. Kinshasa has an incidence of poverty of around 41.6%. However, given that it represents 10.7% of the national population, it concentrates 6.1% of the Congolese poor. Kinshasa has a poverty rate of around 41.6%. In 2002, an average of 64.5% of households spent less than \$0.5 per day on food compared to \$1 per capita per day in 2009. As regards acute malnutrition, it was respectively around 8.8% in 2002, 11.3% in 2003 and 14.8% in 2008 ³ .
Agriculture and Livestock	The plant production practiced in urban agriculture mainly includes market gardening, food crops, fruit and flower crops. Agricultural activities play a major role in meeting the basic needs of Kinshasa people. Agricultural production is present in the Kimwenza, N'djili and Nswenge River valleys where market gardening is practiced, while on the Bateke Plateau, food crops are grown. As for breeding, it is in the suburbs of the capital that it is practiced on a large scale. The capital has the Pool Malebo where artisanal fishing is practiced. Agriculture would fit in well with livestock farming, which is practiced on a large scale in the suburbs of the capital. We note the presence of small livestock (poultry, pigs, goats) and sometimes cattle. This breeding would be the initiative of a few national bourgeois owners of small farms on the Bateke plateau who would have benefited from some external financing. The capital has the Pool Malebo where fishing is practiced. As for fish farming activities, they are mainly concentrated in Kimwenza.
Fishing and aquaculture	Fishing activity is particularly intense in the Pool region, off the coast of Kinshasa, where temporary or permanent camps (Nganda) have multiplied on the banks, islands and sandbanks. It is less developed and is practiced by traditional techniques. The consumption of fish is higher than that of meat, (7 kg/per inhabitant and per year), but the national production remains, however, very insufficient. As for aquaculture, it is dominated by the system of rearing two species of fish in ponds. These are <i>Oreochromis niloticus</i> and <i>Clarias gariepinus</i> . The latter is still being introduced and its yield is very low because of the difficulties due on the one hand to the poor mastery of larviculture techniques, a determining phase of fish production; and on the other hand to insufficient and unsuitable food, lack of mastery of optimal feeding techniques (ration, size of food, frequency of distribution), as well as lack of control of environmental conditions (optimal stocking densities load, temperature, oxygenation, light, shelter, pH, nitrites, ammonia, etc.
Logging	The majority of the population of Kinshasa uses wood for cooking and other household activities. Faced with a galloping household energy demand, considerable quantities of tons of charcoal and firewood are transported to the markets of Kinshasa, without respecting ecological standards, thus leading to a reduction in forest biodiversity. While the prices of wood products have increased relatively over the years, it is almost certain that the income of the population of Kinshasa continues to decline from year to year.
mining and industry	The mining sector

³LELO NZUZI F., 2011

SHUTTERS	DESCRIPTION
	<p>The Democratic Republic of Congo is known for its mining potential representing 1,100 different mineral substances. All the provinces of the country can claim to hold mineral wealth. For the city province of Kinshasa, it has clay, silica, kaolin, arkosic sandstone⁴.</p> <p>The industrial sector Kinshasa's main industries relate to food processing and the production of consumer goods (beer, textiles, shoes), generally intended for the national market. Buildings and services also play a major economic role.</p>
Main sectors of employment	<p>Employment in Kinshasa highlights two sectors: the formal sector on the one hand, the unstructured or informal sector on the other.</p> <ul style="list-style-type: none"> • the structured sector where the State, directly by itself (Public Administration) or indirectly (via public companies) presents itself as the largest employer alongside the private sector, absorbing approximately 15% of the active population. • the informal sector monopolizes the remaining 85%.
Tourism	<p>The tourist sites of the city-province of Kinshasa include: Garden of Eden, Reptilrium Park, Zoological and Botanical Garden or Zoo, the Bonobo sanctuary, Seli Safari Zongo, Mbudi nature, Alina, Monument of President Josph Kasavubu, Mausoleum from M'zee Laurent Désiré Kabila, Center Echangeur, Promenade de la Raquette, Natural Symphonies, Mfuti beaches, Sandpits, Congo tourist, Nikk'in Beach, etc. Already more than 19 companies registered in the tourist site sector for the city of Kinshasa.</p>
Telecommunications	<p>Kinshasa has enormous means of circulation, dissemination of information and communication. Indeed, the communication and information industry is better, compared to the rest of the provinces in terms of infrastructure and communication and information industry. Internet access is easy, the number of access providers (Provider) is growing and mobile telephony is also flourishing in Kinshasa.</p> <p>The dizzying development of new information and communication technologies (NTIC) throughout the world has not left the city-province of Kinshasa indifferent, even if it has not yet reached the desired level of a modern city. The State and the private sector coexist in this area. Here are some illustrations of this vitality: the proliferation of radio and television houses. There are more than 20 television channels and 22 radio channels broadcasting from Kinshasa on short or medium wave.</p>
mobile phone networks	<p>Long before the advent of the Internet, another phenomenon had taken up residence in Kinshasa: mobile telephone networks. These have facilitated the connection and the opening up of the city not only in relation to the interior of the country but more also in relation to the outside. To date, there are 8 mobile telephone networks in Kinshasa, whereas not long ago Kinshasa had only one. These are the following networks:</p> <ul style="list-style-type: none"> ❖ CTC ❖ SCPT. ❖ AIRTEL. ❖ VODACOM. ❖ CONGO KOREA. ❖ STARCEL ❖ AFRICEL
gender aspect	<p>Women represent 51.3% of Kinshasa's population. Their activity rate (35.5%) is lower than that of men (49.6%), but their unemployment rate is lower than that of men (12% for women and 17.3% for men). This inequality in the field of education is reflected in the labor market. However, their working conditions are more precarious. 55.3% of jobs in the informal sector are held by women, who are found concentrated in the most vulnerable jobs, particularly among self-employed workers and family workers. The wage rate is low (15.5% for women and 51.7% for men).</p>

⁴ Source: CTCPM, Investor's guide to the mining and hydrocarbons sector, June 2003

4.2.2. Municipality of LIMETE

4.2.2.1. Geographical location of the municipality of Limete

The limits of the commune of Limete were fixed by the ministerial decree n° 69 - 0042 of January 23, 1969. Covering an area of 67.60 km², the commune of Limete is limited to the south by the communes of Matete, Ngaba and Lemba, to the east by the N'Djili river which separates it from the commune of Masina, to the west by the communes of Kalamu and Makala and to the north by the commune of Barumbu.

It is made up of 14 districts: Kingabwa, Mbamu, Nzadi, Ndanu, Salongo, Mfumu Mvula, Mayulu, Mombele, Industrial, Masiala, Residential, Agricultural, Mososo and Mateba. However, the location of the station construction project is located in the Kingabwa district.

Limeté Industriel is a locality located near Limeté Résidentiel.

4.2.2.2. Physical characteristics

4.2.2.2.1. Relief

The Limete Industriel district in the commune of Limete is a valley, located at an altitude of 250 m, where the swamps border the Congo River to amplify in the West around the Pool Malebo and thus form an alluvial plain there. It should be noted that this area is the favorite place for flooding during floods.

4.2.2.2.2. Hydrography and soil

The hydrographic network of the municipality of Limete has many permanent streams: Kwamataba, Bokele, Bwangongo, Mvuzi, Belle vue, Muzu, Moleka and N'Djoku. These streams bear the names of avenues or streets, by the fact that they originate in the streets concerned. There is mainly a clayey-sandy soil with parts entirely dominated by clay and others dominated by sand.

4.2.2.3. Biological characteristics

4.2.2.3.1. Flora

Regarding the flora of the valley is an area of degraded savannah and herbaceous vegetation. It is bare for the most part, in some places overgrown with grassy masses and hydrophyte plants. It should be noted that the project site is a concession whose flora is composed of fruit or food species.

On the other hand, table 12 below classifies the types of trees or plants by species, subdivided into three species, namely: fruit or food species, ornamental species and weed species.

Table 12. Fruit or food species

Scientific names	French names	Vernacular names
<i>Mangifera indic</i>	Mango	manga
<i>Percea Americana</i>	Lawyer	Lawyer
<i>carica papaya</i>	papaya tree	PayPal
<i>M. acuminata</i>	Banana tree	bitabe

Table 13. Ornamental species

Scientific names	Family	Vernacular names
<i>Paspalum notatum</i>	Poaceae	Paspalum
<i>Eucalyptus sp</i>	Mimosaceae	Bikalibitus
<i>Senna spectabilis</i>	Caesalpiniaceae	-
<i>Elaeis guineensis</i>	Oil palm tree	Nzete ya mbila-
<i>Albizia sp</i>	Mimosaceae	-
<i>Colocasia sp</i>	Araceae	-

Table 14. Weed species

Scientific names	Family
<i>Chromolaena odorata</i>	Asteraceae
<i>Ageratum conyzoides</i>	Asteraceae
<i>Desmodium sp</i>	Fabaceae
<i>panicum maximum</i>	Poaceae
<i>P. repens</i>	
<i>Tridax procumbus</i>	Asteraceae
<i>Spermacos latifolia</i>	Rubiaceae
<i>Phymatosorus scolopendria</i>	Filicineae
<i>Eleusina indica</i>	Cyperaceae
<i>Callopogonium mucunoides</i>	Fabaceae
<i>Assystasia gangetica</i>	Asteraceae

4.2.2.3.2. Conservation status of plant species listed in the perimeter

The floristic inventory carried out in the perimeter and its surroundings is shown in Table 14. Similarly, a conservation status according to the IUCN criteria (2019) is given for each species. Examination of this table shows that the flora of the perimeter is made up of plants with no particular conservation status. Many of these are categorized as: Least Concern (LC).

4.2.2.3.3. Wildlife

The fauna of the commune of Limete is essentially composed of mammalian domestic animals such as dogs, guinea pigs, cats, sheep and goats, of lowland birds such as hens, ducks, etc. To these are added reptiles, insects and microfauna.

Table 15. Weed species

Scientific names	Names in French	Vernacular names	Family
<i>Annelida sp.</i>	(earthworms)	Mutshopi	Annelidae
<i>Tettigonia veridissima</i>	(green grasshopper)	Libanki	Tettigonidae
<i>Libellula quadripunctata</i>	(dragonfly)	Lipungupungu	Libellulidae
<i>Vespa sp</i>	(wasp)	Nzoyi ya mulayi	Vespidae
<i>Musca domestica</i>	(house fly)	Nzinzi	Muscidae
<i>Bufo b. regularis</i>	(toad)	Ligorodo	Bufonidae
<i>formica rufa</i>	(ants)		Formicidae
<i>Apis mellifera</i>	(bee)	Nzoyi	Apidae
<i>Agama sp.</i>	(lizards)	Muselekete	Agamidae
<i>Streptopelia semitorquata</i>	(pigeon)	Ebenga	Columbidae
<i>Bulbulcus ibis</i>	(heron)		Ardeidae
	(goat)	ntaba	

	(sheep)	Same	
	(dog)	Mbua	
	(cat)	Kondoko	
	(chicken)	soso	
	(duck)	Libata	
	(guinea fowl)	Kanga	
<i>Bubo africanus</i>	(owl)	Esulungutu	Strigiidae
<i>Psittacus erythacus</i>	(parrot)	Tshaku	Psittacidae
<i>Hirundo sp</i>	(swallow)	Ndeke	Hirundinidae
<i>Pass griseus</i>	(blue sparrow)	Ndeke	Ploceidae
<i>Corvus albicollis</i>	(raven)	Yanganga	Corvidae

4.2.2.3.4. Conservation status of wildlife species listed in the perimeter

Analysis of the list of wildlife species shows that the surveyed area is not full of animal species with special protection status in accordance with the criteria of the International Union for Conservation of Nature (IUCN, 2019) (Table 15).

4.2.3. Presentation of the location of the RAXIO RDC Data Center

4.2.3.1. Physical environment

The data center will be built within the confines of a concession at the 12th^{industrial} number 9/11, boulevard Lumumba (ref. the Capuchin brothers), in the commune of Limete, city province of Kinshasa.

The place to erect the data center is located in the industrial district, with clay-sandy soil and no river is around 100m. 3 meters from the site, there is the presence of a high-voltage line and an electrical cabin of the National Electricity Company (SNEL). This area has lost its originality in favor of the erection of industrial, residential and commercial houses.

The data center is full of a few trees to fight against greenhouse effects.





Picture 3. access routes on the data center site

4.2.3.2. Biological environment

4.2.3.2.1. Flora of the site

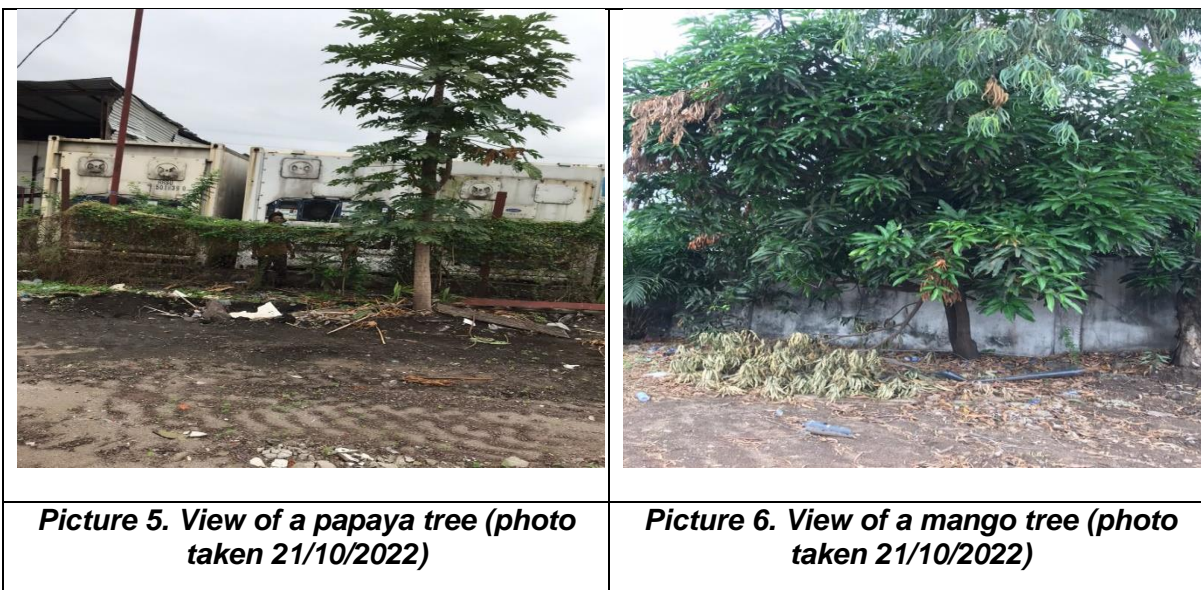
1. Cultivated species

The data center is built on bare ground; There are some cultivated fruit species in the area.

During our exploration, we listed the following species: palm, mango, sugar cane, papaya.

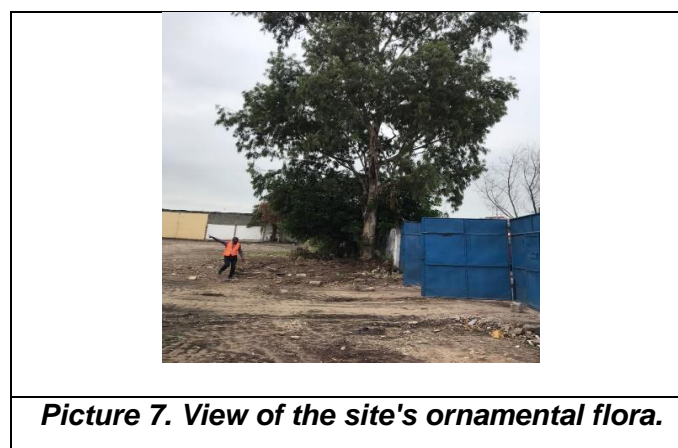


Picture 4. View of palm trees over the Data Center (photo taken 10/21/2022)



2. Ornamental species

In this group are the species that provide the elements of decoration. We have identified: *eucalyptus*



3. Species with special status

In the surveyed site, there are no plants with special status. The rare species listed above are generally common in urban ecosystems where they are considered as ornamental plants,

4.2.3.2.2. Fauna of the site

As the site of this study is frequently disturbed by human activities, its biotope is no longer conducive to the sustainable installation of wildlife. During our visit, we only recognized a few species of birds whose presence is occasional.

Among the number of bird species we noted: *Bulbulcus ibis* (Heron), *Passer griseus* Vieillot (sparrow) and *Corvus albus* Müller (raven) . There is also the presence of cats in the concession.



Picture 8. View of the cats on the site.

The site does not include any wildlife species that are protected or benefit from special protection status.

4.2.3.3. Socio-economic environment

On the place of erection of the Data Center, there are economic activities including shops, cold room, small hairdresser, telephone booth, street vendors at the auction and small restaurants as well as parking for cars at more 500m from the site at the level of the small boulevard Lubumba. However in the surroundings, there is the presence of a cabin of the SNEL, the convent of Capuchin brothers and other industries



Picture 9. Small restaurants (commonly called "Malewa")



Picture 10. Shops on the 12th avenue ^{rue} Limete




Picture 11. 500m from the site, a SNEL substation






4.2.3.4. Sensitivity of the biophysical and socio-economic environment of the place of execution of the project


The characterization and analysis of the biophysical and socio-economic context of the project area has made it possible to determine some socio-environmental sensitive points. Thus, during the operation of the project in the industrial district in the commune of Limete/Kinshasa, all the actors should pay particular attention.

The determination and analysis of the various associated issues made it possible to assess the sensitivity of the receiving environment as shown in the table below.

Table 16. Importance given to the issues identified

Challenges	Description	Sensitivity level	Illustrative photos
Inadequate hygiene and sanitation at the project site	Inadequate management of household waste. Use of certain street corners as landfill with risk of pollution	Strong	Wild rubbish dump on the streets ^{12th street} 
Risk of disturbances and landslides by vibrations of project machinery near neighboring plots	The site is surrounded and invaded by residential and industrial dwellings, with risks of soil, visual and noise pollution	Strong	The walls of fences serve as walls of the rooms of dwellings

			
Protection of private physical assets, land and sources of business income	The presence of economic activities along the data center requires great attention during the works to avoid involuntary displacements, complaints and social conflicts.	Weak	Business activities on the data center concession fence 
other existing installations (electricity, telecommunications, roads and various networks, etc.),	Hydraulic infrastructure works and other existing facilities (SNEL, REGIDESO, Office des Routes, Fiber Optics, OVD) in the area will cause temporary disruption or even interruption of the electric current, interference with the fiber optic line from the main avenue 12th street . To minimize this disruption, it is necessary to take measures to divert these existing installations.	very strong	
temporary traffic disruptions, synergy with other projects (ongoing or future project in the area of intervention	The presence of several dwellings in the project area and the crossing of roads as well as access to concessions call for the implementation of special work management arrangements to avoid and reduce inconvenience and nuisance to the living environment and freedom of movement. movement of goods and people.	strong	
on recruitments (the demand for employment on the project will be strong compared to the real need of the project)	The project area has a high unemployment rate. Thus, failure to take local labor into account and the presence of employees from elsewhere could lead to social conflicts. To minimize conflicts and secure equipment, the organization of advocacy with companies for the recruitment of local unqualified labor is necessary .	mean	

<p>More than 500m from the site, presence in the river of floating plastic objects and release of foul odors (olfactory pollution)</p>	<p>Use of the Yolo River as an outlet for the discharge of rubbish, resulting in a drop in the flow of the river. Lack of cleaning of the river</p>	<p>Weak</p>	<p>Garbage dump on the Yolo River</p> 
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Picture 1. Geolocation of DATA CENTER RAXIO DRC



5. ANALYSIS OF PROJECT VARIANTS

5.1. INTRODUCTION

Two main variants were weighed in the process of design, study and implementation of this project. These are the variant "without" and that "with" project. An analysis based on technical, socio-economic and environmental considerations was carried out to prioritize the "with project" variant.

5.2. VARIANT WITHOUT PROJECT

This option consists of "abandoning" the project, ie not carrying out the work; this will have no impact on the biophysical environment but would limit the development of the environment by condemning the population of the area concerned to very limited access to Internet traffic between content providers at the local level and will make the Internet experience slower, less reliable and not affordable for all digital users.

5.3. VARIANT WITH PROJECT

This option allows the beneficiaries of the zone the advantage of being in an environment optimized for their computer equipment within a state-of-the-art modular installation, fully equipped with the latest in the sector in terms of technology, security, compatibility AC/DC power supply and redundancy. This will facilitate Internet traffic between local content providers and make the Internet experience faster, more reliable and more affordable for all digital users. This option will also allow an increase in the turnover of telecommunications companies, in particular RAXIO. Completion of the project will also promote the creation of direct and indirect jobs and the generation of cash income.

Indeed, the erection being already defined, the emphasis will be placed on these options, the orientation given to this analysis aims to identify the advantages and disadvantages of each option taking into account the environment in which it is registered and socio-economic issues. The following criteria were considered for this analysis and related to the environmental environment, the human environment and socio-economic activities.

5.4. DESCRIPTION OF THE "WITHOUT PROJECT" VARIANT AND THE "WITH PROJECT" VARIANT

The "without project or with project" option was assessed by considering the effects of the absence or presence of the project on the environment, society and the economy. The main objective of this analysis is to study the various scenarios and their effects.

Definition of the assessments of the nature of the impacts:

- the nature of the impact indicates whether the impact is negative or positive;
- the assessment of the nature of the impact is expressed through the degree of disturbance of the environment and is a function of the vulnerability of the component studied;
- three elements of appreciation are considered (major, moderate and minor).
 - Major: when the impact alters the quality or permanently restricts the use of the affected element.
 - Moderate: when the impact somewhat compromises the use, integrity and quality of the affected element.

- Minor: when the impact does not perceptibly modify the quality or the use of the affected element.

Table 17: Analysis of the "without project" variant

Consideration	Impact	Type of impact
Environmental	<ul style="list-style-type: none"> • No change in current environmental conditions, • No waste produced 	Major positive
Socio-economic	<ul style="list-style-type: none"> • No work-related jobs (businesses and labor) 	Moderate negative
Techniques	<ul style="list-style-type: none"> • Maintaining the state and constraints in the field of news, information and communication technologies 	Major negative

Table 18. Analysis of the "with project" variant

Consideration	Impact	Type of impact
Environmental	<ul style="list-style-type: none"> • Modification of the landscape in connection with the works 	minor negative
	<ul style="list-style-type: none"> • Risks of erosion in some places 	Moderate negative
	<ul style="list-style-type: none"> • Noise 	minor negative
	<ul style="list-style-type: none"> • Air pollution 	Moderate negative
	<ul style="list-style-type: none"> • Waste generation 	Moderate negative
Socio-economic	<ul style="list-style-type: none"> • Opportunity for employment at the local level during the works phase (labour); • Creation of business opportunities (national and local companies in the construction phase); • Improving the well-being of populations 	Major positive
	<ul style="list-style-type: none"> • Disruptions to socio-economic activities on the right-of-way (loss of property, loss of assets, hindrance to the mobility of local populations, etc.) 	minor negative
	<ul style="list-style-type: none"> • Relocation of populations or socio-economic activities 	minor negative
Techniques	<ul style="list-style-type: none"> • Increase in the geographical coverage of the use of high-capacity bandwidth networks and reduction in the cost of communications services on the national territory 	Major positive

5.5. PROJECT VARAINE SELECTION

After comparing the technical, socio-economic and environmental criteria, the variant with the project was retained following the positive impacts, particularly in the operation phase.

6. IDENTIFICATION, ANALYSIS AND EVALUATION OF IMPACTS

6.1. Methodological approach

This section aims to present the methodological approach taken to identify, characterize and assess the impacts of project activities on the various environmental and social components.

6.1.1. Identification of impacts

The impact identification approach used takes into account the activities and interventions of the project and the components of the host environment. The analysis of the components of the environment (natural and human environments) on the one hand, and of the interventions and activities of the project (potential sources of impact) on the other hand, makes it possible, when we cross them, to determine the anticipated impacts of the project. This linking, using a matrix, makes it possible to identify the negative and positive impacts. It is a question here, of considering all relevant components of the physical, biological and socio-economic environments which are: the soil, the vegetation, the air, the water, the fauna, the human environment (population, health/quality of life, traffic/traffic, land, economy, etc.).

Project activities in these different phases determine the sources of environmental impacts. A crossing is made between these activities and the components of the environment using Leopold's matrix (1971).

6.1.2. Characterization (analysis) of impacts

The impacts as well as their sources inherent to the activities of the project are characterized in relation to their nature (*positive or negative*) and considering the immediacy of their effects (*direct or indirect*) on a given component of the environment. Depending on the orientation of its contribution to the balance of physical, biological and human ecosystems, the impact has been qualified as nature:

- ❖ Positive: when it is perceived as a benefit for the balance of ecosystems;
- ❖ Negative: when it makes a harmful contribution to the balance of ecosystems.

Furthermore, the impact was considered to be:

- ❖ Direct: when it immediately and without transition touches the component in question;
- ❖ Indirect: when it passes through other channels to affect a given component.

6.1.3. Impact assessment

The assessment of the significance of the impacts is carried out using the following indicators: extent, duration and intensity or degree of disturbance. This is a value judgment which makes it possible to establish levels of acceptability taking into account the standards in force and national and local specificities in terms of environmental management. The Impact Significance Rating Grid shown in Table 19 was used for this purpose.

➤ Duration of impact

The duration of the impact specifies its temporary dimension, ie the period of time during which the modifications undergone by the environmental components will be felt.

This duration factor is grouped into three classes:

- **Momentary**, when the effect of the impact is felt at a given time and for a period of time less than a season;

- **Temporary** , when the effect of the impact is felt continuously for a period of time less than the duration of the project;
- **Permanent** , when the effect of the impact is felt for a period of time greater than or equal to the duration of the project.

➤ **Extent of impact**

It expresses the scope or the spatial influence of the effects generated by an intervention of the project activity on the environment. This notion refers either to a distance or to an area over which the modifications undergone by a component will be felt, or even to the proportion of a population that will be affected by these modifications.

It is **specific**, **local** or **regional** depending on whether the effects of the project are felt respectively inside the project area and outside the project area.

➤ **Degree of disturbance or intensity**

The degree of disturbance generated corresponds to the magnitude of the modifications that affect the environmental component affected. It is a function of duration, its spatial coverage (extent) and its intensity. There are four levels of disturbance: very strong, strong, medium and weak.

The disturbance is **very strong** when the impact deeply compromises the integrity of the affected element, alters its quality and cancels any possibility of its use.

It is **strong** when the impact compromises the integrity of the affected element, alters its quality or significantly restricts its use.

It is **medium** when the impact somewhat compromises the use, quality or integrity of the element affected.

It is **low** when the impact does not perceptibly modify the integrity, quality or use of the affected element.

➤ **Significance of impact**

Accordingly, the significance of the impact can be classified into three categories:

- **Strong**, when the components of the affected environmental element are in danger of being destroyed;
- **Medium**, when they are modified without however the integrity or their existence being threatened;
- **Weak**, when only slightly affected.

Table 15 below schematically presents the essentials of the process leading to the assessment of the significance of the environmental and social impact as well as the inputs and outputs of each of the stages.

Table 19. Impact Significance Rating Grid

Evaluation criteria			Importance
Intensity	Extent	Duration	
Strong (3)	Regional (3)	Permanent (3)	Major
		Temporary (2)	Mean
		Momentary (1)	Minor
	Local (2)	Permanent (3)	Major
		Temporary (2)	Mean
		Momentary (1)	Minor
	Punctual (1)	Permanent (3)	Mean
		Temporary (2)	Minor
		Momentary (1)	Minor
Medium (2)	Regional (3)	Permanent (3)	Major
		Temporary (2)	Mean
		Momentary (1)	Minor
	Local (2)	Permanent (3)	Mean
		Temporary (2)	Minor
		Momentary (1)	Minor
	Punctual (1)	Permanent (3)	Mean
		Temporary (2)	Minor
		Momentary (1)	Minor
Low (1)	Regional (3)	Permanent (3)	Mean
		Temporary (2)	Minor
		Momentary (1)	Minor
	Local (2)	Permanent (3)	Mean
		Temporary (2)	Minor
		Momentary (1)	Minor
	Punctual (1)	Permanent (3)	Minor
		Temporary (2)	Minor
		Momentary (1)	Minor

Source: Adapted from Martin Fecteau

Each impact is assessed according to the Assessment Grid shown in Table 20 below:

Table 20. Impact assessment grid

Project activity					
Types of impacts					
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without bonus					
Bonus measures					
With bonus					

6.1.4. Potential sources of impacts

The sources of impact are defined as all the activities planned within the framework of the project and which are likely to directly or indirectly modify or disturb a component of the natural (physical, biological) or human environment. They are linked to the different phases of the project: preparation, construction (or work phase) and operation (Table 21).

Table 21. Activities sources of impacts

Stages	Activities	
Preparatory	Site installation	Site-specific installation Signaling
	Clearing	Weeding and stump removal
	Supply of construction materials and equipment to the site	Acquisition of materials Material supply Transport of materials and equipment per vehicle
	Manufacture of fired bricks	Manufacture and firing of bricks
	Recruitment of workers	Recruitment of: ± 250 workers involved in the construction site and THIMO
	Choice, opening and use of borrow pits and quarries	Exploitation of borrow areas and quarries to obtain sand, clay, crushed stone, etc. for the works
Construction	Signaling	Installation of site panels Marking of the site Site lighting
	Earthwork	Digging, excavation, etc.
	Construction of buildings and structures	Earthworks and foundations; Elevation masonry in solid fired bricks; Concrete (footings, stringers, beams, slabs etc.); Coating - Floor and wall covering; Metal and wooden joinery; Welding and thermal cutting; Electricity ; Solar energy ; Paint : Roofing, waterproofing & False ceilings; Air conditioning & Ventilation; Plumbing, Sanitation and Sanitation; Drilling;
	Various roads and networks (VRD)	Excavation for drainage works Implementation of building materials ditches or gutters Electrical installation Sanitation and stormwater drainage
	Withdrawal from the construction site	Site cleaning Dismantling of site equipment Transport of equipment and materials for Worksite
	Installation of equipment	Installing furniture Installation of workshop equipment
Operation	Operation of buildings and machinery	Commissioning of buildings Practical work electricity, plumbing, Mechanics, carpentry etc; Operation of dormitories and restaurants; Operation of laboratories
	Sanitation	Building maintenance; Maintenance of green areas ; Road maintenance and various networks; Waste management
	Care and maintenance	Equipment care and maintenance

Source: Results of fieldwork, February 2022

6.1.5. Identification of environmental components and impact analysis

The matrix presented in Table 22 identifies the impacts of project activities on the various components of the environment. Indeed, the identification of the environments affected by the project activities is made by crossing the project activities with the elements of the environment.

These impacts are described in the following paragraphs. For each of the elements of the environment affected, the impacts likely to occur during the different phases of the project are identified and characterized.

Table 22 : Matrix of potential interactions

Project stage	Media and Components environmental Impact activities	Physical environment					Biological medium		Socio-economic environment		
		Air	Floor	Water	Vibe Sound	Countryside	Flora	Wildlife	Health and security	Employment and income	Economical activities
Preparatory phase	Site installation and living bases		-		-	-			-	+	+
	Land preparation		-			-				+	
	Supply of construction equipment and materials to the site	-	-		-				-	+	+
	Recruitment of workers								-	+	+
	Choice, opening and use of borrow pits and quarries	-	-		-	-	-	-	-	+	+
Project construction	Earthworks and foundations;	-	-			-	-	-	-	+	+
	Elevation masonry in solid bricks ;		-			-			-	+	+
	Concrete works (footings, stringers, beams, slabs etc.);		-			-			-	+	+
	Coating work - Floor and wall covering		-						-	+	+
	Metal and wood carpentry work	-	-		-				-	+	+
	Welding and thermal cutting work				-				-	+	+
	Electrical work		-			-			-	+	+
	Photovoltaic energy works					-			-	+	+
	Paint work	-	-						-	+	+

	Roofing works, waterproofing & False ceilings					-			-	+	+
	Air Conditioning & Ventilation Works								-	+	+
	Plumbing, Sanitation and Sanitary Works								-	+	+
	Roads and Miscellaneous Networks		-	-		-	-	-	-	+	+
	Installation of equipment (furniture, workshop equipment, computers and machines, etc.)								-	+	+
	Withdrawal from the construction site								-	+	+
Project operation	Operation of buildings and equipment	-	-						-	+	+
	Care and maintenance (buildings and equipment)								-	+	+
	Sanitation management	-	-	-					-	+	+

Source: Leopold matrix and adapted March 2022,

Legend: - = Negative; + = Positive

The analysis of Table 22 shows that the various activities to be developed during the implementation of the project, considered as sources of impacts, affect in various ways the main components of the environment.

The elements of the physical environment most affected by the identified sources of impact are:

- air (deterioration of its quality and noise pollution);
- the landscape (modification of the natural landscape of the site by the erection of buildings and works);

As for the elements of the human environment, the most affected are:

- population health/safety;
- the social and the economic will be strongly influenced by the development of this activity in the municipality of Limete in general and the 12th street in particular;
- job creation (recruitment of labor for building construction works) will influence the income of the local population;

Depending on the nature of the modifications that affect the various elements of the environment, the resulting effects can be qualified as negative or positive.

6.2. Positive Impacts

6.2.1. Positive impacts in the preparation phases

The direct positive impacts of the project in the preparatory phase mainly concern the human environment for employment opportunities and increased income.

➤ **Job creation**

Clearing work, installation of the site (bases), manufacture of fired bricks, transport of materials, etc. will require the recruitment of labor which will contribute to increasing the income of some families.

Table 23 below provides a summary of the impact related to job creation.

Table 23. Job Creation Impact Assessment Summary

Summary of impact assessment					
Project activities	Preparation of the ground, installation of the site (bases), transport of materials, etc.				
Types of impacts	Job creation				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without bonus	Mean	Local	Temporary	Minor	Not Reversible
Bonus measures	- Prioritize the local recruitment of the population for certain jobs (with equivalent skills) and favor the THIMO method (Works of high intensity of local labor);				
With bonus	Mean	Local	Temporary	Minor	Not Reversible

6.2.2. Positive impacts during the works phases

The direct positive impacts of the project in the construction phase mainly concern the human environment for employment opportunities, increased income and the opportunities they generate.

➤ **Job creation**

The erection of the data center (Data Center) at 12th street Limete will generate jobs. The jobs created will be rather temporary for the workforce assigned to the structural works and the THIMO works. They will be until the end of the works for technical activities (construction works or installation of equipment) and temporary for THIMO works (making bricks).

In all cases, they will participate in improving the income of the staff involved, the turnover of local businesses. It is estimated that the project will create about 150 jobs (with 30% women) including 125 temporary (THIMO) and 25 for the construction of buildings or the installation of equipment. Women's jobs can change power dynamics within households, and be a risk factor for GBV, including domestic violence. Table 24 below provides a summary of the impact related to job creation.

Table 24. Job Creation Impact Assessment Summary

Summary of impact assessment					
Project Activities	Construction work on buildings or installation of equipment,				
Types of impacts	Job creation				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without bonus	Mean	Local	Temporary	Minor	Not Reversible
Bonus measures	<ul style="list-style-type: none"> - Prioritize the THIMO method (high-intensity local labor work); - Prioritize local construction companies and local NGOs for THIMO works; - Recourse to the MGP in the event of conflicts or complaints; 				
With bonus	Mean	Local	Temporary	Mean	Not Reversible

➤ **Business opportunities for private economic operators**

The planned investments take into account the purchase of building construction materials, equipment to be installed (furniture, office equipment and machinery, etc.) and site development work. Thus, the start of the Project is a business opportunity for construction companies, technical control, import-export and consulting engineering firms (geotechnics, environmental assessment, etc.). The landscape botanists employed for the beautification of the project site will be part of the private economic operators.

Table 25. Summary of the impact assessment related to business opportunities for private economic operators

Summary of impact assessment					
Project activity	Purchases of materials and equipment, Landscaping (development operations)				
Types of impacts	Increase in the turnover of economic operators				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without bonus	Mean	Regional	Temporary	Mean	Not reversible
Bonus measures	<ul style="list-style-type: none"> - Prioritize economic operators and local firms (women and girls); - Arrange spaces for the sale of meals and drinks (women and girls); - Recourse to the MGP in the event of conflicts or complaints; 				
With bonus	Mean	Regional	Temporary	Mean	Not reversible

➤ **Payment of import taxes and/or value added tax**

The construction works of the data center center (Data Center) at 12th Limete Street will require the purchase of materials (iron bars, cement, false ceiling, paint, plumbing, sanitary, etc.), materials (machinery, vehicles, cement mixer etc) and equipment (offices, machines, etc) which will be either imported or purchased locally. The financial management of the DRC will benefit from the sources of foreign exchange through import taxes for the materials, materials and equipment imported as well as for the value added tax in the context of the materials, materials and equipment that will be purchased. locally.

Table 26 below gives the summary of the evaluation of the impact related to the payment of import taxes.

Table 26. Summary of the assessment of the impact related to the payment of import taxes

Impact title	Payment of import taxes and/or value added tax				
	Intensity	Extent	Duration	Importance	Reversibility
Classes or degrees	Mean	Regional	Temporary	Mean	Nope
Bonus measures	<ul style="list-style-type: none"> - Avoid corruption and revenue leakage; - Payment of tax and all related taxes. 				
Residual character	strong positive				

➤ **Small business activities**

In addition, income-generating activities, including stalls (Malewa), grocery stores known as “Nganda Maboke”, stalls and the sale of food products and basic necessities, will be stimulated by the presence of the workers of the company in charge of the work.

Table 27. Small Business Impact Assessment Summary

Summary of impact assessment					
Project activity	Small businesses (shops (Malewa), grocery stores, inns)				
Types of impacts	Increase in the turnover of economic operators				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without bonus	Mean	Regional	Temporary	Mean	Not reversible
Bonus measures	<ul style="list-style-type: none"> - Prioritize local economic operators (women and girls); - Arrange stalls, grocery stores, inns, for the sale of meals and drinks (women and girls); 				
With bonus	Strong	Regional	Permanent	Major	Not Reversible

6.2.3. Positive impacts during the operational phase

The positive impacts of this Data Center construction project at 12th Limete Street in the operating phase are related to the human environment and the socio-economic environment.

➤ **Increase in the reception capacity of the center;**

With a large area of 6500 m², the Data Center at 12th Limete Street is a project that will increase Kinshasa's digital data reception capacity.

Table 28 below gives the summary of the evaluation of the impact linked to the increase in the reception capacity of the centre.

Table 28: Summary of the evaluation of the impact linked to the increase in the reception capacity of the center

Summary of impact assessment					
Project activities	Operation of buildings and equipment (offices, machines, etc.)				
Types of impacts	<i>Increase in the reception capacity of the center</i>				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without bonus	Mean	Local	Permed	Mean	Reversible
Bonus measures	<ul style="list-style-type: none"> - Encourage women and young girls to take data collection training at the centre. - Ensure and innovate training programs in new technologies (Communication) 				
With bonus	Mean	Local	Permed	Mean	Reversible

Job Opportunities

In terms of employment, the project will contribute to the creation of stable jobs. The operation of the center is an opportunity to recruit local labour. It is an opportunity for young graduates of universities and higher technical institutes (Electricity, Mechanics, IT, Electronics, etc.). These jobs will not only reduce the number of unemployed but also provide stable incomes to these employees.

Table 29. Job Creation Impact Assessment Summary

Summary of impact assessment					
Project activities	Care and maintenance (buildings and equipment)				
Types of impacts	Job opportunity				
Criteria	Intensity	Extent	Long	Importance	Reversibility
Without bonus	Mean	Local	Temporary	Minor	Reversible
Bonus measures	<ul style="list-style-type: none"> - With equal competence, give priority to local labour; - Prioritize local populations including the participation of women and girls. - Organize training on capacity building for workers 				
With bonus	Mean	Local	Permanent	Minor	Reversible

Table 30: Summary of positive impacts during the preparation phase

Activities/sources of impact	Environmental component affected	Nature of potential impact	Intensity			Extent			Duration			Importance		
			Fa	M	For	P	Lo	R	Mo	T	P	Mid	M	My
Clearing, installation of the base camp and, recruitment of workers etc.	Social	Job creation		X			X			X				

Table 31: Summary of positive impacts during the construction phase

Activities/sources of impact	Environmental component affected	Nature of potential impact	Intensity			Extent			Duration			Importance		
			Fa	M	For	P	Lo	R	Mo	T	P	Mid	M	My
Data center construction works at 12th Limete Street	Social	Job creation		X			X			X				
Purchase of construction equipment and materials	Social	Increase in the turnover of economic operators		X			X			X				
		Payment of import taxes for construction work on buildings and structures		X			X			X				
The influx of labor on site linked to recruitment	Social	Small businesses		X			X			X				

Table 32: Summary of positive impacts during the operational phase

Activities/sources of impact	Environmental component affected	Nature of potential impact	Intensity			Extent			Duration			Importance		
			Fa	M	For	P	Lo	R	Mo	T	P	Mid	M	My
Increase in reception capacities	Social	Building operation		X			X				x			
Care and maintenance (buildings and equipment)	Social	Job creation		X				X		X				

6.3. Negative Impacts

6.3.1. Negative impacts in the preparation phase

The negative impacts of the Project in the Preparation phase concern both the biophysical environment and the human environment.

a) Impacts on the biophysical environment

Air impacts

➤ Altered air quality (dust, vehicle exhaust)

During the preparatory phase, the air quality will be affected by dust and smoke emissions from the various works relating to the cleaning activities of the areas where new constructions will be erected, the transport of materials (sand, gravel, cement, etc.) , the installation of the site, the activities of preparation of the ground , and the works of etc. Emission of gases such as carbon monoxide (CO), sulfur (SO) and nitrogen (NO) oxides, hydrocarbon vapours. The quantities of these gases released will be low and will generate environmental impacts of minor importance, thanks to the installation of filters on the exhaust pipes of all machines and vehicles.

The impact of dust emissions is greater during the driest periods, insofar as natural precipitation limits the production of dust.

Table 33: Summary of the assessment of the impact related to the alteration of air quality

Impact: <i>Alteration of air quality</i>					
Project Activity	Preparation of the land, transport of materials, installation of the site, clearing activities, and work on the manufacture and firing of bricks, etc.				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Strong	Local	Temporary	Mean	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop dust and other air emissions control plan - Regularly water the access road to the site and the circulation routes inside the site - Cover trucks transporting construction materials; - Cover stored powdery materials; - Ensure the periodic maintenance of rolling stock and fixed installations that are sources of polluting emissions; - Ensure the maintenance of machinery and the vehicle fleet; - Strictly apply the speed limit provision in built-up areas; - Provide workers with personal protective equipment (PPE); - Use vehicles and machinery in good condition; - Check the air quality by periodic measurements; - Prohibit any incineration of waste in the open air 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

➤ Noise

During the preparatory phase, the noise level will increase in the environment due to the noise generated by the comings and goings of trucks to supply the site with construction materials by the movement of machinery, and the presence of site workers. This noise is likely to cause great inconvenience given that the work is taking place not far from neighboring dwellings. This impact is temporary and of minor significance.

Table 34. Summary of noise impact assessment

Impact: Noise pollution					
Project Activity	Supply of construction equipment and materials to the site				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Local	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a Noise Control Plan - Avoid noisy work during rest hours for local residents; - Place anti-noise devices in machines to reduce noise pollution 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

❖ **Ground impact**

➤ **Soil pollution by construction waste**

In the preparatory phase, several types of waste will be produced on the site. These include household waste, waste similar to household waste: packaging (plastic bags, sheets, paper, cardboard, empty boxes, etc.), etc. Good management of all this waste is necessary. The ideal sought is the recycling of waste as far as possible.

For waste that cannot be recycled, it will be necessary to contact the approved environmental service for their evacuation and disposal.

Table 35: Summary of the assessment of the impact related to soil pollution by construction waste

Impact: Soil pollution by solid construction waste					
Project Activity	Production of waste during the building construction phase				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Local	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a Waste Management Plan - Comply with good waste storage practices; - Arrange bins on the site by category of waste (plastics, glass, metals, etc.) - Sign a contract with an approved structure for the removal of waste; 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

❖ **Impact on flora and fauna**

➤ **Loss of Biodiversity (fauna and flora)**

The installation works for the construction site and living bases, preparation of the land, selection, opening and use of borrow areas and quarries, will impact the vegetation. The work being done in a concession, the degradation of the vegetation is almost non-existent.

This work will also disturb the tranquility of the avian (*Bubulcus ibis*, *Passer grisens*), entomological (insects) and herpetological (cat, frog, toads and gecko) wildlife resources, as well as the reptiles existing in the vicinity of the site. This work will affect the wildlife habitats of these species in a minor way. No listed species is on the national lists of protected species.

Table 36. Biodiversity Loss Impact Assessment Summary

Impact: Loss of flora					
Project Activity	Site installation work, clearing, opening, use of borrow pits and quarries, manufacture of fired bricks, etc.				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Local	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Landscape and revegetation plan - limit clearing to the strict minimum necessary; - save as much as possible the vegetation around the project site; - use electric ovens for firing bricks; - leveling and revegetating the borrow areas after exploitation; 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

➤ **General construction accidents (various positions)**

During the preparatory phase, work accidents may be due to injury from sharp or pointed objects (nails, scrap metal, etc.), malfunctioning of machinery or machinery. Movements of machinery and vehicles on site may be at the base of collision accident or collision of workers due to lack of marking of the site (internal traffic plan), transport of materials, etc.

Table 37. Summary of the impact assessment related to general work accidents

Impact: general construction site accidents (injury by sharp or pointed objects (nails, scrap metal, etc.), malfunctioning of machinery or machines, etc.					
Project Activity	Work carried out in different work stations				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Punctual	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Worksite traffic and site access management plan - provide site workers with adequate PPE (helmets, safety clothing and boots, gloves, safety harnesses, etc.) and ensure that they are actually worn; - apply penalties for non-compliance; - raise awareness among site workers of health, safety and environmental measures at work; - mark out the site (traffic plan); - provide the site with a medical first aid kit; - recruit an HSE manager on site; - take out accident risk insurance with an approved body; - sign an agreement with a hospital center closest to the site for appropriate care of the injured. The center will have an ambulance for the evacuation of the injured. 				
With attenuation	Weak	Punctual	Temporary	Minor	Reversible

6.3.2. Negative impacts during the Works phase

a) Impacts on the biophysical environment

Air impacts

➤ **Alteration of air quality (dust, vehicle exhaust, earthworks)**

During the construction of buildings and structures, dust and fumes (COx, NOx, SOx and PAH) generated by earthmoving activities, the use of welding and thermal cutting, the operation of machinery, and vehicle of the construction site and the preparation of the concrete, will locally affect the quality of the air.

The impact of dust emissions is greater during the driest periods, insofar as natural precipitation limits the production of dust.

Table 38 below provides the summary of the impact assessment related to changes in air quality .

Table 38: Summary of the assessment of the impact related to the deterioration of air quality

Impact: change in air quality					
Project Activity	Earthworks, welding and thermal cutting work, operation of machinery, and site vehicle				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Strong	Local	Temporary	Mean	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a dust and other air emissions control plan - Regularly water the access road to the site and the circulation routes inside the site - Cover trucks transporting construction materials; - Cover stored powdery materials; - Ensure the periodic maintenance of rolling stock and fixed installations that are sources of polluting emissions; - Ensure the maintenance of machinery and the vehicle fleet; - Strictly apply the speed limit provision in built-up areas; - provide workers with personal protective equipment (PPE); - use vehicles and machinery in good condition; - control air quality through periodic measurements; - Prohibit any incineration of waste in the open air 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

➤ **Noise**

During the work phase, the noise level will increase in the environment due to the noise generated by the comings and goings of trucks for the supply of materials to the site, the supply of construction materials by machinery, the operation of machines and the presence of site workers. This noise is likely to cause great annoyance as the work is taking place within the Data Center. This impact is temporary and of medium importance.

Table 39. Summary of noise impact assessment

Impact: Noise pollution					
Project Activity	Operation of machinery and presence of site workers.				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Local	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a Noise Control Plan - Avoid noisy work during the training center's working hours. - Avoid noisy work during rest hours for local residents; - Place anti-noise devices in machines to reduce noise pollution 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

❖ **Ground impact**

➤ **Soil pollution by solid construction waste**

During the construction phase, several types of waste will be produced on site. These include household waste, metal shavings, spikes, bits of wood, and waste similar to household waste: packaging (plastic bags, sheets, paper, cardboard, empty boxes, etc.), pieces of baked bricks, etc. Good management of all this waste during the construction phase is necessary. The ideal sought is the recycling of waste as far as possible.

For waste that cannot be recycled, it will be necessary to contact the approved environmental service for their evacuation and disposal.

Table 40: Summary of the assessment of the impact linked to the obstruction of the ground by construction waste

Impact: Soil pollution by solid construction waste					
Project activity	Production of waste during the building construction phase				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Local	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a Waste Management Plan - Comply with good waste storage practices; - Arrange bins on the site by category of waste (plastics, glass, metals, etc.) - Sign a contract with an approved structure for the removal of waste; 				
With attention	Weak	Local	Temporary	Minor	Reversible

➤ ***Modification of the structure and texture of the ground in accordance with ESS n° 1***

During the works phase, the quality of the soil will be affected by the earthworks and foundations, etc.) This will lead to the destruction of the plant cover during the said works, which may be the cause of the modification of the structure and soil texture.

Table 41: Summary of the evolution of the impact to the modification of the structure and the texture of the soil

Impact: change in soil structure and texture					
Project Activity	Earthworks and foundations etc.				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Local	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop an Erosion and Sediment Control Plan - Avoid earthworks and digging during the rainy season; - At the end of the work, level the reworked soils and promote the establishment of a stabilizing herbaceous layer; - Encourage local erosion control initiatives; 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

❖ ***Impact on the landscape***

Changing the scenery matches NES #1

During the construction phase, the earthworks and foundations, the elevation brick masonry, the concrete works (footings, stringers, beams, slabs, etc.); will modify the initial appearance of the landscape.

Table 42 below gives the summary of the assessment of the impact linked to the modification of the landscape.

Table 42. Summary of landscape modification impact assessment

Changing the landscape					
Project activity	earthworks and foundations, elevation masonry in solid fired bricks, concrete works (footings, stringers, beams, slabs, etc.)				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Strong	Local	Temporary	Mean	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a comprehensive management plan for the operation and rehabilitation of borrow pits and quarries - Develop a Landscape and Revegetation Plan - Consolidate construction machinery and vehicles as well as the deposit of materials only on the work site; - Regularly collect and evacuate the waste generated by the construction site; - Level and reforest the borrow areas and Carrère after exploitation by the company. 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

❖ **Impact on the living environment and mobility of people**

➤ ***Degradation of the Center's internal access road***

The transport of materials for the supply of the site, the circulation of trucks and machines to access the site of the site will be sources of degradation of the access road (road of the 12th street) connecting the Boulevard Lumumba and the site of the works. It is also imperative that the company in charge of the work develops this access to the site which will be degraded from time to time by the passage of trucks and site machinery. The drainage of runoff water from the construction site is likely to be at the base of the gullies of this access road.

Table 43 below gives the summary of the assessment of the impact linked to the modification of the landscape.

Table 43: Summary of the evaluation of the impact related to the degradation of the internal access road of the Center

Impact: Degradation of the access road (12th street road) linking Boulevard Lumumba to the work site					
Project Activity	Transport of materials, movement of trucks and machinery, drainage of runoff water from the site,				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Punctual	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a site traffic and site access management plan; - Develop the access road (12th street road) linking Boulevard Lumumba and the work site in the event of deterioration following the passage of trucks and site machinery or further to gullies caused by runoff from the site 				
Before attenuation	Weak	Punctual	Temporary	Minor	Reversible

b) human environment

Impact on the health of local communities and staff

➤ ***Traffic disruption and accidents***

During the construction work, the supply of materials and equipment to the site is carried out by trucks, which means a temporary increase in traffic and the risk of accidents on the access road (12th street road) connecting the Boulevard Lumumba and the works site which allow access to the center. The use of machinery during work inside the site can also be the cause of traffic accidents.

Table 44 below gives the summary of the impact assessment related to traffic disruption and accidents.

Table 44. Summary of the traffic accident impact assessment

Impact: Disruption and traffic accidents					
Project Activity	Transport, installation of the base camp, production of waste				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Strong	Local	Temporary	Mean	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a site traffic and site access management plan - Sensitize all drivers of vehicles and machinery on road safety; - Provide a traffic plan within the work site; - Install signage around and inside the site - Limit speed to 45 km/h along Boulevard Lumumba and 30 km/h on the access road to the site (12th street road); - Prohibit drivers from consuming alcoholic beverages or narcotics during working hours. 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

➤ **General construction accidents (various positions)**

During the construction phase, work accidents may be due to injury by sharp or pointed objects (nails, scrap metal, etc.), malfunction of machinery or equipment, etc.

Table 45. Summary of the impact assessment related to general work accidents

Impact: general construction site accidents (injury by sharp or pointed objects (nails, scrap metal, etc.), malfunctioning of machinery or machines, etc.					
Project Activity	Work carried out in different work stations				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Punctual	Temporary	Minor	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Provide site workers with adequate PPE (helmets, safety clothing and boots, gloves, safety harnesses, etc.) and ensure that they are actually worn; - Apply sanctions in case of non-compliance; - Raise the awareness of site workers on health, safety and environmental measures at work; - Provide the site with a medical first aid kit; - Recruit an HSE manager on site; - Take out accident risk insurance with an approved body; - Sign an agreement with a hospital center closest to the site for appropriate care of the injured. The center will have an ambulance for the evacuation of the injured. 				
With attenuation	Weak	Punctual	Temporary	Minor	Reversible

c) Human Environment

❖ **Impact on cultural heritage**

➤ **Impact on chance find**

The earthworks and foundations of the buildings to be constructed, the exploitation of borrow pits and quarries can lead to possible fortuitous discoveries of the remains. The company should comply with the requirements of Standard No. 8 relating to cultural heritage and national procedures for discovery of cultural heritage.

Table 46. Summary of Chance Finding Risk Assessment

<i>Risk of accidental discovery</i>					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	Chance discovery of cultural heritage.	1	4	14	Damage to the remains
Reduction measures/Improvement	Follow the national procedure in the event of fortuitous discovery of archaeological sites and cultural relics during works, namely: <ul style="list-style-type: none"> - Inform customary and religious authorities and local populations about the arrangements made - Inform and educate workers on respect for local habits and customs - Stop work in the event of a fortuitous discovery - Circumscribe and protect the discovery area - Immediately notify the competent services for action to be taken 				
<i>After prevention</i>	Chance discovery of cultural heritage	1	4	14	Damage to the remains

6.3.3. Procedure in the event of a fortuitous discovery

For civil engineering projects involving excavation, procedures are normally provided for in the event of a “chance discovery ⁵” of buried physical cultural property.

The procedures adopted depend on the local regulatory framework, which notably takes into account the legislative provisions applicable to the fortuitous discovery of antiquities under archaeological objects.

Note: The general recommendations below apply to situations in which an archaeologist will be called upon. In exceptional situations where excavation work is carried out in areas rich in physical cultural assets, such as a UNESCO World Heritage Site, an archaeologist is usually present on site to monitor the excavation and make decisions that arise. In this case, the procedures must be modified accordingly, with the agreement of the authorities responsible for cultural matters.

Chance find procedures generally include the following:

1. Definition of physical cultural property

Physical cultural property is defined as: “movable or immovable objects, sites, works or groups of works having archaeological, paleontological, historical, architectural, religious, aesthetic or other value”.

2. Property

Depending on the circumstances, a property may be the local government, the state, a religious institution, or the site owner. It also happens that the identity of the owner is later determined by the competent authorities.

3. Acknowledgement

It is not specified how the company will recognize physical cultural property and the company may require a disclaimer.

4. Procedure applicable in the event of discovery

- Suspension of work:

After suspension of work, the company must immediately report the discovery to the Resident Engineer. The company may not be entitled to claim compensation for the period of suspension of work.

⁵ World Bank, Excerpt from Principles for the Safeguarding of Physical Cultural Heritage - A Practical Guide, March 2009,

The resident engineer may have the authority to suspend work and request the company to carry out excavations at his own expense if he feels that a discovery which has just been made has not been reported.

- Delineation of the discovery site

With the Resident Engineer's approval, the company is then asked to temporarily cordon off the site and restrict access.

- No suspension of work

The procedure may allow the resident engineer to determine if the physical cultural property can be moved elsewhere before proceeding with the work, for example if the discovered object is a coin.

- Chance Find Report

The company must then, at the request of the Resident Engineer and within the specified deadlines, prepare a Chance Find Report providing the following information:

- Date and time of discovery;
- Location of discovery;
- Description of the physical cultural property;
- Estimation of the weight and dimensions of the property;
- Temporary protective measures put in place.

The Chance Find Report shall be submitted to the Resident Engineer and other designated parties by mutual agreement with the Cultural Services, and in accordance with national law.

The resident engineer, or any other party designated by mutual agreement, must inform the cultural services of the discovery.

- Arrival of cultural services and measures taken

The departments responsible for cultural heritage arrange to send a representative to the site of the discovery within agreed deadlines (within 24 hours, for example) and determine the measures to be taken, in particular:

- Removal of physical cultural property deemed important;
- Continuation of excavation work within a specified radius around the discovery site;
- Expansion or reduction of the area delimited by the company.

These measures must be taken within a given period (within 7 days, for example).

The company may, but need not, be entitled to compensation for the period of suspension of work.

If the cultural services do not send a representative within the specified time (within 24 hours, for example), the resident engineer may be authorized to extend these times for a specified period.

If the cultural services do not send a representative within the extension period, the resident engineer may be authorized to ask the company to move the physical cultural property or take other mitigating measures and take over the works. The additional work will be charged to the market, but the company cannot claim compensation for the period of suspension of the work.

- Additional suspension of work

During the 7-day period, cultural services may be entitled to request the temporary suspension of work on or near the discovery site for an additional period of 30 days, for example.

The company may, but need not, claim compensation for this additional period of suspension of work.

However, the company may be authorized to sign a new agreement with the departments responsible for cultural heritage for the provision of additional services or resources during this period.

➤ **Withdrawal and dismantling of the site**

The closure of the site often leads to the abandonment of waste of all categories (wrecks, shacks, waste dumps, etc.) this negatively impacts the living environment and leads to its disfigurement.

Table 47. Summary of the assessment of the impact linked to the withdrawal and dismantling of the site

Impact: Abandonment of waste and deterioration of the living environment					
Project Activity	Withdrawal and dismantling of the construction site				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Strong	Local	Temporary	Mean	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop a management plan for the operation and rehabilitation of sites (worksite borrow areas and quarries); - Restore used areas by clearing all equipment, machinery, materials, waste and debris from the site, wrecks, huts, etc. - Restore borrow pits in the event of exploitation by leveling the land followed by reforestation of the site 				
With attenuation	Mean	Local	Temporary	Minor	Reversible

6.3.4. Negative impacts during the operational phase

- ❖ Biophysical environment
 - **Soil pollution by household and hazardous waste**

During the operation phase, several types of waste will be produced, in particular household waste from the office, etc. Proper management of all this waste during the operating phase is necessary. The ideal sought is the recycling of waste as far as possible. Poorly managed wastewater and sanitary water from buildings can be the basis of soil pollution.

Table 48. Summary of the impact assessment related to soil pollution by household and hazardous waste

Impact: Soil pollution by household and hazardous waste					
Project Activity	Operation of buildings				
Criteria	Intensity	Extent	Duration	Importance	Reversibility
Without attenuation	Mean	Local	Permed	Mean	Reversible
Reduction measures/ Improvement	<ul style="list-style-type: none"> - Develop the Hazardous Products Management Plan; - Comply with good waste storage practices; - Arrange bins on the site by category of waste (plastics, glass, metals, etc.) - Sign a contract with an approved structure for the removal and/or recycling of waste; - Find a company approved and specialized in the recycling of hazardous waste; - Maintain sanitation networks and plumbing to prevent leaks or discharge of wastewater; - Ensure the tightness of storage or handling areas for hydrocarbons and chemical substances; - Contain soil contaminated by the products in an impermeable container placed in an area sheltered from the weather before their disposal - Educate staff on waste management. 				
With attenuation	Weak	Local	Temporary	Minor	Reversible

Table 49 below gives a summary of the impact assessment during the works phase.

Table 49. Summary of the assessment of negative impacts in the preparatory phase

Activities/sources of impact	Environmental component affected	Nature of potential impact	Intensity			Extent			Duration			Importance		
			Fa	M	For	P	Lo	R	Mo	T	P	Mid	M	My
Preparation of the land, transport of materials, installation of the site, clearing activities, and work on the manufacture and firing of bricks, etc.	Air	Altered air quality (dust, vehicle exhaust)			X		X			X				
Supply of construction equipment and materials to the site	Air	Noise		X			X			X				
Production of waste during the preparatory phase and building construction works	Floor	Soil pollution by site waste		X			X			X				
Site installation work, site preparation, opening, use of borrow pits and quarries and manufacture of fired bricks, etc.	Flora and fauna	Loss of Biodiversity (fauna and flora)		X			X			X				
General construction site accidents (injury by sharp or pointed objects (nails, scrap metal, etc.), malfunctioning of machinery or machines, etc.	Health and security	Construction accidents		X		X				X				

	Risk of work and discrimination/violence against children	2	3	23
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Table 50. Summary of the assessment of negative impacts during the construction phase

Activities/sources of impact	Environmental component affected	Nature of potential impact	Intensity			Extent			Duration			Importance			
			Fa	M	For	P	Lo	R	Mo	T	P	Mid	M	My	
Earthworks and foundations, metal and wooden carpentry, welding and thermal cutting, operation of machinery, site vehicle and concrete preparation	Air	Altered air quality (dust, vehicle exhaust)			X		X			X					
Supply of construction equipment and materials to the site	Air	Noise		X			X			X					
Production of waste during the building construction phase	Floor	Soil pollution by solid construction waste		X			X			X					
Earthwork and foundation	Floor	Modification of soil structure and texture		X			X			X					
Earthworks and foundations, etc.	Countryside	Changing the landscape			X		X			X					
Transport of materials, movement of trucks and machinery, drainage of runoff water from the site,	Living environment	Degradation of the Center's internal access road		X		X				X					
Transport of materials for the supply of the construction site,	Living environment and mobility of people	Degradation of the Center's internal access road		X		X				X					
Transportation of materials	Health and security	Traffic disruption and accidents			X		X			X					
General site accident (injury by sharp or pointed objects (nails, scrap metal, etc.), malfunction of machinery or equipment, etc.	Health and security	General construction accidents		X		X				X					

Activities/sources of impact	Environmental component affected	Nature of potential impact	Intensity			Extent			Duration			Importance		
			Fa	M	For	P	Lo	R	Mo	T	P	Mid	M	My
Withdrawal and dismantling of the site	Living environment	Abandonment of waste and deterioration of the living environment			X		X			X				

Table 51: Summary of the assessment of negative impacts during the operation phase

Activities/sources of impact	Environmental component affected	Nature of potential impact	Intensity			Extent			Duration			Importance		
			Fa	M	For	P	Lo	R	Mo	T	P	Mid	M	My
Operation of equipment (use of vehicles for transporting staff and office inputs)	Air	Altered air quality (dust, vehicle exhaust)		X			X			X				
Operation of equipment	Air	Noise		X			X			X				
Operation of buildings and equipment	Floor	Soil pollution by household and hazardous waste		X			X				X			
Supply of the center with materials and equipment for offices etc.	Health and security	Traffic disruption and accidents			X		X			X				
Maintenance work on buildings, equipment, etc.	Health and security	Accidents at work		X		X				X				

7. RISKS OF ACCIDENTS AND PREVENTION MEASURES

7.1. METHODOLOGY

Risk assessment is used to plan preventive actions during construction work, taking into account priorities.

The methodology used mainly comprises three steps:

- Identification of work-related risk situations on the site;
- The estimate for each hazardous situation of the severity of the potential damage and the frequency of exposure;
- The ranking of risks to determine the priorities of the action plan.

7.2. Risk identification and assessment

Risk identification was based on feedback (accidents and occupational illnesses in similar fields). For risk assessment a rating system has been adopted; this rating is made with the aim of defining the significant risks and prioritizing preventive actions.

The criteria which were taken into account in this assessment are: The Probability of the event where the frequency and/or the duration of exposure are taken into account in the estimation of the probability and the severity of the accident or the incident. In Table 52 below, we have the grid for estimating the levels of probability and severity.

Table 52. Grid for Estimating Probability and Severity Levels

Probability Scale		Severity scale	
Score	Meaning	Score	Meaning
1	Once every 10 years, Very unlikely	1	Reversible lesions, without AT
2	Once a year, unlikely	2	Reversible lesions, with AT
3	Once a month, Likely	3	Irreversible damage, permanent disability
4	Once a week or more, Very likely	4	Death

The risk is evaluated by the formula: **R** (risk) = **G** (severity) × **P** (probability), a "**criticality matrix**" is established and allows to see the acceptable risks and the unacceptable risks but also the prioritization of the actions which range from 1 to 3. Table 53 below shows the criticality matrix.

Table 53. Criticality matrix

	P1	P2	P3	P4
G4	41	42	43	44
G3	31	32	33	34
G2	21	22	23	24
G1	11	12	13	14

Meaning of colors:

- A very limited **risk will have a green color**. In this case the priority on the actions to be carried out is of the third order.
- The **yellow color** materializes a **significant risk**. In this case, the priority on the actions to be carried out is 2.
- While the color red represents an **unacceptably high risk** that requires high priority actions.

Table 54 below illustrates the meaning of the colors on the risks

Table 54. Meaning of colors

	High Risk with Priority 1 Actions
	Significant risk with Priority 2
	Low risk with Priority 3

Table 55 below shows the risk assessment tool.

Table 55. Risk assessment tool

Risk name					
Activities concerned:					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>					
<i>Preventative measures</i>					
	Residual risks	Probability	Gravity	Risk level	Shame
<i>After prevention</i>					

7.2.1. Risks during the construction phase

7.2.1.1. Risks of accidents related to the movement of construction machinery and equipment

During the construction phase, there will be risks of accidents related to the movements/movements of construction machinery/instruments and the presence of poorly protected or poorly used construction materials . The risk of falling exists for all authorized and unauthorized persons on the construction site in narrow and congested traffic areas. The risk of accident also linked to the delivery of construction materials is to be feared.

Table 56: Risks of accidents related to the movement of construction machinery and equipment

Hazards and/or dangerous situations <ul style="list-style-type: none"> • Driver incompetence • Brake failure • Lack of panoramic vision from the driver's seat • Certain maneuvers including reverse • Failure to wear safety equipment 	Qualitative risk assessment:	
	These hazardous situations may well be encountered in the work area	
	Probability: Low probability	P2
	Severity: sickness with work stoppage	G2
	Risk level :	2
Preventative measures		
The people most exposed are naturally drivers and pedestrians likely to be hit. The main factors for reducing these risks are: <ul style="list-style-type: none"> • Ensure the proper training of drivers, • Proper maintenance and regular testing are necessary to reduce the possibility of brake failure. • The risk of falls to operators entering or exiting the cabin can be eliminated to a large extent by installing and maintaining suitable access systems to cabins and, where applicable, to other parts of large machinery. 		

<ul style="list-style-type: none"> All machines must be equipped with a protective structure associated with a safety belt holding the driver in the event of a rollover, a reverse gear display and signaling system, ergonomic access, adapted cabins, a protection against falling objects. <p>The risks of injury by the mechanical action (cutting, crushing, etc.) of a machine or a tool must also not be neglected. To prevent this risk, the main actions to be taken are:</p> <ul style="list-style-type: none"> Train staff in workplace safety; Draw up procedure sheets for the use of machines; Ensure that personal protective equipment (PPE) is worn: helmets, safety boots, appropriate gloves, etc.
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7.2.1.2. Risks of fire and explosion in the site life base

This is a serious risk of burns or injury to persons resulting from a fire or an explosion. They can cause material and bodily damage (for the personnel and even for the populations established in the area).

Table 57: Summary of the fire and explosion risk assessment in the living quarters

<p>Hazards and/or dangerous situations</p> <ul style="list-style-type: none"> Presence of fuels on site: diesel, fuel oil, etc. Ignition of a vehicle or machine; Mixing of incompatible products or undifferentiated storage; Presence of source of flames or sparks: Welding, incandescent particles, electrical sparks, etc . 	Qualitative risk assessment:	
	These hazardous situations may well be encountered in the work area.	
	Probability: probable event	P3
	Severity: sickness with work stoppage	G3
	Risk level :	1
Preventative measures		
<ul style="list-style-type: none"> Organize storage (Provide separate storage places for diesel), at regulatory distances from the office, base camp and homes. Set up means of smoke detection, fire, alarm system. Establish intervention and evacuation plans Have sufficient means of extinction on site (extinguishers, sandboxes, foam concentrates and pumping means) to overcome a fire very quickly before it develops; and equip vehicles and machinery with working fire extinguishers. Place fire extinguishers in a way that is visible and accessible to everyone (the paths leading to their access must be clear of any obstacle). Train staff and train them in fire extinguishing. Prohibition of smoking in well-specified places (near storage areas for example). Strengthen surveillance measures. Set up the site base outside the dwellings 		

7.2.1.3. Risks related to the handling of loads

It is a risk of injury and, under certain conditions, of occupational diseases resulting from physical exertion, crushing, shocks, repetitive movements, bad postures.

Table 58: Risks associated with handling loads

Hazards and/or dangerous situations <ul style="list-style-type: none"> • Handling heavy loads; • Handling carried out repetitively and at high speed; • Bad posture taken by staff (remote loads, regularly bent back); 	Qualitative risk assessment:	
	These hazardous situations may well be encountered in the work area.	
	Probability: probable event	P3
	Severity: sickness with work stoppage	G2
	Risk level :	2
Preventative measures		
– Collective protection <ul style="list-style-type: none"> • Organize workstations to eliminate or reduce handling; • Use handling means: Pallet truck for example; • Indicate precisely the areas or points of transit and transshipment; • Equip the loads with gripping means: handle for example; • Train staff to adopt appropriate gestures and postures; – Individual protections <ul style="list-style-type: none"> • Wear personal protective equipment (shoes, gloves, etc.). 		

7.2.1.4. Risks of falling related to work at height and excavation

Work at height (work on concrete, outriggers, elevation of bricks, coating, painting, roofing and framework, etc. can be the basis of falls on the ground and sometimes lead to fatal accidents. earthworks and foundations could cause workers to trip and fall on site if preventive measures are not taken. These risks could lead to sometimes very serious accidents.

Table 59: Summary of the assessment of fall risks linked to work at height and excavation

Risks of falling related to work at height and excavation					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	<ul style="list-style-type: none"> - Fall on the same level (colliding with workers on site); - Falling or slipping in the working environment at height following poor anchoring of ladders, platforms and harnesses - Falling from a height is the main cause of serious and fatal work accidents. 	3	3	33	Injuries, fractures, deaths,
Prevention and management measures	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Provide workers with adequate PPE (helmets, boots, clothing, harnesses, etc.) on site; - Recruit a Hygiene, Health and Safety manager on site - Prohibit the consumption of alcohol during working hours; - Raise the awareness of site workers on health and environmental hygiene measures at work; - Schedule "health and safety quarter-hours" periodically for site personnel; - Train site teams on the use of portable ladders and the basket - Check and test the anchorage of baskets, portable ladders and individual platforms, scaffolding before use - Provide the site teams with the operating procedures for work on the nacelle and portable ladders 				

Risks of falling related to work at height and excavation					
	Initial risks	Probability	Gravity	Risk level	Shame
	<ul style="list-style-type: none"> - Use collective protection adapted to work at height - Organize technical inspections of the nacelles and their accessories; - Sign an agreement with a hospital center close to the work site that has an ambulance to transport the injured; - Take out accident risk insurance with an approved organization 				
After prevention	Fall	1	3	13	Wound

7.2.1.5. Risks related to collapses and falling objects

These risks are caused by site installations, electricity pylons, cable pulling, etc. These injury hazards result from falling objects from material storage, or excavation collapse, rupture of the support rope/belt, etc.

Table 60: Risks related to collapses and falling objects

Hazards and/or dangerous situations <ul style="list-style-type: none"> • Objects stored at height (storage rack); • Objects stacked very high; • Pulling electrical cables; • bulk material; • Rubble from demolitions. 	Qualitative risk assessment:	
	These hazardous situations may well be encountered in the work area.	
	Probability: probable event	P3
	Severity: sickness with work stoppage	G2
	Risk level :	2
Preventative measures		
<ul style="list-style-type: none"> - Collective protection <ul style="list-style-type: none"> • Organize storage (reserved spaces, storage methods adapted to objects, width of aisles compatible with the handling means used); • Limit storage heights; • Mark out risk areas; • Backfill excavations; • Properly secure the loads being handled; • Educate site personnel on safety measures. - Individual protections <ul style="list-style-type: none"> • Wear personal protective equipment (safety shoes, helmets, etc.) 		

7.2.1.6. Risks related to traffic and travel

The presence of machinery is a source of congestion on the traffic lanes within the site. This situation has resulted in the disruption of internal traffic and around the area. Accidents could occur during the work.

Table 61: Risks related to traffic and travel

Hazards and/or dangerous situations <ul style="list-style-type: none"> • lack of traffic, • Excessive speed or lack of visibility during manoeuvres; • Disruption of road traffic; • Unsuitable vehicles; • Disobeying road traffic sign. 	Qualitative risk assessment:	
	These hazardous situations may well be encountered in the work area.	
	Probability: probable event	P3
	Severity: sickness with work stoppage	G2

	Risk level :	2
Preventative measures		
<ul style="list-style-type: none"> • Respect speed limits on construction sites and quarries; • Put up barriers to prevent the public and strangers from entering the worksites; • Establish instructions for the circulation of vehicles inside the construction sites and on the service tracks; • Design and build site facilities, transport, loading, unloading and storage of materials so as not to compromise safety; • Sufficiently light the site and its surroundings to prevent any risk of accident and facilitate the intervention of the safety teams. 		

➤ **Risks of collision of machinery or vehicles and collision of workers in the work area**

The use of machines and vehicles on site can be the basis of accidents resulting from the collision of machines or vehicles with each other or from the collision of a worker.

It is a risk of injury or death resulting from a collision accident inside the work area.

Table 62: Summary of the evaluation of the risk of collision of machinery or vehicles in the work area

Risks of collision of machinery or vehicles in the work area					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	<ul style="list-style-type: none"> - Movements of machinery and vehicles on the site can be the basis of collision accidents or collisions with workers due to the lack of marking of the site (internal traffic plan); - Technical failures related to braking system failures of machinery and vehicles can be the basis of collision accidents or strikes of workers 	3	3	33	Injuries, death, material damage
Prevention and management measures	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Ensure the installation of audible reversing alarms on construction machinery (horn, light signal, audible reversing alarm, etc.); - Provide site personnel with high-visibility reflective vests to allow visibility to drivers of machinery and vehicles in service; - Limit speeds to 30 km/h inside the site and on the access road to the site entrance; - Educate drivers and all staff on compliance with the Highway Code in the DRC; - Mark out the site and install road signs and speed reduction signs; - Mandatory wearing of PPE for drivers of vehicles and machinery on construction sites; - Train a beacon operator inside the construction site, - Prohibit the consumption of alcohol during working hours; - Carry out regular maintenance of vehicles and service equipment; 				
<i>After prevention</i>	Collision and clashes of workers	1	3	13	Injury or property damage

➤ **Risk related to exposure to noise**

It is a risk resulting from exposure to a high noise environment that can lead to irreversible hearing loss and generate health problems (memory, fatigue, etc.). The contractor is required to comply with SFI guidelines for the limitation of noise.

Table 63. Work Area Noise Accident Assessment Summary

Noise hazard in the work area					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	- Continuous sound exposure to very high noise or very high impulse noise related to carpentry and welding work,	3	2	32	Deafness, tinnitus, ringing or ringing in the ears, hyperacusis
Prevention and management measures	- Develop a Noise Control Plan - Inform workers of the risks; - Install sound level meters on site - Ensure the use of PPE (cap, noise-canceling headphones, etc.); - Organize special medical surveillance for exposed workers; - Ensure compliance with SFI noise exposure standards				
<i>After prevention</i>	Sound exposure	1	2	12	buzzing

➤ **Risk of poisoning and allergy to chemicals**

Exposure of workers to chemical products (glue, solvent, stripper, solder, paint, varnish, rust remover, etc.) can lead to poisoning, allergies either by direct contact or in the form of gas emitted by these products.

Table 64. Summary of the risk assessment related to poisoning and allergy to chemical products

Risk of poisoning and allergy to chemicals					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	- Exposure to chemical products during work on floor and wall coatings, painting, etc.	2	2	22	allergies; Skin diseases; chemical poisoning
Prevention and management measures	- Hazardous Materials Management Plan - Compulsory wearing of PPE (mask, glove, clothing, muffler, boots, etc.) - Sanction those who fail to comply with the instructions given; - Organize medical care in the event of allergy or poisoning related to exposure to said products; - Educate workers on the risks associated with the chemicals used				
<i>After prevention</i>	Exposure to noise	1	2	12	allergies

7.2.1.7. Risks of waste proliferation

The inadequacy of the household waste management system leads to a proliferation of waste in almost all the municipalities hosting the project. This is a serious public health risk. Measures for managing this waste must necessarily be considered.

Table 65: Risk of waste proliferation

Hazards and/or dangerous situations	Qualitative risk assessment:	
<ul style="list-style-type: none"> Insufficient public landfills Closure of some public landfills; Insufficient waste disposal materials and equipment. 	These dangerous situations may well be encountered in the various target municipalities.	
	Probability: probable event	P3
	Severity: pollution source of disease	G4
	Risk level	1

Prevention and protection measures	
<ul style="list-style-type: none"> • Ensure appropriate waste management; • Inform and sensitize company staff on waste management; • Set up 5 garbage bins in the base of the construction site and periodically transfer this garbage to public landfills. • Reinforce in number and rehabilitate public landfills. • Support target municipalities in waste management. 	

➤ **Risk of soil pollution by liquid waste**

Soils can be contaminated by the direct discharge of liquid waste such as used motor oil, oil from accidental spills, fuels and any other chemical product used on construction sites. Such an incident can occur during the transport, storage or handling (transport from one container to another, lubrication or refueling) of these chemicals. It can be caused by road accidents, leaks from storage containers (due to corrosion or other), the negligence of service providers, etc.

Soil pollution impacts soil functionality, wildlife habitat quality, primary production and biodiversity. Some chemical compounds are degradable in the soil, but this depends on the physico-chemical and biological properties of the soil, as well as the type of pollutants considered. In general, the biodegradation of chemical pollutants is relatively long (several years for diesel in sandy soil, for example). Laitance water loaded with cement can pollute the soil when washing equipment

Table 66. Summary of Oil Pollution Risk Assessment

Soil pollution (oil spills, waste oil, waste water, milt water)					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	Spill of: <ul style="list-style-type: none"> - New oils; - Concrete laitances; - Fuels; - Construction waste. 	3	3	33	Soil pollution, unsanitary
Prevention and management measures	<ul style="list-style-type: none"> - Develop a Hazardous Products Management Plan; - Ensure the tightness of storage or handling areas for hydrocarbons and chemical substances; - Collect used oils and waste for recycling or proper disposal (sorting, storage and disposal); - Set up watertight and drainable septic tanks in the base camp; - Water soiled with cement must be filtered and then decanted into a tank before being discharged; - Educate staff on the risks of chemical spills and response procedures. 				
<i>After prevention</i>	Spill	1	3	13	soil pollution

➤ **Risk related to GBV/SEA/SH**

The presence of male and female workers for site work and THIMO, following their mixing and influx of non-native labor may exacerbate the practice of transactional sex/moneyed sexual intercourse as well as SEA/HS), rape, early marriages in the project area.

Table 67: Summary of GBV/SEA/SH development risk assessment

Risk related to the development of gender-based violence (GBV/SEA/SH)					
Activities concerned: installation of construction site and living quarters, selection, opening and use of borrow pits and quarries, manufacture of fired bricks and preparation of the ground, etc.					
	Initial risks	Probability	Gravity	Risk level	Shame
Before prevention	<i>Abuse and exploitation, sexual, harassment and other gender-based violence</i>	1	4	14	Frustration; transmission of STIs and HIV-AIDS; Psychological violence, physical violence, unintended pregnancies.
Preventative measures	<ul style="list-style-type: none"> - Ensure compliance with internal regulations and have staff sign the code of good conduct related to GBV/EAS/ SH as provided for in the PMPP and the GBV Plan; - Engage staff in GBV trainings organized by the NGO responsible for implementing the GBV/SEA/SH plan; - Provide separate toilets and changing rooms for men and women; - Place fountains on the project site to supply drinking water to the local population in order to reduce women's chores and the risk of rape. 				
After prevention	<i>Gender Based Violence (GBV)</i>	1	4	14	Trauma, depression, HIV/AIDS and STI contamination, loss of human rights, social exclusion

➤ **Risk related to Corona Virus (COVID-19) contamination**

During the preparatory phase of construction of the data center, the recruitment of labor on site will promote the transmission of COVID-19, if there are infected among the recruits. The project should take into account barrier measures during recruitment and works. The contractor should consider the World Bank's protocol in relation to COVID-19 for consideration in civil works construction projects and IFC's Health, Safety and Security Guidelines.

Table 68: Summary of COVID-19 risk assessment

Risk related to COVID-19 contamination					
Activities concerned: Recruitment of labor					
	Initial risks	Probability	Gravity	Risk level	Shame
Before prevention	<i>COVID-19 infection</i>	2	2	22	Influenza and other effects related to COVID 19
Preventative measures	<ul style="list-style-type: none"> - Raise awareness among workers and local populations on the fight against COVID-19; - Mandatory wearing of masks for all persons accessing the site; - Apply anti-COVID 19 barrier measures on site; - Caring for workers sick with COVID-19 - Educate workers about voluntary vaccination. 				
After prevention	COVID-19 infection	1	2	12	Containment of the infected person

➤ **Risks of social conflicts related to the recruitment of local labor**

The non-recruitment of local or resident labor during the works could give rise to frustrations or conflicts given the high unemployment rate prevailing in the project area.

However, local recruitment would allow a clearer appropriation of the infrastructures at the same time as it will constitute an expression of pride as to the participation of local expertise in the works. The frustration arising from the sidelining of the "premises" can lead to acts of vandalism during and after the works. On the other hand, their recruitment can constitute a reason for security, guarantee and protection of infrastructures. The non-recruitment of women can also cause frustration for this category of the population.

Table 69. Summary of the assessment of the risk of conflicts linked to the non-recruitment of local populations

Risk of social conflicts linked to the non-recruitment of local populations					
	Initial risks	Probability	Gravity	Risk level	Damage
<i>Before prevention</i>	- Non-recruitment of local labor	2	3	23	Frustration acts of vandalism and insecurity
Preventative measures	<ul style="list-style-type: none"> - Recruit local labor for unskilled jobs (THIMO etc.); - Take gender into account when recruiting staff by promoting the hiring of women; - Educate workers on conflict prevention; - No to discrimination against women ($\pm 30\%$ of women will be hired on the site); - Prohibit the employment of minors under the age of 18 on the site; - Establish a transparent recruitment system; 				
<i>After prevention</i>	Non-recruitment of local labor	1	3	13	Frustration acts of vandalism and insecurity

➤ **Risk of work and discrimination/violence against children**

There is a risk of social conflict between young local communities and the company in charge of building the data center due to the non-recruitment of child labor of working age. The non-recruitment of children of working age could constitute a form of discrimination during the recruitment of labor and could give rise to frustrations or conflicts.

Table 70. Summary of Child Labor and Discrimination/Violence Risk Assessment

Risk assessment of the risk of work and discrimination/violence against children					
	Initial risks	Probability	Gravity	Risk level	Damage
<i>Before prevention</i>	- Non-recruitment of children of working age	2	3	23	Frustration acts of vandalism and insecurity
Preventative measures	<ul style="list-style-type: none"> - Put in place mechanisms to prevent the recruitment of children under 18; - Develop leaflets, posters prohibiting children in the construction site which will be used and popularized during awareness raising; - Solicit the complete identities of candidates during recruitment; - Enforce laws by prohibiting violence against children (norms and values legitimize sexual abuse of girls or aggressive behavior against young boys); - Have the code of good conduct against all kinds of violence against children signed; - Popularize the labor code and the Code of good conduct for entrepreneurs; - Sensitize the community on the law on the protection of children in its related articles; - Set up a monitoring alert mechanism on the recruitment of minors; - Sensitize the local community on child labor and sexual exploitation; - Respect the principle of non-discrimination during recruitment, particularly for children of working age; - Prevent the use of all forms of forced labor and child labor; 				

Risk assessment of the risk of work and discrimination/violence against children					
	Initial risks	Probability	Gravity	Risk level	Damage
	<ul style="list-style-type: none"> - Include child labor clauses in collective bargaining agreements; - Prohibit the employment of minors under the age of 18 on the site; - Establish a transparent recruitment system; 				
<i>After prevention</i>	Non-recruitment of children of working age	1	3	13	Frustration acts of vandalism and insecurity

➤ **Risk of work and discrimination and consideration against people with disabilities**

During recruitment, people with disabilities are often discriminated against on the basis of their disability. Entrepreneurs see them as less productive and distrust them by creating unfavorable conditions for their recruitment.

Table 71. Summary of the assessment on the risk of work and discrimination and consideration against people with disabilities

Risk of work and discrimination and consideration against people with disabilities					
	Initial risks	Probability	Gravity	Risk level	Damage
<i>Before prevention</i>	- Discrimination against people with disabilities at work	2	3	23	Frustration
Preventative measures	<ul style="list-style-type: none"> - Prohibit discrimination based on disability during recruitment; - Promote equality of opportunity and treatment between disabled workers and workers in general; - Ensure that reasonable accommodations are made in the workplace for people with disabilities (access ramp, special toilet, favorable furniture for people with disabilities, etc.); - Promote the technical and vocational rehabilitation program for people with disabilities; - Ensure that people with disabilities have access to vocational training and guidance services as well as employment-related services at the highest possible level of qualifications; - Provide protection against discrimination at all stages of employment, including selection and recruitment; - Ensure that the general regime of activities is accessible and favorable to people with disabilities; - Ensure that support measures such as sheltered or supported employment schemes are in place; - Ensure that workers with disabilities enjoy the same rights as others; - Include disability work clauses in collective bargaining agreements; - Respect the principle of non-discrimination during recruitment, in particular for vulnerable people (candidates with disabilities) so that they benefit from equal opportunities - Recruit the disabled candidate for a particular position, while modifying, if necessary, the place, the position and the working conditions, in order to better perform his task; - Adapt tools and equipment to allow the disabled worker to perform his task in the best way Promote equal opportunities for people with disabilities in order to enable them to enjoy their right to dignity, equal treatment, a life independence and participation in society; - Set up a transparent recruitment system. 				

Risk of work and discrimination and consideration against people with disabilities					
	Initial risks	Probability	Gravity	Risk level	Damage
After prevention	Discrimination against people with disabilities at work	1	3	13	Frustration

7.2.2. Risks in the operational phase

➤ human environment

7.2.2.1. Fire and Electrocutation Hazards

This is a serious risk of burns or injury to persons due to fire or electrocution. They can lead to material and bodily damage (for personnel during network upkeep and maintenance activities) or even for the beneficiary populations.

Table 72: Fire and Electrocutation Hazards

Hazards and/or dangerous situations <ul style="list-style-type: none"> • Ignorance of the risks associated with electricity; • Direct or indirect contact of the maintenance person with the cables and/or the pylons; • Explosion of a cabin; • Illegal connections; • Use of non-compliant equipment 	Qualitative risk assessment:	
	These dangerous situations may well be encountered in the work area and among new subscribers;	
	Indeed, lack of knowledge of the risks associated with electricity can lead to electrocution of uninformed users and non-compliance with safety instructions can cause this phenomenon among workers during line maintenance .	
	Probability: probable event	P3
Severity: illness or fatal accident	G4	
Risk level	1	
Prevention and protection measures		
<ul style="list-style-type: none"> • Raise public awareness of the risks of electrocution linked to misuse or poor domestic connections; • Develop and distribute awareness manuals on good practices in the use of electric current; • Require the wearing of suitable PPE during servicing and maintenance of the electrical network; • Train staff and train them in fire extinguishing. • Isolate all live parts; • Keep overhead lines away; • Use of local equipotential bonds (not earthed); • Electrical separation (isolation transformer); • Connect all masses to an earthed protective conductor. 		

➤ **Risk of falling due to work at height**

Work at height during building maintenance may lead to accidents that are sometimes fatal.

Table 73. Summary of the fall risk assessment for working at height

Fall hazards associated with working at height during building maintenance					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	<ul style="list-style-type: none"> - Fall on the same level (strike by maintenance personnel); - Falling or slipping in the working environment at height following poor anchoring of ladders, platforms and harnesses 	2	3	23	Injuries, fractures, Death
Prevention and management measures	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Provide maintenance personnel with adequate PPE (helmets, boots, clothing, harnesses, etc.); - Prohibit the consumption of alcohol during working hours; - Sensitize maintenance staff on safety measures at work; - Train maintenance staff on the use of portable ladders and the basket - Check and test the anchoring of nacelles, portable ladders and individual platforms, scaffolding before use; 				
<i>After prevention</i>	Fall	1	3	13	injuries

➤ **Risk of fire and explosion**

The use of electrical equipment and materials in offices presents potential risks of electrification, electrocution and fire. These risks can be of electrical origin (poor insulation, abnormal heating of electrical conductors under voltage, aging of electrical installations) or greasy fires (fires from liquids or liquefiable solids: hydrocarbon, solvent, paraffin, etc.).

Table 74. Summary of fire and explosion risk assessment

Fire and Explosion Hazards					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	<ul style="list-style-type: none"> - Presence in the center of fuels: hydrocarbon, paint, rustproofing , etc. - Mixture of incompatible products or undifferentiated storage - Use of pressure vessels; - Presence of source of flames or sparks: welding, incandescent particles, electrical sparks, etc. - Poor electrical insulation 	3	4	34	Injuries, burns, asphyxia, death, material damage
Prevention and management measures	<ul style="list-style-type: none"> - Organize regulatory inspection missions of pressure devices - Organize storage (provide separate storage places for hydrocarbons), at regulatory distances from the office, dormitories, restaurant, etc.); - Install fire-fighting equipment (extinguisher, sandbox, etc.) in high-risk areas such as the materials warehouse, technical workshops, garages, offices, etc. - Establish response and evacuation plans - Equip vehicles with functional fire extinguishers - Train staff and train them in fire extinguishing - Prohibition of smoking in well-specified places (near storage areas for example) - Strengthen surveillance measures 				
<i>After prevention</i>	<ul style="list-style-type: none"> - Presence in the center of fuels: hydrocarbon, paint, rustproofing , etc. 	1	4	14	Injuries, burns, death

➤ **Risk of insalubrity linked to lack of hygiene**

During the center's operating phase, non-compliance with hygiene measures risks creating unsanitary conditions in the center and the appearance of infections and diseases.

Table 75. Summary of the risk assessment related to insalubrity and lack of hygiene

Risk of insalubrity linked to lack of hygiene					
Activities concerned: operation of the vocational training center					
	Initial risks	Probability	Gravity	Risk level	Shame
<i>Before prevention</i>	Accumulated waste not evacuated Latrines and showers not maintained	2	2	22	Diseases of dirty hands and proliferation of disease vectors (flies, rats, etc.)
Preventative measures	<ul style="list-style-type: none"> - Develop an upkeep and maintenance plan; - Regularly maintain (daily cleaning and disinfection) office areas, latrines, cesspits, sinks, and showers etc. by permanent staff assigned to this subject. - Have internal regulations related to public hygiene rules which will be visibly displayed in all buildings and facilities of the training center; - Perform periodic disinfection and deratization of premises (offices, etc.) 				
<i>After prevention</i>	Accumulated waste not evacuated Latrines and showers not maintained	1	2	12	Diseases of dirty hands and proliferation of disease vectors (flies, rats, etc.)

➤ **Risks of social conflicts linked to the non-recruitment of local labor**

The non-recruitment of local or resident labor during construction work could lead to frustrations or conflicts.

However, local recruitment would allow a clearer appropriation of the infrastructures at the same time as it will constitute an expression of pride as to the participation of local expertise in the works. The frustration arising from the sidelining of the "premises" can lead to acts of vandalism during and after the works. On the other hand, their recruitment can constitute a reason for security, guarantee and protection of infrastructures. The non-recruitment of women can also cause frustration for this category of the population.

Table 76. Summary of the assessment of the risk of conflicts linked to the non-recruitment of local populations

Risk of social conflicts linked to the non-recruitment of local populations					
	Initial risks	Probability	Gravity	Risk level	Damage
<i>Before prevention</i>	- Non-recruitment of local labor	2	3	23	Frustration acts of vandalism and insecurity
Preventative measures	<ul style="list-style-type: none"> - Recruit local labor for unskilled jobs (THIMO etc.); - Take gender into account when recruiting staff by promoting the hiring of women; - Educate workers on conflict prevention; - No to discrimination against women (±30% of women will be hired on the site); - Prohibit the employment of minors under the age of 18 on the site; - Establish a transparent recruitment system; 				
<i>After prevention</i>	Non-recruitment of local labor	1	3	13	Frustration acts of vandalism and insecurity

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

The ESMP is a practical application tool, both at the level of the environmental assessment process and at the level of project management in general.

The ESMP must identify and propose the means, procedures and techniques, and also delineate the responsibilities and estimate the costs for the implementation of environmental and social management. It constitutes the environmental and social specifications of the project

8.1. Goals

The environmental and social management plan has the following objectives:

- identify and summarize all anticipated negative environmental and social impacts related to forced relocation including GBV/SEA/SH and COVID-19;
- describe each mitigation measure, including the type of impact it relates to
- assess any environmental and social impact that these measures could generate;
- consider and comply with other mitigation plans required for the project (e.g. for forced resettlement or cultural heritage including GBV/SEA/SH/COVID-19 risks);
- Assess the cost of implementing environmental and social impact mitigation measures.

8.2. Content of the ESMP

This ESMP has in its content the following points:

- The main impact mitigation, compensation and enhancement measures;
- Environmental management (in the preparation, construction and operation phases);
- The environmental surveillance and monitoring program;
- Responsibilities for implementing monitoring and key performance indicators;
- The capacity building plan;
- The schedule for the implementation of the various components of the ESMP;
- The estimate of the costs of taking charge of the measures envisaged in the ESMP, subsequently included in a table.

8.3. Responsibilities and implementation of the ESMP

As part of the implementation of the ESMP, the following arrangements are proposed:

(i) Ministry of Infrastructure and Public Works (MITP)

The implementation of the project is coordinated by the MITP through the Operational Steering Committee (CPO) . The Operational Steering Committee (CPO) whose purpose is to ensure effective monitoring of the implementation of Project activities.

(ii) The Ministry of Urban Planning and Housing (MUH)

The Minister of MUH chairs the Strategic Orientation Committee (COS) of the project together with the MITP. The COS is responsible for coordinating, monitoring and guiding the activities of the Project. It reviews and approves the annual budgeted work programs, ensuring their consistency with the Project's objectives.

(iii) Ministry of Environment and Sustainable Development (MEDD)

The MEDD intervenes essentially through the intermediary of the ACE, particularly with regard to the validation of the ESIA and the environmental and social monitoring of the implementation of the ESMP.

(iv) ACE and CPE of the city Province of Kinshasa

Their role is to validate the ESIA by the ACE on behalf of the MEDD. ACE monitors the implementation of the project's environmental and social measures. At the provincial and local level, this monitoring-control will be provided by the CPE of Kinshasa.

(v) Company

The company is responsible for the physical execution of the works on the ground, including the execution of the ESMP. It ensures the effective implementation of certain mitigation measures included in the ESMP and possibly additional mitigation measures identified as part of environmental monitoring and surveillance activities. It draws up and implements the site's environmental and social management plan.

(vi) Mission Control (MoC)

The Control Mission (MdC) ensures the supervision and control of all the work carried out by the Works Company, including aspects related to safeguards.

(vii) Municipality of Limete

The municipality of Limete where the project site is located will act through the Mayor in the monitoring, sensitization of the population and social mobilization. The technical services of the municipality as well as the head of the district will ensure the close monitoring of the implementation of the recommendations of the ESMP. They will participate in social mobilization, adoption and dissemination of the information contained in the ESMP and will monitor the infrastructure built.

(viii) NGOs and other civil society organizations

Civil society (including women's organizations) will play a key role in:

- participating in the preparatory phase of the project;
- participating fully in the public consultations and feedback seminar;
- reviewing the ESMP document and providing feedback to the project;
- monitoring the results and the problems that arise and giving feedback and suggestions to all stakeholders.

These organizations will also be able to support the project in informing and raising awareness of the actors involved and the local population on the environmental and social aspects related to the works and the commissioning of the project.

8.4. Measures to enhance positive impacts and mitigate negative impacts

8.4.1. Regulatory measures (authorization and permits)

This involves ensuring that the project complies with the applicable regulations; this will require companies to comply with the following regulatory and contractual provisions in order to obtain the necessary permits and authorizations for certain works, see table 77 below.

Table 77: Regulatory compliance measures

Type of Authorization/ Validation/ Permit/ Agreement	Prerequisite/Composition of file/Document	File submission location
Clearing authorization	Modalities to do with the Environment Department of the Municipality of Limete	Municipality of Limete
ICPE (diesel tank & generator) Diesel storage:	Modalities to do with the ACE	CAOT Management
Municipal agreement for the disposal and management of non-hazardous waste	Modalities to do with the Sanitation Service of the Municipality of Limete	Municipality of Limete
Approval of the location of borrow quarries and the programs for the operation and rehabilitation of these borrow quarries for each prospective site	Modalities to do with the Control Mission	Control mission
Building permit	Modalities to do with the Town Planning and Housing Department of the Municipality of Limete	Municipality of Limete

8.4.2. Positive impact enhancement measures

a) Improvement measures / Preparatory phase and works

The main improvement measures during the preparatory and works phase are summarized in table 78 below.

Table 78. Summary of the main improvement measures during the preparatory and works phase

Receiving environment	impacts	Bonus measures
Social	Recruitment of local labor in THIMO (manufacture of fired bricks) and 50 for structural work	<ul style="list-style-type: none"> - Prioritize the local recruitment of the population for certain jobs (with equivalent skills) and favor the THIMO method (Works of high intensity of local labor); - Hire women, heads of households and other vulnerable social strata to fight against endemic poverty - Promote the active and dynamic participation of the local population
	Development of small businesses all around the sites with the presence of restaurants and shops for the daily food of workers on the sites	<ul style="list-style-type: none"> - Raise awareness among local populations (owners of small businesses) on savings, entrepreneurship and entrepreneurship - Arrange spaces for the sale of meals and drinks (women and girls);
	Business opportunities for private economic operators	<ul style="list-style-type: none"> - Subcontract certain activities with local companies in order to strengthen their technical expertise and improve their financial capacities - Prioritize economic operators and local firms (women and girls); Prioritize local construction companies and local NGOs for THIMO works - Raise awareness among stakeholders (traders and workers) about entrepreneurship - Sensitize the actors (tradesmen and workers) on the rules of hygiene.
	Payment of import taxes and/or value added tax	<ul style="list-style-type: none"> - Avoid corruption and revenue leakage; - Payment of tax and all related taxes.

b) Improvement measures / Operation phase

The main improvement measures during the operation phase of the Limete center are summarized in table 79 below.

Table 79. Summary of the main improvement measures during the operation phase of the Limete center

Receiving environment	impacts	Bonus measures
	Increase in the reception capacity of the center and improvement in the quality of work	<ul style="list-style-type: none"> - Ensure and innovate work programs in new technologies (Communication, etc.)
	Job opportunities	<ul style="list-style-type: none"> - Recruit labor locally for unskilled jobs; - Give priority to local populations, including the participation of women and girls in the event of equal skills
	Improving stormwater management within and around the Center	<ul style="list-style-type: none"> - Collect rainwater from the center in cesspools.

8.4.3. Mitigation measures for negative impacts

a) Preparatory and construction phase

The main overall environmental and social mitigation measures recommended for the project are listed in Table 80 below.

Table 80. Negative Impact Mitigation Measures/Preparatory and Construction Phase

Environments and environmental component	impacts	Mitigation measures to be taken
Air	Alteration of air quality	<ul style="list-style-type: none"> - Develop a dust and other air emissions control plan - Regularly water the access road to the site and the circulation routes inside the site - Cover trucks transporting construction materials; - Cover stored powdery materials; - Ensure the periodic maintenance of rolling stock and fixed installations that are sources of polluting emissions; - Ensure the maintenance of machinery and the vehicle fleet; - Strictly apply the speed limit provision in built-up areas; - Provide workers with personal protective equipment (PPE); - Use vehicles and machinery in good condition; - Check the air quality by periodic measurements; - Prohibit any incineration of waste in the open air
	Noise	<ul style="list-style-type: none"> - Develop a noise control plan; - Avoid noisy work during the training center's working hours. - Avoid noisy work during rest hours for local residents; - Place anti-noise devices in machines to reduce noise pollution
	Soil pollution by solid construction waste	<ul style="list-style-type: none"> - Develop a waste management plan; - Comply with good waste storage practices; - Arrange bins on the site by category of waste (plastics, glass, metals, etc.) - Sign a contract with an approved structure for the removal of waste;
	Risk of soil pollution by liquid waste	<ul style="list-style-type: none"> - Develop the Hazardous Products Management Plan - Ensure the tightness of storage or handling areas for hydrocarbons and chemical substances; - Collect used oils and waste for recycling or proper disposal (sorting, storage and disposal); - Set up watertight and drainable septic tanks in the base camp; - Water soiled with cement must be filtered and then decanted into a tank before being discharged;

Environments and environmental component	impacts	Mitigation measures to be taken
Floor		<ul style="list-style-type: none"> - Educate staff on the risks of chemical spills and response procedures.
Floor	Modification of soil structure and texture	<ul style="list-style-type: none"> - Develop an Erosion and Sediment Control Plan; - Delimit the exploitation of the soil in the lodgings of borrowing materials (sand and lateritic soil); - Avoid earthworks and digging during the rainy season; - At the end of the work, level the reworked soils and promote the establishment of a stabilizing herbaceous layer; - Encourage local erosion control initiatives;
Flora	Loss of flora (Biodiversity)	<ul style="list-style-type: none"> - limit clearing to the strict minimum necessary; - Revegetate the surroundings of the site by planting - leveling and revegetating the borrow areas after exploitation
Wildlife	Destruction of wildlife and their habitat	<ul style="list-style-type: none"> - Use the only existing access route; - Limit work to the Project site only;
Countryside	Changing the landscape	<ul style="list-style-type: none"> - Develop a Landscape and Revegetation Plan; - Reduce brush clearing activities only in the work area; - Consolidate construction machinery and vehicles as well as the deposit of materials only on the work site; - Regularly collect and evacuate the waste generated by the construction site; - Limit the brick making area only to the Limete site. <p>Level and reforest the borrow areas and Carrère after exploitation by the company.</p>
Living environment	Degradation of the Center's internal access road	<ul style="list-style-type: none"> - Develop the access road (12th street road) linking Boulevard Lumumba and the work site in the event of deterioration following the passage of trucks and construction machinery
Health and security	Traffic disruption and accidents	<ul style="list-style-type: none"> - Develop a site traffic and site access management plan; - Raise awareness and train all drivers of vehicles and machinery on road safety; - Provide a traffic plan within the work site; - Install signage around and inside the site - Limit speed to 45 km/h along Lumumba Boulevard and 30 km/h on the access road to the site (dirt road); - Prohibit drivers from consuming alcoholic beverages or narcotics during working hours.

Environments and environmental component	impacts	Mitigation measures to be taken
Health and security	General construction accidents	<ul style="list-style-type: none"> - Develop a Hygiene, Health and Safety Plan at the Site; - Develop a Site Traffic and Site Access Management Plan; - Provide site workers with adequate PPE (helmets, safety clothing and boots, gloves, safety harnesses, etc.) and ensure that they are actually worn; - Apply sanctions in case of non-compliance; - Raise awareness and train site workers on health, safety and environmental measures at work; - Provide the site with a medical first aid kit; - Recruit an HSE manager on site; - Take out accident risk insurance with an approved body; - Sign an agreement with a hospital center closest to the site for appropriate care of the injured. The center will have an ambulance for the evacuation of the injured.
	Risks of falling related to work at height and excavation	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Provide workers with adequate PPE (helmets, boots, clothing, harnesses, etc.) on site; - Recruit a Hygiene, Health and Safety manager on site - Prohibit the consumption of alcohol during working hours; - Raise the awareness of site workers on health and environmental hygiene measures at work; - Schedule "health and safety quarter-hours" periodically for site personnel; - Train site teams on the use of portable ladders and the basket - Check and test the anchorage of baskets, portable ladders and individual platforms, scaffolding before use - Provide the site teams with the operating procedures for work on the nacelle and portable ladders - Use collective protection adapted to work at height - Organize technical inspections of the nacelles and their accessories; - Sign an agreement with a hospital center close to the work site that has an ambulance to transport the injured; - Take out accident risk insurance with an approved organization -

Environments and environmental component	impacts	Mitigation measures to be taken
Health and security	Risks related to collapses and falling objects	<ul style="list-style-type: none"> - Organize storage (reserved spaces, storage methods adapted to objects, width of aisles compatible with the handling means used); - Limit the loads to be transported or stored at height; - Mark out risk areas; - Check the stability of formwork elements, props, etc. ; - Properly secure the loads being handled; - Raise awareness and train site personnel on safety measures and individual protection; - Wear personal protective equipment (safety shoes, helmets, etc.) - Sign an agreement with a hospital center close to the work site that has an ambulance to transport the injured; - Take out accident risk insurance with an approved organization
	Risks of transmission of STIs/HIV AIDS	<ul style="list-style-type: none"> - Raise awareness among site workers and local residents on measures to combat STIs/HIV AIDS, - Make condoms available to site personnel. - Organize voluntary HIV/AIDS screening sessions;
	Fire and Explosion Hazards	<ul style="list-style-type: none"> - Develop a Complex Fire Safety Plan; - Organize regulatory inspection missions of pressure devices - Organize storage (provide separate storage places for diesel), at regulatory distances from the office, and base camp - Install fire-fighting equipment (extinguisher, sandbox, etc.) in high-risk areas such as the materials warehouse, technical workshops, garages, etc. - Establish response and evacuation plans - Equip vehicles and machinery with functional fire extinguishers - Train staff and train them in fire extinguishing - Prohibition of smoking in well-specified places (near storage areas for example) - Strengthen surveillance measures - Set up the worksite base far from the workshops
	Risks of collision of machinery or vehicles and collision of workers in the work area	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Ensure the installation of audible reversing alarms on construction machinery (horn, light signal, audible reversing alarm, etc.); - Provide site personnel with high-visibility reflective vests to allow visibility to drivers of machinery and vehicles in service; - Limit speeds to 30 km/h inside the site and on the access road to the site entrance; - Sensitize and train drivers and all staff on compliance with the Highway Code in the DRC;

Environments and environmental component	impacts	Mitigation measures to be taken
		<ul style="list-style-type: none"> - Mark out the site and install road signs and speed reduction signs; - Mandatory wearing of PPE for drivers of vehicles and machinery on construction sites; - Train a beacon operator inside the construction site, - Prohibit the consumption of alcohol during working hours; - Carry out regular maintenance of vehicles and service equipment;
Health and security	Risk related to exposure to noise	<ul style="list-style-type: none"> - Develop a Noise Control Plan - Inform workers of the risks; - Install sound level meters on site - Ensure the use of PPE (cap, noise-canceling headphones, etc.); - Organize special medical surveillance for exposed workers; - Ensure compliance with SFI noise exposure standards
	Risk of poisoning and allergy to chemicals	<ul style="list-style-type: none"> - Develop a Hazardous Products Management Plan; - Compulsory wearing of PPE (mask, glove, clothing, muffler, boots, etc.) - Sanction those who fail to comply with the instructions given; - Organize medical care in the event of allergy or poisoning related to exposure to said products; - Raise awareness and train workers on the risks associated with the chemicals used
	Risk related to GBV/SEA/SH	<ul style="list-style-type: none"> - Ensure compliance with internal regulations and have staff sign the code of good conduct related to GBV/EAS/SH - Engage staff in training on GBV/SEA/SH - Provide separate toilets and changing rooms for men and women; - Place fountains on the project site to supply drinking water to the local population in order to reduce women's chores and the risk of rape. - Operationalization of a complaint management mechanism sensitive to SEA/SH - Provide separate toilets and changing rooms for men and women, lockable inside;
Health and security	Risk related to Corona Virus (COVID-19) contamination	<ul style="list-style-type: none"> - Raise awareness among workers and local populations on the fight against COVID-19; - Mandatory wearing of masks for all persons accessing the site; - Apply anti-COVID 19 barrier measures on site; - Establish the procedure to follow if a worker becomes ill following WHO guidelines; - Implement a communication strategy with the community, community leaders and local authorities regarding COVID-19 issues at the project site; - Caring for workers sick with COVID-19 - Educate workers about voluntary vaccination.

Environments and environmental component	impacts	Mitigation measures to be taken
Social	Labor recruitment risks	<ul style="list-style-type: none"> - Implementation of a staff recruitment plan and a conflict prevention and management mechanism; - - Recruit local labor as a priority for unskilled jobs; - No to discrimination against women ($\pm 30\%$ of women will be hired on the site); - Prohibit the employment of minors under the age of 18 on the site; - Implement the Complaints Management Mechanism (CMM) and the GBV-sensitive one - Have workers on construction sites, including those of subcontractors and service providers, sign a Code of Good Conduct; - Develop and have signed Internal Rules; - Affiliate all workers to the CNSS, including those of subcontractors and service providers. - Have workers sign a Code of Good Conduct; - Sign the contract of the workers on the construction site, including those of the subcontractors and service providers and have them stamped at the ONEM; - Set up a transparent recruitment system (Avoid recruitment at the work site, but preferably organize it at a recruitment centre. Prepare a list of local residents wishing to work on the project and communicate to the company and its sub-contractors contractors.); - Raising awareness of workers and companies on compliance with the minimum wage in the DRC; - Educate site personnel on respect for the habits and customs of local populations
Social	Risks of social conflicts related to the recruitment of local labor	<ul style="list-style-type: none"> - Recruit local labor for unskilled jobs (THIMO etc.); - Take gender into account when recruiting staff by promoting the hiring of women for less light work; - Educate workers on conflict prevention;
Cultural Heritage	Risk of chance discovery	<ul style="list-style-type: none"> - Develop a management plan for tangible and intangible Cultural Resources; - Follow the national procedure in the event of fortuitous discovery of archaeological sites and cultural remains during the works, namely: <ul style="list-style-type: none"> - Inform customary and religious authorities and local populations about the arrangements made - Inform and educate workers on respect for local habits and customs - Stop work in the event of a fortuitous discovery - Circumscribe and protect the discovery area - Immediately notify the competent services for action to be taken

Environments and environmental component	impacts	Mitigation measures to be taken
Living environment	Withdrawal and dismantling of the construction site	<ul style="list-style-type: none"> - Develop a management plan for the operation and rehabilitation of sites (worksite borrow areas and quarries); - Restore used areas by clearing all equipment, machinery, materials, waste and debris from the site, wrecks, huts, etc. - Restore borrow pits in the event of exploitation by leveling the land followed by reforestation of the site

b) Operation phase

Table 81. Negative Impact Mitigation Measures /Operation Phase

Environments and environmental component	impacts	Mitigation measures to be taken
Air	Altered air quality (dust, vehicle exhaust)	<ul style="list-style-type: none"> - Develop a dust and other atmospheric emissions control plan ; - Regularly water the access road to the site and the circulation path inside the site; - Ensure the permanent maintenance of vehicles and place the filters on the exhaust pipes of the vehicles; - Provide workers with personal protective equipment (PPE);
	Noise	<ul style="list-style-type: none"> - Develop a Noise Control Plan; - Place anti-noise devices in machines to reduce noise pollution; - Provide PPE to workers in machine rooms etc.
Floor	Soil pollution by household and hazardous waste	<ul style="list-style-type: none"> - Develop a Hazardous Products Management Plan; - Comply with good waste storage practices; - Arrange bins on the site by category of waste (plastics, glass, metals, etc.) - Sign a contract with an approved structure for the removal and/or recycling of waste; - Find a company approved and specialized in the recycling of hazardous waste; - Maintain sanitation networks and plumbing to prevent leaks or discharge of wastewater; - Ensure the tightness of storage or handling areas for hydrocarbons and chemical substances; - Contain soil contaminated by the products in an impermeable container placed in an area sheltered from the weather before their disposal - Educate staff on waste management.
Health and security	Traffic disruption and accidents	<ul style="list-style-type: none"> - Develop a traffic and site access management plan - sensitize all drivers of vehicles and machinery on road safety; - Provide a traffic plan inside the site during operation; - Install signage on the access road and inside the site

Environments and environmental component	impacts	Mitigation measures to be taken
		<ul style="list-style-type: none"> - Prohibit drivers from consuming alcoholic beverages or narcotics during working hours; - Educate staff on the risks of chemical spills and response procedures.
Health and security	Accidents at work	<ul style="list-style-type: none"> - Develop an upkeep and maintenance plan ; - Safety boots, gloves, safety harnesses, etc.) and ensure that they are actually worn; - Raise the awareness of maintenance workers on occupational health and safety measures; - Recruit an HSE manager on site; - Take out accident risk insurance with an approved body;
Health and security	Risks of falling related to work at height	<ul style="list-style-type: none"> - Develop an upkeep and maintenance plan; - Provide maintenance personnel with adequate PPE (helmets, boots, clothing, harnesses, etc.); - Prohibit the consumption of alcohol during working hours; - Sensitize and train maintenance staff on work safety measures; - Train maintenance staff on the use of portable ladders and the basket - Check and test the anchoring of nacelles, portable ladders and individual platforms, scaffolding before use;
Health and security	Fire and Explosion Hazards	<ul style="list-style-type: none"> - Develop a Complex Fire Safety Plan ; - Organize regulatory inspection missions of pressure devices - Organize storage (provide separate storage places for hydrocarbons), at regulatory distances from the office, dormitories, restaurant, etc.); - Install fire-fighting equipment (extinguisher, sandbox, etc.) in high-risk areas such as the materials warehouse, technical workshops, garages, offices, etc. - Establish response and evacuation plans - Equip vehicles with functional fire extinguishers - Train staff and train them in fire extinguishing - Prohibition of smoking in well-specified places (near storage areas for example) - Strengthen surveillance measures
Health and security	Risks of transmission of STIs/HIV AIDS	<ul style="list-style-type: none"> - Sensitize learners and teaching staff of the center as well as local residents on measures to fight against STIs/HIV AIDS; - Provide the occupants of the center with condoms (placed in toilets, etc.). - Organize voluntary HIV/AIDS screening sessions;
Health and security	Risk related to GBV/SEA/SH	<ul style="list-style-type: none"> - Draw up the internal regulations and the code of good conduct in terms of GBV to be respected by all the occupants of the center (learners and teaching staff); - Raise awareness among all occupants of the training center and local residents on GBV/EAS/HS; - Provide separate toilets, showers and changing rooms for men and women that can be locked inside;

Environments and environmental component	impacts	Mitigation measures to be taken
		<ul style="list-style-type: none"> - Separate dormitories for men and women;
Health and security	Risk related to Corona Virus (COVID-19) contamination	<ul style="list-style-type: none"> - Educate the occupants of the center on the fight against COVID-19; - Mandatory wearing of masks for all people accessing the center; - Apply anti-COVID 19 barrier measures at the center; - Caring for workers sick with COVID-19 - Educate workers about voluntary vaccination.
Health and hygiene	Risk of insalubrity linked to lack of hygiene	<ul style="list-style-type: none"> - Develop an upkeep and maintenance plan; - Regularly maintain (daily cleaning and disinfestation) office areas, latrines, cesspits, sinks, and showers etc. by permanent staff assigned to this subject. - Have internal regulations related to public hygiene rules which will be visibly displayed in all buildings and facilities of the training center; - Perform periodic disinfestation and deratization of premises (offices, etc.)

8.5. Environmental management of the construction site

The management of the negative impacts of the construction site listed above is summarized in table 82 and will contribute to significantly reducing the potential impacts.

Table 82. Environmental management of the site of the preparatory and construction phase of the project

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
Recruitment of site personnel	Social	Social conflicts between local populations and site personnel (Influx of workers)	<ul style="list-style-type: none"> - Recruit local labor for unskilled jobs (THIMO etc.); - Take gender into account when recruiting staff by promoting the hiring of women for less light work; - Promote work with High Intensity of Labor (HIMO) by favoring the recruitment of local labor, with regard to the needs for unskilled labor; - Educate workers on conflict prevention 	Mean	Company	MdC	ACE	1000
		Risk of work and discrimination and consideration against people with disabilities	<ul style="list-style-type: none"> - Prohibit discrimination based on disability during recruitment; - Promote equality of opportunity and treatment between disabled workers and workers in general; - Remove physical, architectural or communication barriers; - Ensure that reasonable accommodations are made in the workplace for people with disabilities (access ramp, special toilet, favorable furniture for people with disabilities, etc.); - Promote the technical and vocational rehabilitation program for people with disabilities; - Focus on capacity assessment; - Ensure that people with disabilities have access to vocational training and guidance services as well as employment-related services at the highest possible level of qualifications; 	Mean	Company	MdC	ACE	1000

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
			<ul style="list-style-type: none"> - Provide protection against discrimination at all stages of employment, including selection and recruitment; - Ensure that the general regime of activities is accessible and favorable to people with disabilities; - Ensure that support measures such as sheltered or supported employment schemes are in place; - Ensure workers with disabilities enjoy the same rights as others 					
		Risk of work and discrimination/violence against children; Risk of exploitation of children on the construction site	<ul style="list-style-type: none"> - Put in place mechanisms to prevent the recruitment of children; - Develop leaflets, posters prohibiting children in the construction site which will be used and popularized during awareness raising; - Solicit the complete identities of candidates during recruitment; - Enforce laws by prohibiting violence against children (norms and values legitimize sexual abuse of girls or aggressive behavior against young boys; - Have the code of good conduct against all kinds of violence against children signed; - Sensitize the local community on child labor and sexual exploitation; - Sanction all cases of violence against children. 	Mean	Company	GBV NGO MdC	ACE	1000

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
Installation of site and base camps and execution of site works (land preparation, earthworks, transport of materials, manufacture of bricks, operation of borrow pits, etc.)	Air	Alteration of air quality	<ul style="list-style-type: none"> - Regularly water the access roads to the sites and the traffic routes within the sites; - Cover trucks transporting construction materials; - Cover stored powdery materials; - Ensure the periodic maintenance of rolling stock and fixed installations that are sources of polluting emissions; - Ensure the maintenance of machinery and the vehicle fleet; - Strictly apply the speed limit provision in built-up areas; - Use gear in good condition. - Provide workers with personal protective equipment (PPE); - Use vehicles and machinery in good condition; - Prohibit any incineration of waste in the open air on site; 	Mean	Company	MdC	ACE	1500
	Air	Noise pollution	<ul style="list-style-type: none"> - Avoid noisy work during the training center's working hours. - Avoid noisy work during rest hours for local residents; - Place anti-noise devices in machines to reduce noise pollution, - Comply with noise exposure standards 	Minor	Company	MdC	ACE	1000
Site installation and building construction work	Floor	Soil pollution by waste (solid and liquid)	<ul style="list-style-type: none"> - Ensure the tightness of storage or handling areas for hydrocarbons and chemical substances; - Collect used oils and waste for recycling or proper disposal (sorting, storage and disposal), - Contain soil contaminated by the products in an impermeable container placed in an area sheltered from the weather before their disposal - Set up watertight and drainable septic tanks in the 	Minor	Company	MdC	ACE	2500

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
			<ul style="list-style-type: none"> - base camp; - Water soiled with cement must be filtered and then decanted into a tank before being discharged; - Educate staff on the risks of chemical spills and response procedures. - Collection of special waste in airtight containers - Comply with good waste storage practices; - Arrange bins on the site by category of waste (plastics, glass, metals, etc.) - Sign a contract with an approved structure for the removal of waste; 					
Clearing/weeding and quarrying and borrow pit		Modification of soil structure and texture	<ul style="list-style-type: none"> - Choose borrow pits outside sensitive areas (protected areas, etc.) - Ensure project compliance with applicable regulations - Limit clearing, uprooting of shrubs and felling of trees to what is strictly necessary - Regulating and revegetating the exploited sites will ensure the maintenance of the plantations during the period of the works and a guarantee period of at least one year for the monitoring of tree growth. - Approve the location of quarries and borrow pits and programs for the operation and rehabilitation of these borrow pits 	Minor	Company	MdC	ACE	1500
Site installation works, clearing, opening, use of borrow pits and quarries, brick making, earthworks and foundations, etc.	Flora	Loss of biodiversity (destruction of vegetation)	<ul style="list-style-type: none"> - Limit clearing to the strict minimum necessary only in the work area; - Use electric ovens for firing bricks; - Revegetate around the site by planting - Vegetate the borrow sites and quarries after exploitation by ensuring the maintenance of the plantations during the period of the works and a guarantee period of at least one year for the monitoring of the growth of trees 	Minor	Company	MdC	ACE	1800

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
Clearing, clearing, opening and use of borrow pits and quarries, manufacture of fired bricks	Wildlife	Destruction of wildlife and wildlife habitat	<ul style="list-style-type: none"> - Use the only existing access route; - Install the living quarters on the project site and protect the plant cover of the site; - Limit work to the Project site only; 	Minor	Company	MdC	ACE	1400
Installation of site and living quarters, selection, opening and use of borrow pits and quarries, manufacture of fired bricks, earthworks and foundations; clearing	Countryside	Changing the landscape	<ul style="list-style-type: none"> - Reduce site preparation activities only in the work area; - Consolidate construction machinery and vehicles only on the work site; - Regularly collect and evacuate the waste generated by the construction site; - Level and reforest borrow pits and quarries after mining 	Mean	Company	MdC	ACE	1300
Transport of materials, movement of trucks and machinery, drainage of runoff water from the site,	Living environment and circulation	Degradation of the access road to the Center	<ul style="list-style-type: none"> - Develop the access road (12th street road) linking Boulevard Lumumba and the work site in the event of deterioration following the passage of trucks and construction machinery 	Minor	Company	MdC	ACE	2500

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
Transport, installation of the base camp, production of waste	Health and security	Traffic disruption and accidents	<ul style="list-style-type: none"> - Raise awareness and train all drivers of vehicles and machinery on road safety; - Provide a traffic plan within the work site; - Install signage around and inside the site - Limit speed to 45 km/h along Boulevard Lumumba and 30 km/h on the access road to the site (12th street road); - Prohibit drivers from consuming alcoholic beverages or narcotics during working hours. 	Mean	Company	MdC	ACE	2000
Different work stations .	Health and security	General construction site accidents (injury by sharp or pointed objects (nails, scrap metal, etc.), malfunctioning of machinery or machines, etc.	<ul style="list-style-type: none"> - Provide site workers with adequate PPE (helmets, safety clothing and boots, gloves, safety harnesses, etc.) and ensure that they are actually worn; - Apply sanctions in case of non-compliance; - Raise awareness and train site workers on health, safety and environmental measures at work; - Provide the site with a medical first aid kit; - Recruit an HSE manager on site; - Take out accident risk insurance with an approved body; - Sign an agreement with a hospital center closest to the site for appropriate care of the injured. The center will have an ambulance for the evacuation of the injured 	Minor	Company	MdC	ACE	1200
Work at height (work on concrete, outriggers, elevation of bricks, coating, painting, roofing and framework, etc. can be the basis of a full-foot fall	Health and security	Risks of falling related to work at height and excavation	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Provide workers with adequate PPE (helmets, boots, clothing, harnesses, etc.) on site; - Recruit a Hygiene, Health and Safety manager on site; - Prohibit the consumption of drugs (hemp, etc.) and alcohol during working hours; - Educate site workers on health and safety measures at work; - Schedule "health and safety quarter-hours" periodically for site personnel; 	Major	Company	MdC	ACE	2000

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
			<ul style="list-style-type: none"> - Train site teams on the use of portable ladders and the basket - Check and test the anchorage of baskets, portable ladders and individual platforms, scaffolding before use - Provide the site teams with the operating procedures for work on the nacelle and portable ladders - Use collective protection adapted to work at height - Organize technical inspections of the nacelles and their accessories; - Sign an agreement with a hospital center close to the work site that has an ambulance to transport the injured; - Take out accident risk insurance with an approved organization 					
Assembly work of individual or collective platforms (scaffolding), work floors, brick elevation work, etc.	Health and security	Risks related to collapses and falling objects	<ul style="list-style-type: none"> - Organize storage (reserved spaces, storage methods adapted to objects, width of aisles compatible with the handling means used); - Limit the loads to be transported or stored at height; - Mark out risk areas; - Check the stability of formwork elements, props, etc. ; - Properly secure the loads being handled; - Raise awareness and train site personnel on safety measures and individual protection; - Wear personal protective equipment (safety shoes, helmets, etc.) - Sign an agreement with a hospital center close to the work site that has an ambulance to transport the injured; - Take out accident risk insurance with an approved organization 	Mean	Company	MdC	ACE	1500

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
Mobilization (use) of labor	Health	Risk of transmission of STIs/HIV/AIDS	<ul style="list-style-type: none"> - Sensitize site workers and local residents on measures to fight against STIs/HIV AIDS, unwanted pregnancies; - Make condoms available to site personnel; - Organize voluntary HIV/AIDS screening sessions. 	Major	Company	MdC	ACE	1500
Use of pressure devices, welding work or any work with the presence of a source of flames or sparks: Electrical work, etc.	Health and security	Fire and Explosion Hazards	<ul style="list-style-type: none"> - Organize regulatory inspection missions of pressure devices - Organize storage (provide separate storage places for diesel), at regulatory distances from the office, and base camp - Install fire-fighting equipment (extinguisher, sandbox, etc.) in high-risk areas such as the materials warehouse, technical workshops, garages, etc. - Establish response and evacuation plans - Equip vehicles and machinery with functional fire extinguishers - Train staff and train them in fire extinguishing - Prohibition of smoking in well-specified places (near storage areas for example) - Strengthen surveillance measures - Set up the worksite base far from the workshops 	Major	Company	MdC	ACE	2000
Use of machinery and vehicles on site	Health and security	Risk of collision of vehicles or machines and collision of workers	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Ensure the installation of audible reversing alarms on construction machinery (horn, light signal, audible reversing alarm, etc.); - Provide site personnel with high-visibility reflective vests to allow visibility to drivers of machinery and vehicles in service; - Limit speeds to 30 km/h inside the site and on the access road to the site entrance; - Sensitize and train drivers and all staff on compliance with the Highway Code in the DRC; 	Major	Company	MdC	ACE	1600

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
			<ul style="list-style-type: none"> - Mark out the site and install road signs and speed reduction signs; - Mandatory wearing of PPE for drivers of vehicles and machinery on construction sites; - Train a beacon operator inside the construction site, - Prohibit the consumption of alcohol during working hours; - Carry out regular maintenance of vehicles and service equipment; 					
Carpentry, welding, thermal cutting etc.	Health and security	Risk related to exposure to noise	<ul style="list-style-type: none"> - Inform workers about noise risks; - Install sound level meters on site - Ensure the use of PPE (cap, noise-canceling headphones, etc.); - Organize special medical surveillance for exposed workers; - Ensure compliance with SFI standards for noise exposure; 	Mean	Company	MdC	ACE	1500
Floor and wall coating work, painting etc. Painting work (glue, solvent, paint stripper, solder, varnish, anti-rust etc.)	Health and security	Risks related to poisoning and allergy to chemicals	<ul style="list-style-type: none"> - Compulsory wearing of PPE (mask, glove, clothing, muffler, boots, etc.) - Sanction those who fail to comply with the instructions given; - Organize medical care in the event of allergy or poisoning related to exposure to said products; - Educate workers on the risks associated with the chemicals used 	Mean	Company	MdC	ACE	1500
Mobilization (use) of labor	Health, Hygiene and Safety	GBV/SEA/SH risks	<ul style="list-style-type: none"> - Ensure compliance with internal regulations and have staff sign the code of good conduct related to GBV/EAS/SH; - Engage staff in GBV trainings organized by the NGO responsible for implementing the GBV/SEA/SH plan; 	Minor	Company NGO responsible for implementing the GBV plan	MdC	ACE	1500

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
			<ul style="list-style-type: none"> - Identify and train community sensitizers to inform the community about GBV risks; - Provide separate toilets and changing rooms for men and women that can be locked inside; 					
Mobilization (use) of labor	Health, and hygiene	Risk of COVID-19 contamination	<ul style="list-style-type: none"> - Raise awareness among workers and local populations on the fight against COVID-19; - Mandatory wearing of masks for all persons accessing the site; - Apply anti-COVID 19 barrier measures on site; - Caring for workers sick with COVID-19 - Educate workers about voluntary vaccination. 	Mean	Company	MdC	ACE	2500
Mobilization (use) of labor	Social	Social conflicts between local populations and site personnel (Influx of workers)	<ul style="list-style-type: none"> - Implementation of a staff recruitment plan and a conflict prevention and management mechanism; - Recruit local labor as a priority for unskilled jobs; - No to discrimination against women ($\pm 30\%$ of women will be hired on the site); - Prohibit the employment of minors under the age of 18 on the site; - Implement the Complaints Management Mechanism (GMP); - Have workers on construction sites, including those of subcontractors and service providers, sign a Code of Good Conduct; - Develop and have signed Internal Rules; - Affiliate all workers to the CNSS, including those of subcontractors and service providers. - Have workers sign a Code of Good Conduct; - Sign the contract of the workers on the construction site, including those of the subcontractors and 	Mean	Company	MdC	ACE	1800

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
			<p>service providers and have them stamped at the ONEM;</p> <ul style="list-style-type: none"> - Set up a transparent recruitment system (Avoid recruitment at the work sites, but preferably organize it in a recruitment centre. Prepare a list of local residents wishing to work in the project and communicate to the company) 					
Earthworks, building foundations and operation of borrow pits and quarries	Cultural heritage	Risk of chance discovery	<ul style="list-style-type: none"> - Develop a management plan for tangible and intangible Cultural Resources; - Follow the national procedure in the event of fortuitous discovery of archaeological sites and cultural remains during the works, namely: - Apply chance find procedures; - Include in the DAO and the service provider's contract the measures to be respected in the event of a fortuitous find below: <ul style="list-style-type: none"> ▪ inform customary and religious authorities and local populations of the arrangements made ▪ inform and educate workers on respect for local habits and customs ▪ Stop work in the event of a fortuitous discovery ▪ Circumscribe and protect the discovery area ▪ Immediately notify the competent services for action to be taken 	Minor	Company	MdC	ACE	2100
Withdrawal and dismantling of the construction site	Living environment	Presence of waste, wrecks, shacks and	Develop a management plan for the operation and rehabilitation of sites (worksite borrow areas and quarries);	Mean	Company	MdC	ACE	2100

PREPARATORY AND CONSTRUCTION PHASE OF THE PROJECT								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			Cost
					Execution	Control and monitoring	Followed	
		gaping holes etc.	<ul style="list-style-type: none"> - Restore the areas used by clearing all equipment, machinery, materials, waste and debris from the site - Restore borrow pits in the event of exploitation by leveling the land followed by reforestation of the site 					
Total annual cost								41300

Table 83: Environmental management of the construction site of the Operation phase of the project

OPERATIONAL PHASE								
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible			
					Execution	Control and Monitoring	Followed	
Operation of the workshops (carpentry workshops, garage, laboratory, use of vehicles intended for the transport of personnel and workshop inputs	Air	Alteration of air quality	<ul style="list-style-type: none"> - Develop a dust and other atmospheric emissions control plan ; - Regularly water the access road to the site and the circulation path inside the site; - Work under cover in workshops with a chimney having an air filtration device; - Ensure the permanent maintenance of the vehicles and place the filters on the exhaust pipes of the centre's vehicles; - provide workers with personal protective equipment (PPE); 	Minor	Company	Municipality of Limete	ACE, CPE	

OPERATIONAL PHASE							
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible		
					Execution	Control and Monitoring	Followed
Operation of workshops, garage and machinery etc.	Air	Noise	<ul style="list-style-type: none"> - Avoid noisy work during rest hours for learners and trainers in their dormitories; - Place anti-noise devices in machines to reduce noise pollution 	Minor	Company	Municipality of Limete	ACE, CPE
Operation of buildings	Floor	Soil pollution by household and hazardous waste	<ul style="list-style-type: none"> - Comply with good waste storage practices; - have bins on site for each category of waste (plastics, glass, metals, etc.) - sign a contract with an approved structure for the removal and/or recycling of waste; - Find a company approved and specialized in the recycling of hazardous waste; - Maintain sanitation networks and plumbing to prevent leaks or discharge of wastewater; - Ensure the tightness of storage or handling areas for hydrocarbons and chemical substances; - Contain soil contaminated by the products in an impermeable container placed in an area sheltered from the weather before their disposal - Educate staff on waste management. 	Mean	Company	Municipality of Limete	ACE, CPE
Supply of the center with materials and equipment for workshops, offices, laboratories, movement of center staff vehicles, etc.	Health and security	Traffic disruption and accidents	<ul style="list-style-type: none"> - educate all drivers of vehicles and machinery on road safety; - provide a traffic plan within the site during operation; - install signage, speed bump on Boulevard Lumumba, access road (12th street road) and inside the site - prohibit drivers from consuming alcoholic beverages or narcotics during working hours; 	Mean	Company	Municipality of Limete	ACE, CPE

OPERATIONAL PHASE							
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible		
					Execution	Control and Monitoring	Followed
Maintenance work for buildings, equipment and machinery	Safety and health	Risk of work accidents	<ul style="list-style-type: none"> - provide maintenance workers with adequate PPE (helmets, safety clothing and boots, gloves, safety harnesses, etc.) and ensure that they are actually worn; - raise the awareness of maintenance workers on occupational health and safety measures; - recruit an HSE manager on site; - take out accident risk insurance with an approved body; 	Minor	Company	Company	ACE, CPE
Building maintenance work, at height	Safety and health	Risk of falls related to work at height	<ul style="list-style-type: none"> - Develop a procedure/work plan; - Provide maintenance personnel with adequate PPE (helmets, boots, clothing, harnesses, etc.); - Prohibit the consumption of alcohol during working hours; - Sensitize maintenance staff on hygiene and occupational health measures; - Train maintenance staff on the use of portable ladders and the basket - Check and test the anchoring of nacelles, portable ladders and individual platforms, scaffolding before use; 	Mean	Company	Company	ACE, CPE
Work involving the use of pressure devices, source of flames or sparks, welding, incandescent particles, sparks Use of electricity, etc.	Safety and health	Risk of fire and explosion	<ul style="list-style-type: none"> - Organize regulatory inspection missions of pressure devices - Organize storage (provide separate storage places for hydrocarbons); - Install fire-fighting equipment (extinguisher, sandbox, etc.) in high-risk areas such as the materials warehouse, technical workshops, garages, offices, etc. - Establish response and evacuation plans - Equip vehicles with functional fire extinguishers - Train staff and train them in fire extinguishing 	Major	Company	Company	ACE, CPE

OPERATIONAL PHASE							
Impact activities	Environmental component affected	Nature of potential impact	Reduction measures	Significance of impact	Institution responsible		
					Execution	Control and Monitoring	Followed
			<ul style="list-style-type: none"> - Prohibition of smoking in well-specified places (near storage areas for example) - Strengthen surveillance measures 				
Center operation	Health and Hygiene	Risk of transmission of STIs/HIV/AIDS	<ul style="list-style-type: none"> - Sensitize learners and teaching staff of the center as well as local residents on measures to fight against STIs/HIV AIDS, unwanted pregnancies; - Provide the occupants of the center with condoms (placed in toilets, etc.). - Organize voluntary HIV/AIDS screening sessions; 	Major	Company, PNMLS	Company	ACE, CPE
Operation of the center through the cohabitation of learners, teachers and local residents	Health Hygiene and safety	Risk of GBV/SEA/SH	<ul style="list-style-type: none"> - Draw up the internal regulations and the code of good conduct in terms of GBV to be respected by all the occupants of the center; - Raise awareness among all occupants of the training center and local residents on GBV/EAS/HS; - Provide separate toilets and changing rooms for men and women; 	Minor	Company	Company	ACE, CPE
Operation of the center through the cohabitation of learners, teachers and local residents	Health and Hygiene	Risk of COVID-19 contamination	<ul style="list-style-type: none"> - Educate the occupants of the center on the fight against COVID-19; - Mandatory wearing of masks for all people accessing the center; - Apply anti-COVID 19 barrier measures at the center; - Caring for patients with COVID-19 - Educate workers about voluntary vaccination. 	Mean	Company	INRB	ACE, CPE
Operation of buildings	Health and Hygiene	Risk of insalubrity and Diseases of dirty hands	<ul style="list-style-type: none"> - Regularly maintain (daily cleaning and disinfection) office areas, dormitories, latrines, cesspits, washbasins, and showers etc. by permanent staff assigned to this subject. - Have internal regulations related to public hygiene rules which will be visibly displayed in all buildings and facilities of the training center 	Mean	Company	Municipality of Limete	ACE, CPE

8.6. Environmental and social surveillance and monitoring program

The monitoring and follow-up program aims to ensure that the mitigation and enhancement measures are implemented, that they produce the anticipated results and that they are modified, interrupted or replaced if they prove to be inadequate. Additionally, it assesses compliance with national environmental and social policies and standards, as well as World Bank environmental and social standards.

8.6.1. Environmental and social monitoring activities

Environmental and social monitoring is an activity that aims to ensure that companies meet their environmental commitments and obligations throughout the project cycle. It aims to ensure that the proposed improvement and mitigation measures are effectively implemented during the execution phase. The monitoring therefore aims to reduce the inconvenience for the resident populations and the effects on the environment of the various project activities. Each project activity will be subject to environmental and social monitoring by the contracting authority, who may delegate some of its prerogatives to an approved monitoring office. Table 84 below presents monitoring through the implementation of environmental and social measures.

Table 84: Implementation of the environmental and social monitoring plan

Things to watch out for	Monitoring Methods and Devices	Means of verification	Managers
Implementation of the environmental measures prescribed in the ESMP	Control of the effectiveness of the prescribed measures (compliance; level of achievement)	Visual control during field visits, surveys and mission reports Monthly ESMP implementation reports Monthly and quarterly ESMP environmental and social monitoring reports	MdC CPE / ACE
Measures to reduce the effects induced by project activities	Monitoring will focus on checking: air quality; the noise level at workstations	Air quality measuring device (probe) Noise measuring device (Sound level meter)	MdC / CPE/ ACE
	the number of work incidents registered complaints.	Investigations and mission reports Monthly ESMP implementation reports Monthly and quarterly ESMP environmental and social monitoring reports	
Implementation of security, health and social actions	In terms of health, medical monitoring will be provided on a permanent basis to check the state of health of operating personnel and compliance with hygiene measures on the site.	Staff medical checks and visual checks during field visits, surveys and mission reports	MdC / CPE/ ACE
	Check : the availability of safety instructions in the event of an accident the existence of appropriate signage compliance with traffic regulations compliance of transport vehicles compliance with the speed limit compliance with working hours wearing adequate protective equipment	Visual control during field visits, surveys and mission reports	MdC / CPE/ ACE
	An information and awareness program for staff and populations will be developed and implemented (the outline of this program is defined in § 8.5.2 below)	Staff and community surveys and mission reports	MdC / CPE/ ACE Municipality of Limete
Implementation of actions relating to health and safety at work.	Open and keep a register of accidents and incidents at workstations	Field visits, surveys and mission reports	MdC / CPE/ ACE
Violence against vulnerable groups	People who have been sexually abused by companies		MdC / CPE/ ACE Municipality of Limete

Things to watch out for	Monitoring Methods and Devices	Means of verification	Managers
Preferential hiring of local communities	Implement a file of the inhabitants of the communities who have benefited from a job in the company	Investigations and mission reports Presence of local residents among company staff	MdC / CPE/ ACE Municipality of Limete
Dangers associated with the movement of heavy machinery	Workplace safety performance and number of accidents	Control during field visits, surveys and mission reports	MdC / CPE/ ACE Municipality of Limete
Noise, visibility and vibrations	Complaints and grievances of local populations	Control during field visits, surveys and mission reports	MdC / CPE/ ACE Municipality of Limete
	Noise level at workstations		
Dust and air emissions in the workplace	Employee Complaints and Grievances at Workstations Follow-up of Acute Respiratory Infections	Visual control during field visits, surveys and mission reports Number and nature of complaints recorded Medical register	MdC / CPE/ ACE Municipality of Limete
Measures to reduce negative impacts related to the commissioning of the road	Control based on: socio-economic accounts; air quality; registered complaints.	MdC monitoring and investigation mission report	MdC / CPE/ ACE Municipality of Limete

8.6.2. Environmental and social monitoring activities

These activities consist of measuring and evaluating the impacts of the project on certain environmental and social components of concern after the application of the mitigation measures and implementing corrective measures if necessary. Moreover, it can help to react promptly to the failure of a mitigation or compensation measure or to any new disturbance of the environment by implementing appropriate measures.

Finally, environmental monitoring helps to better deal with the impacts in subsequent similar projects and to possibly revise the standards and guiding principles relating to the protection of the environment.

The monitoring program defines as clearly as possible the indicators to be used to monitor the mitigation and enhancement measures that need to be assessed during the execution and/or operationalization of the project. It also provides technical details on monitoring activities such as methods to be used, sampling locations, frequency of measurements, detection limits as well as definition of thresholds for signaling the need for corrective action.

The ACE is in charge of environmental monitoring and may appoint natural and/or legal persons indicated according to the type of monitoring indicator. Several indicators have been identified for environmental and social monitoring as shown in Table 85 below. This table calls for considering these following key indicators in order to assess the environmental and social performance of the project. It is :

- Number of complaints recorded
- Number of workers respecting the wearing of PPE
- Areas restored or compensatory reforestation
- Safety and hygiene plan implementation report
- Number of IEC sessions and targets
- Number of accidents recorded
- Number and type of vulnerable people subjected to sexual abuse by companies
- Waste collection system put in place

Table 85. Monitoring and performance indicators in the preparatory phase and works

Tracking items	Indicators		Means of verification	Persons in charge and period	
	Followed	Performance		Surveillance	Followed
Social (Recruitment of site personnel)	<ul style="list-style-type: none"> Number of jobs created ; Number of local staff recruited ; Number of women recruited Number of complaints registered; Number and type of violence recorded 	<ul style="list-style-type: none"> 100% of unskilled labor recruited locally; 30% of women recruited: No complaints registered 	Monthly report of the control mission; Contract and Number of staff, Book of grievances complaints	Control mission (During the works)	ACE and CPE, Company, municipality of Limete
Air (air pollution)	<ul style="list-style-type: none"> Visual: Flying dust as vehicles pass Registered complaints; Number of people sensitized Number of workers wearing PPE Number of PPE in reserve in the depot Number of trucks with tarpaulins and exhausts Soil and construction site humidity of the dirt access road 	<ul style="list-style-type: none"> 100% trucks with protection; 100% of site access (dirt road) watered two to three times a day. 100% of people sensitized; 100% of workers wear PPE; 100% Protective Gear to distribute Presence of sufficient spare PPE Presence of dust on site: None Number of complaints: None 	Visual control during field visits, surveys and mission reports; Monthly site environmental monitoring report Number of air pollution complaints from residents.	Control Mission (During the works)	ACE and CPE, Company, municipality of Limete
Air (Noise Pollution)	<ul style="list-style-type: none"> Complaints recorded; Duration of exposure for workers assigned to noisy workstations; Listed hearing diseases, Checking the noise intensity using a sound level meter 	<ul style="list-style-type: none"> Number of complaints: None Hearing diseases: None; Number of decibels recorded below 60 during noisy work 	Sound level meter Investigations and mission reports; Monthly report of the control mission List of demands	Control Mission (During the works)	ACE and CPE, Company, municipality of Limete
Water	<ul style="list-style-type: none"> Provision of staff with drinking water; Wastewater management 	<ul style="list-style-type: none"> Absence of manure on construction sites and surrounding areas. <p>Clean and sanitary toilets.</p>	Visual control during field visits, surveys and mission reports.	Control mission (During the works)	ACE and CPE, Company, municipality of Limete

Tracking items	Indicators		Means of verification	Persons in charge and period	
	Followed	Performance		Surveillance	Followed
Soils	<ul style="list-style-type: none"> Existence of authorizations for the exploitation of borrow pits and quarries; Areas and number of borrow pits rehabilitated; State of cleanliness of workshops and other work areas; Number of complaints related to the exploitation of quarries and loans; existence of erosion, Existence of quarry flooding and borrow pit 	<ul style="list-style-type: none"> 100% of borrow pits and quarries have operating permits; 100% of sites contaminated by treated liquid waste; 100% of open quarries are restored; 100% of waste dumping points identified; No flooding no erosion triggers. 	Visual control during field visits, surveys and mission reports. Book of grievances complaints	Control Mission (During the works)	ACE and CPE, Company, municipality of Limete
Vegetation	<ul style="list-style-type: none"> Number of trees felled; Number of trees planted; Cleared area; Reforested borrow area; Number of awareness sessions for environmental protection. 	<ul style="list-style-type: none"> 100% reforested trees; Number of awareness sessions held Number of trees felled: None Area cleared: None 	Visual control during field visits, surveys and mission reports; Complaints book ; Unannounced control	Control mission (During the works)	ACE and CPE, Company, municipality of Limete
Countryside	<ul style="list-style-type: none"> cleanliness of the site; Ecological and aesthetic quality of the landscape. 	<ul style="list-style-type: none"> The existence of assigned staff for cleanliness, The existence of an aesthetic ecology 	Visual control during field visits, surveys and mission reports List of demands	Control mission (During the works)	ACE and CPE, Company, municipality of Limete

Tracking items	Indicators		Means of verification	Persons in charge and period	
	Followed	Performance		Surveillance	Followed
Security measures	<ul style="list-style-type: none"> • Availability of an HSE Manager on site; • Signaling status on the site; • Existence of safety instructions in the event of an accident; • 100% of workers respecting the wearing of PPE; • Level of technical compliance of transport vehicles; • Presence of a medical kit or a Health Post on the site; • Level of respect for working hours; • Availability of first aid kits; • Observance of the speed limit; • Effectiveness of the staff and local population awareness program • Existence of operational fire extinguishers at sensitive sites; • Number of accidents recorded on the site; • Number of incidents observed on the site; • Number of security awareness sessions; • Number of people reached by awareness-raising activities; 	<ul style="list-style-type: none"> • The existence of signage on the site; • The existence of safety instructions on the site; • Existence of a waste management plan on site; • 100% of site workers made aware • Presence of fire extinguisher on site 	<p>Visual control during field visits, surveys and mission reports</p> <p>List of demands</p>	Control Mission (During the works)	ACE and CPE, Company, municipality of Limete

Tracking items	Indicators		Means of verification	Persons in charge and period	
	Followed	Performance		Surveillance	Followed
Sanitary measures,	<ul style="list-style-type: none"> Existence of a first aid kit for primary care on site and accessible to all employees; Presence of medical personnel on site; Number of consultations carried out; Number of wounded treated; Number of patients cared for on site; Number of awareness sessions organized on health and safety; Quantity of condoms made available to staff; Number of STI/HIV/AIDS, COVID-19 patients disease prevalence rate Number and type of complaints <p><u>Waste management :</u></p> <ul style="list-style-type: none"> State of cleanliness of the sites and installations of the company and the MDC; Existence of personnel assigned to site maintenance; Existence of garbage bins and trash cans; Existence of a hazardous waste management site; Number of awareness sessions on the cleanliness of the operational work environment; 	<ul style="list-style-type: none"> 100% of workers are sensitized, screened voluntarily before hiring on the fight against STIs and HIV/AIDS; 100% of injured workers are taken care of by the Project; 100% of COVID-19 cases are identified and taken care of by the Provincial Response Committee; Prevalence rate of work-related illnesses (ARI); The existence of a waste management plan (solid and liquid); Existence of a waste collection and disposal system at the site level; The existence of a waste management plan on the site; The existence of assigned staff for cleanliness, Presence of garbage bins 	<p>Visual control during field visits, surveys and mission reports</p> <p>- Control in Health Zones (ARI and HIV/AIDS)</p>	Control Mission (During the works)	ACE and CPE, Company, municipality of Limete

8.7. Site waste management

The site will generate various waste, including wood residues, metals, “domestic” waste, paper, cardboard, bags of cement, scrap metal, oils and lubricants, used oil, used tires, used batteries, etc. The site's Waste Management Plan will comply with the principles of 4RVE (recovery, reuse, reduction, recycling, recovery and disposal). To do this, you must therefore ensure that:

- the proper management of residual materials by providing by asking the contractor to provide appropriate garbage cans in sufficient quantity to ensure the segregation of residual materials and meet the needs of the residual materials management plan according to whether they are recoverable, reusable, recyclable or that they can be valued;
- disposal of residual materials on authorized sites;
- the collection and storage of domestic waste in closed bins to avoid attracting animals and the regular disposal of this waste;
- disposal of hazardous waste (hydrocarbons) by authorized companies;
- the information reported concerning any fortuitous discovery of soils presenting visual or olfactory indications of contamination;
- adequate management of any contaminated soil discovered fortuitously, which must be temporarily stored on a watertight platform, characterized and disposed of in accordance with the regulations and policies in force,
- treatment of accidentally contaminated soil by immediate stripping and bioremediation.

8.7.1. Hazardous materials management

The main objective of the Preparation and Construction Phase Hazardous Waste Management Plan is to facilitate the safe management, procurement, storage, handling and disposal of hazardous materials and to prevent any release. uncontrolled in the surrounding environment. Good management minimizes the risk of contamination in the event of an accidental spill. The site must have a Waste Management Plan and ensure compliance with the following safety measures:

- Flammable liquids and combustibles, as well as hazardous materials, must be stored and handled in accordance with applicable standards;
- No chemicals will be spilled or released into the surrounding environment;
- Any spills will be cleaned up immediately; contaminated runoff and contaminated soil must also be collected and treated or disposed of using an approved method;
- The Emergency Plan requires the availability of emergency equipment that can be used in the event of an accidental spill; the workers must be trained in the application of the emergency plan on the site;
- Monitoring and control measures are in place for the transshipment, handling and storage of hazardous materials on the worksite;
- Fire protection systems and secondary means of containment for storage facilities will be provided to prevent fires or the release of hazardous materials into the environment;
- Staff will be trained in practices for handling, storing and containing chemicals and hazardous materials, taking into account the positions occupied; this training will be part of the site admission and training process;

- The refueling of construction/rehabilitation vehicles and generators must be done in areas provided for this purpose and outside the work sites;
 - Rainwater likely to be contaminated by hazardous products must also be monitored to determine the possibilities of elimination;
 - Any spill is reported immediately as well as the actions taken to minimize the impacts;
- In the event of a spill, the environmental emergency plan for the sites is triggered.

8.7.2. Management of household, non-hazardous and other site waste

- Ordinary waste (e.g. cardboard, wood, empty metal boxes, plastic bags, etc.)

Inert ordinary waste (metal cans, plastics, cardboard, etc.) will be recovered and returned to approved or informal recyclers after approval by the control mission.

- household waste

They will be deposited in public landfills or they can be used to enrich the soil of sites intended for re-vegetation.

8.8. Worksite Hygiene, Health and Safety Plan

8.8.1. Definitions and concepts relating to health, safety and environment aspects

- ✓ **Hygiene:** This is the set of collective or individual means, principles and practices aimed at preserving or promoting health.
- ✓ **Safety :** it is the state of what inspires confidence, the absence of accidents or unacceptable risk or the situation in which someone or something is not exposed:
 - to no danger;
 - at no risk of physical aggression, accident, or theft.
- ✓ **Health :** It is the complete state of physical, mental and social well-being which does not consist only of the absence of disease or infirmity (definition of the World Health Organization)
- ✓ **Accident at work and occupational diseases :** the terms “accident at work” are usually reserved for accidents occurring to agents covered by the application of the labor code.
- ✓ **Serious and imminent danger:** The danger is serious when it is likely to produce an accident or an illness leading to death or appearing to lead to temporary or prolonged permanent incapacity. Its imminence implies the risk of an event occurring in the very near, almost immediate future.
- ✓ **Risk :** The AFNOR EN 292-1 standard defines risk as the cause capable of causing injury or damage to health. The word risk is generally accompanied by other words specifying its origin or the nature of the feared lesion or damage to health: electrical risk, risk of crushing, risk of intoxication, etc.

8.8.2. Hygiene, health, safety and environment (HSSE) policy

The HSSE policy is based on the following areas of progress:

- **QUALITY**

- The continuous improvement of performance and the development of profitability for a better knowledge of our costs and the permanent concern to be all at the service of our construction sites

- Customer orientation through the continuous improvement of the quality of services and the development of customer satisfaction and Mission control
- The development of human capital through the permanent increase of skills and the strengthening of local supervision
- **SECURITY**
 - The continuous improvement of the control of our risks by the identification and regular evaluation of the Health, Safety at Work, and road safety risks of the construction site
- **ENVIRONMENT**
 - Improving the working environment by developing actions related to organization and cleanliness within the company, particularly at the level of the technical base, living base, site facilities, industries, and erosion control of the road under construction.

8.8.3. Responsibilities for the implementation of the HSSE Plan

The site management team as well as the responsibilities in terms of health and safety on the project are as follows:

- a) Works Director: He is the guarantor of the implementation of the HSSE policy and surrounds himself with the necessary specialists. Its mission is to:
 - ensure general compliance with site health and safety requirements;
 - participate in the assessment of the risks and impacts of the project;
 - Organize the work while respecting health and safety;
 - Ensure compliance with safety instructions;
- b) HSSE manager: his mission is to train and inform workers of the provisions relating to health, safety and environmental protection. He reports directly to the Director of Works and is vested with absolute power to stop any work which, in his view, represents an unacceptable risk. And he :
 - participates in risk assessment;
 - participates in the drafting of the PHSS;
 - ensures the application of safety instructions;
 - drafts health and safety reports;
 - draws up reports on accidents at work and investigations;
 - educates staff and participates in simulation exercises.
- c) Company workers: Each of them must take an active part in their own safety but also that of their colleagues. He has a duty to respect each established safety instruction.

8.8.4. Measures relating to health, hygiene and safety

- a) Health and hygiene measures

The company will organize a routine and emergency medical service in the life base on the site. This service will include:

- A medical labor agreement with a health center having an ambulance with means of evacuation in case of emergency;
- A team of trained permanent first aiders;
- First aid kits at the gate, in vehicles and machinery;

➤ Medical agreement for medical visits and care:

Before the start of the work, the company will sign a medical agreement with a health center closest to the work;

➤ **Management of Hazardous Materials and Substances in Service**

Safety data sheets (MSDS) for hazardous products will be available from the HSSE Manager and made available to user personnel as well as to the site store. In collaboration with the medical team, he will draw up synoptic tables to facilitate the management of the risks resulting from the contact of these materials with the human body.

➤ **Hygiene**

The base facilities will include comfort areas for all company personnel. Changing rooms will be set up to allow workers to exchange clothes. The cleanliness of the facilities will be ensured by a team of maintenance staff who will take care of it on a daily basis.

As a result, identified bins will be placed in the places indicated for waste collection. The type of waste will be collected, stored, removed and treated according to the recommendations of the waste management plan.

On site, the work areas will be cleared of all residues (falling boards, iron, cables, etc.) as the work progresses and at the end of the day. These residues will be windrowed, collected and stored according to the recommendations of the HSSE manager.

Workstations will be left clean and tidy.

Awareness campaigns on personal hygiene and cleanliness will be carried out among staff and women who sell meals daily near the workplace. Drinking water will be accessible to all workers.

b) Security Measures

All personnel working on the site will first undergo training on site safety, namely:

- The company's HSE policy;
- Description of medical facilities and evacuation plan;
- Disciplinary measures in case of violation of security rules;
- Collective and individual protective equipment;
- Emergency procedures ;
- Accident/workplace incident/fire alert procedures;

c) Specific training

HSS training will focus on:

- Rescue and first aid at work;
- Stress in the workplace;
- The risks of accidents related to site activities (work at height, risk of electrocution, exposure, etc.);
- The line of conduct and road safety;
- Lifting loads;
- Prevention and fight against fires;
- etc. _

Subsequently, safety training will also be done through awareness meetings, the frequency of which will depend on the degree of application of safety measures in the field by all company personnel.

d) Personal Protective Equipment (PPE)

This equipment is used to personally protect the wearer against dangers that are as benign as they are irremediable on a construction site. In this category, we can cite:



- **Helmets** : they generally protect the wearer against injuries or shocks caused by falling objects, collisions against objects, projections of caustic material, and even by flames;
- **Glasses** : they protect the eyes against radiation or projections;
- **Shoes and boots** : to protect the feet against risks of all kinds. They must comply with the standards in force and be well maintained;
- **Protective clothing** : they prevent mechanical (cuts, scratches), chemical (burns by chemical agents) and thermal (cold, heat, fire) aggressions;
- **Gloves** : the hands being very stressed on the construction site, they are more subject to the risks of perforation, burns, cuts, and tears. It is therefore important to protect them with gloves, arm warmers and other accessories;
- **Hearing protection** : these are plugs and shells protecting the ears against noise pollution;
- **Masks** : these are devices that protect the respiratory tract against harmful particles and pathogens;
- **arrest devices** : ropes, reels, harnesses, carabiners and others protect workers from the risk of falling;
- **Fluorescent vests**







The wearing of this equipment will be made compulsory on the site and during the work for all employees. In the event of non-compliance, the culprit will be sanctioned by his managers.

All PPE will be inspected, used, stored and maintained properly. If a PPE no longer has the required level of protection, it will be repaired or replaced immediately. PPE that is no longer usable must be destroyed before being thrown away. Personal Protective Equipment will be checked during inspections.

A list of the various PPE provided to staff will be kept by the storekeeper(s) specifying the type of equipment issued, the date and the name of the person. Table 86 below indicates the PPE required for the site and according to the type of work.

Table 86. PPE required for the site and the types of work

PPE Symbols	Instructions	Types of work or tasks
	Compulsory wearing of high visibility vest	All tasks including site visits
	Compulsory wearing of head protection equipment (helmet)	All tasks on site

PPE Symbols	Instructions	Types of work or tasks
	Wearing safety shoes	All tasks on site
	Mandatory wearing of hand protection equipment	All tasks on site
	Compulsory wearing of respiratory protection equipment	Excavations and handling of harmful products; Loading of gravel and unloading of materials
	Mandatory wearing of eye protection equipment	Excavations, handling of harmful products, surface patching work, welding work,
	Mandatory wearing of protective equipment for pedestrians	Pedestrian corridor during the visit of the Worksite
	Compulsory wearing of hearing protection equipment	Use of jackhammer /perforator/ cement mixer

e) Collective protective equipment (EPC)

They protect not only people but also construction equipment by isolating them from dangers such as bumps, falls, damage, etc. For this, they have a higher priority than personal protective equipment. Their functions can be diverse:

- Reducing emissions: we can cite **hoods** , **acoustic boxes** and **suction systems** ;
- Eliminate the hazard: these include, for example , **nets** , **scaffolding** and **railings** .

f) Other preventive safety measures on site:

In addition to wearing or installing individual and collective protective equipment, the company will take preventive safety measures to considerably reduce the risk on the site. These rules include:

- Awareness of workers on the risks related to the job, Internal Regulations of the Site, Health and Safety Rules on the Site; Risks related to Sexually Transmitted Diseases (STIs) including HIV/AIDS as well as the fight against COVID-19;
- The cleanliness of the site;
- The renewal of work teams;
- The development of break / rest places;
- Prohibition of the presence of children on the site;
- The installation of fencing around the work site;
- Definition of prevention plans
- The traffic plan in the construction site
- Spill Response Plan

8.8.5. Compliance

It consists of the control, technical verification of machinery, transport equipment, lifting devices and their accessories, heavy or light equipment and materials assigned to the site in accordance with the legislation in force. It also involves the installation and maintenance of safety equipment and devices.

8.8.6. Inspections

They will be carried out daily on the work areas and in the site installation areas, first by the various works managers, and then by the HSSE manager.

They will make it possible to quickly correct any violation of the safety rules or to stop until correction, any action exposing their authors or third parties to the risk of incidents or accidents. The inspections will cover both personal protective equipment and working methods. For each violation noted by the HSSE manager, corrective actions will be recommended and the managers responsible for monitoring them will be indicated by name. An archiving of this operation will be carried out.

All regulatory measures and all reasonably practicable precautions will be taken to avoid any risk to employees or any other person who may be affected. But, first of all, it is essential to remember that each employee is responsible for his own safety, that of others, as well as the preservation of the installations.

Responsibility for safety must be fully recognized and clearly defined at all levels.

The General Management of the company is responsible for the management of accidents, health and hygiene on the site.

8.9. Circulation plan

The traffic plan implements the set of measures to ensure the protection of the population and workers against traffic accidents that may occur during the execution of the works.

As the project is in an urban area, high priority will be given to traffic and signage during the works. The site will be fenced off and closed to the public. Adequate signage will be placed on the work site to prevent vehicle collisions. The signs and symbols necessary for the prevention of accidents will be placed in a visible manner at all times during the execution of the works.

The traffic plan is supported by the installation of various road signs and ribbon markers in the work zones in order to:

- Facilitate the location and layout of vehicle and machinery exits so as to pose no risk to the safety of workers and site vehicle drivers;
- To indicate the road safety instructions especially along the route of the road used by the project;
- These panels and beacons are reinforced by the mobilization of workers responsible for regulating traffic on the site.

8.10. Sensitization on STI-HIV in the Project area

The Company is required, before the start of work, to organize, with the assistance of a specialized structure and in coordination with the competent authorities (PNMLS, PNLS),

specific training sessions, in particular related to risks, prevention and the fight against STIs/HIV/AIDS.

These information and awareness campaigns must be carried out in the Maes district concerned by the Project for the communities and for the workers.

Company personnel must be made aware of the risks of transmission of STIs-HIV/AIDS through posters and other media. Emphasis will be placed on voluntary testing of employees. The Company must provide staff with condoms against STIs/HIV-AIDS.

This campaign will continue throughout the duration of the works with at least two sessions, one before the start of the works and another in the middle of the works.

A specific training program for employees should be proposed in the Company's site ESMP.

9. PUBLIC CONSULTATION

9.1. SUMMARY OF PUBLIC CONSULTATION

The public consultations were carried out on the dates of October 21 to 24, 2022 on the site of the data center in Limete in the city province of Kinshasa.

These consultations were led by EMC experts in the form of focus groups in the places concerned by the project.

The objective of these consultations was to ensure the participation and commitment of stakeholders in the project so as to encourage the consideration of their opinions, expectations, concerns and recommendations in the process of preparation, implementation and monitoring. during the pre-construction, construction and operation of the project.

9.2. CONSULTATION OBJECTIVES

The general objective of public consultations is to ensure the participation and commitment of the populations and stakeholders involved in the project so as to promote the consideration of their opinions, expectations, concerns and recommendations in the process of preparation, implementation and monitoring.

In the context of this project, it is more exactly:

- To inform the populations and the actors about the project and the actions envisaged;
- To allow the populations and the actors to decide on the project;
- To express their opinion, concerns, needs, expectations, fears etc. vis-à-vis the project;
- To collect their suggestions and recommendations for the project.

9.3. METHODOLOGY

To achieve the objectives of public participation in the context of this study, the method of public consultation was adopted. The methodological tools used for this purpose were the semi-structured interview for individual meetings and the focus group for group meetings. Two stages characterized the public consultations, namely the organization of: (i) information meetings on the project during data collection in the field and (ii) public consultation sessions.

The targeted actors concern the RAXIO RDC personnel in charge of the project, local residents, vendors close to the Data Center site, the lists of which are appended to this report as well as the photos to illustrate the consultations carried out within the framework of the project.

9.4. SUMMARY OF PUBLIC CONSULTATIONS

Public consultation makes it possible to inform and collect the opinions, expectations, concerns and recommendations of legal entities or individuals directly or indirectly affected by the project. It consists of conducting an investigation through interviews with the previously identified entities concerned. Minutes (PV) were drawn up with the various players and the summary of the public consultations was made in the form of a table.

Dates of public consultations and number of people present:

In accordance with the standards, the public consultations were held on Friday October 21 to Sunday October 23, 2022 with the stakeholders of the public consultations, in particular the local politico-administrative authorities (the Mayor of the commune, and the head of the Congolese National Police (PNC) Proximity close to the site, civil society organizations including NGOs fighting against GBV/SEA/SH and residents living near the site) . During this phase of the ESIA in accordance with the World Bank's CES and in view of the COVID-19 situation in the world and in the DRC in particular, the number of people at the consultation was limited for compliance with the rules. linked to barrier measures and physical distancing throughout the Democratic Republic of Congo.

The dates for these consultations are below.

Table 87: Dates and places of consultations

Commune	Consultation date	Number of male participants	Number of female participants
Municipal House of Limeté	October 23, 2022	1	1
Office of C/S PNC Limete 12	October 22, 2022	1	1
Technical framework with the RAXIO team	October 21, 2022	10	10
Public consultation sessions	October 21 to 22, 2022	25	25
Total		37	37

The minutes and the lists of participants are presented respectively in the appendices.

The photos below illustrate the meetings with some stakeholders during the public consultation.



Picture 12. Consultation with the Architect of the RAXIO RDC/Limete data center site



Picture 13. Framing with the RAXIO RDC technical team

9.5. SUMMARY OF THE PUBLIC CONSULTATION

The summary of the consultation carried out by type of actor is given in the table below. The public consultation minutes are appended to the report.

9.5.1. General opinion on the project

Overall, the project is very well appreciated by the various actors met during the public consultations. All the players agree that the project is welcome because it solves the difficulties of storing digital data. The wish of the actors is above all the realization of this project in order to generate temporary and permanent jobs.

9.5.2. Summary of concerns, fears and questions

The main concerns and fears are:

- ✓ RAXIO DRC activities;
- ✓ The sensitivity of electromagnetic fields;
- ✓ Hygiene and health on the sites;
- ✓ Employment within the RAXIO RDC site;
- ✓ Raising awareness of the population on STIs/AIDS, GBV, COVID 19;
- ✓ The company's outlook for monitoring the site's environmental and social management plan.

9.6. OVERALL COMMENTS FROM INTERVIEWS WITH POPULATIONS AND GROUPS

The main results of the interviews with the population during the public hearings can be summarized around the points contained in the following summary table:

Table 88. Summary of the major conclusions of the public hearings

ACTORS / INSTITUTIONS	MAIN CONCERNS OF PARTICIPANTS
<p>Technical Staff RAXIO DRC On 10/21/2022</p>	<p>The services rendered by RAXIO RDC are beneficial for operators, companies and the local population.</p> <p>The RAXIO database allows storage of digital content from several telecommunications operators in order to ensure security and access to information. This has many advantages including:</p> <ul style="list-style-type: none"> - improving access to telecommunications services; - Fast and secure way to store and share digital information <p>However, the technical staff insisted on the need to cover the site so that the work generated by the site could not disturb the neighboring plots.</p>
<p>population and local authorities On 10/21/2022 As of 10/22/2022</p>	<p>The welcome project was enthusiastically aimed at improving the telecommunication system and data storage (such as an electronic data bank).</p> <p>The local population would like it to be taken into account in the recruitment of local labour.</p>

9.7. CONCLUSIONS AND RECOMMENDATIONS OF THE CONSULTATIONS

The public consultation report demonstrates that people living near the sites enthusiastically welcome the advent of this project. Thus, it will be necessary to take into account the opinions and grievances mentioned above.

The analysis of the above results makes it possible to draw certain conclusions on the perception of the populations and groups consulted in relation to the project to erect the Data Center of the RAXIO RDC Company. We can cite, among others, that:

- The project is a social necessity and comes at the right time given the scale of the proliferation of telecommunications activities.
- The populations see the project as a priority in the field of local economic development.
- The use of local labor should strengthen the fight against poverty and promote social acceptance of the project in the community;
- Taking into account mitigation measures with the involvement of all project stakeholders would be an achievement;
- The system of compensation and compensation for losses, according to local authorities, should be selective to discourage anarchy and, in turn, strengthen the authority of the state.

10. ESTIMATED BUDGET FOR THE IMPLEMENTATION OF THE ESMP

The cost of the implementation of the Environmental and Social Management Plan (ESMP) relating to the data center construction project in Limete amounts to **US\$ 105,300**, this cost covers the implementation of mitigation actions and support, taking into account the monitoring program, complementary initiatives and any other institutional arrangement and measure related to the management and protection of the environment during the implementation and operation phase of the project.

This cost of environmental management during the different phases of project implementation will be part of the overall project envelope.

Table 89: Estimation of ESMP implementation costs

No	ACTIVITIES	COST (US\$)
3	Raising awareness and training of workers on HSS measures at work (use of portable ladder, nacelles, nacelle anchoring, individual platform, scaffolding, PPE, driving lifts, machinery, use of chemicals, use of fire extinguishers, staff training intended for the maintenance of buildings, data collection equipment and workshops in the operating phase, etc.)	15000
4	Management of solid and hazardous waste (Installation of bins by category of waste (plastics, glass, metals, etc., during the works and operation phases)	5000
5	Sensitization of workers and residents on the fight against STIs and HIV/AIDS. (Awareness raising, distribution of condoms, collaboration with PNMLS and NGOs working in the field of STIs/HIV/AIDS etc.)	15,000
8	Fight against COVID-19, Worker awareness and purchase of anti-COVID-19 PPE.	8000
10	Environmental monitoring through audits, inspections, consultation of the population, processing of complaints, etc., by the Congolese Environment Agency (ACE/MEDD)	41300
11	Medical aid kit and agreement with a hospital center for care of accident victims	20,000
12	Purchase and filing of complaint registers at the municipal office of Limete, at the industrial district and on site	1000
TOTAL MONITORING COST (US\$)		105300

The estimated cost of implementing the environmental and social measures of this project will be approximately US\$105,300 (One Hundred and Five Thousand Three Hundred US Dollars), including monitoring fees which are set in accordance with the Ministerial Order No. 022/CAB/MIN/EDD/AAN/ 2017 of September 6, 2017 setting the costs related to the assessment of environmental and social studies. They are distributed as indicated in the table above.

11. GENERAL CONCLUSION

The construction project of the data center (Data Center) in Limete 12th^{Street} will contribute to the implementation of technical bases of innovation which constitutes the centerpiece of the infrastructure supporting the growth of the digitization of the African economy in relation to the needs of the market in the various sectors of communication in the city province of Kinshasa .

This project raises a lot of expectations on the one hand, from the Government of the Democratic Republic of Congo and Provincial of Kinshasa in general and on the other hand, from the population of Kinshasa in particular in order to solve the problems of digital communication and manage them. in an appropriate way.

After an analysis of the state of the initial environment (biophysical and human environments) and the technical elements of the project, it should be emphasized that in addition to the positive aspects of the project, potential negative impacts are notable.

However, these impacts will not have major and uncontrollable ecological effects. Indeed, these potential negative impacts could be circumscribed technically and financially within reasonable limits, or even sometimes be offset by adequate corrective measures, through the implementation of the Environmental and Social Management Plan.

In addition, based on good practices in the management of environmental and social risks, health and safety at work, these impacts will be controlled.

From the above, it is clear that the positive impacts that this project will generate at the socio-economic level are inestimable compared to the negative environmental and social setbacks which, moreover, are completely controllable. Hence, we can say that this project can be deployed taking into account the requirements of this Environmental and Social Impact Assessment (ESIA) in order to integrate harmoniously into its receiving environment.

As a result, the RAXIO RDC Company undertakes to ensure the implementation of all the environmental measures recommended in the ESMP, so as to prevent all environmental risks that may affect the viability of the project.

12. PROMOTER COMMITMENT



ENGAGEMENT DU PROMOTEUR

Je soussigné Yannick SUKAKUMU, Directeur Général, atteste par le présent acte que la société **RAXIO DATA CENTRE SAS** s'engage à respecter toutes les mesures et recommandations environnementales et sociales inscrites dans les études d'Impact Environnemental et Social (EIES) du projet d'érection d'un centre des données dans la commune de Limeté, ville-province de Kinshasa en RD. Congo.

En foi de quoi, le présent acte est signé.

Fait à Kinshasa, le 20/10 / 2022

Yannick SUKAKUMU
Directeur Général




Siiikin Village, Concession Cotex ; 63, avenue Colonel Monjiba Ngaliema-Kinshasa, RD Congo
RCCM: CD/KNG/RCCM/21-B-0328; ID Nat 01:H5300N92615F N° Impôt : A2283835A

13. BIBLIOGRAPHY

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9	Ministry of Infrastructure and Public Works, Environmental and Social Management Framework (ESMF), updated according to the World Bank's New Environmental and Social Framework, February 2021.
10	Ministry of Infrastructure and Public Works, Gender-Based Violence Action Plan (GBV), June 2021.
11	Ministry of Infrastructure and Public Works, Resettlement Policy Framework (CPR), updated according to the New Environmental and Social Framework of the World Bank, February 2021.
12	Ministry of Infrastructure and Public Works, Complaint Management Mechanism (MGP), February 2021
13	Ministry of Infrastructure and Public Works, Stakeholder Mobilization Plan (PMPP), February 2021.
14	Ministry of Infrastructure and Public Works, Workforce Management Plan (PGMO), February 2021.
15	PEMU – FA, Environmental and social impact study of the Securing Project for the raw water catchment station of the N'djili River, April 2020.
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19	Official Journal of the Democratic Republic of Congo, Law n° 14/003 of February 11, 2014 relating to the conservation of nature.
20	Official Journal of the Democratic Republic of Congo, Law No. 011/2002 of August 29, 2002 on the Forest Code.
21	Ministry of Infrastructure and Public Works, Environmental and Social Impact Study (ESIA) of the Rehabilitation Works for the Development of Public Spaces (Maison Communale and Place Sainte Thérèse of the Commune of N'djili / KIN ELEENDA Project, February 2021.
22	State of play of biodiversity in the DRC, 2014
23	Summary Preliminary Project Report (APS) for the construction of a data training center, 2022

Annex 1. Mission order visa

 BUREAU D'ETUDES ET DES SERVICES « ENVIRONMENT AND MARKETING CONSULTING SARL »
RCCM : 17-B-01387, IDN : 01-83-N25498P, INPP N°39531,00, CNSS N°010211215U1,
N° AGREMENT N°077/CAB/MIN/AAN/MBL/SAA/2018

ORDRE DE MISSION N°067/EMC/10/022

Les personnes dont les noms et qualités ci-après sont chargées d'effectuer une mission dans la commune de Limeté dans la Ville Province de Kinshasa pour le compte de la société RAXIO SA.

Il s'agit de :

- ❖ Marc KILENGE : Expert Socio-environnementaliste (Chef de mission)
- ❖ Guy MUNSAYONGO : Expert Hydro-environnementaliste
- ❖ Orelis KATO : Expert Socio-Economiste
- ❖ Christian PUNGI : Expert Sociologue

Date de Début : 21 Octobre 2022
Fin : 25 Octobre 2022
Durée : 5 jours

Objet de la mission

➤ Survey Technique et Socio-environnemental pour l'Elaboration de l'Etude d'impact Environnemental et Social (EIES) du projet d'érection d'un centre des données (Data Centre) d'une superficie de 6500m2 dans la commune de Limeté 12eme rue Industriel/Kinshasa pour le compte de RAXIO RDC.


Matériel/Instrument

- ❖ GPS, BOUSOLE, CYCLOMETRE

Les autorités civiles, militaires et de la police nationale sont priées de leur apporter assistance.
Le présent document leur est délivré pour servir et valoir ce que droit.

Fait à Kinshasa, le 20/10/2022

Pour le Bureau d'études et Services EMC SARL
Marc KILENGE TORO PUKU
Directeur Général



Siège : N°1, avenue Colonel Ebeya, Kinshasa/Gombe République Démocratique du Congo
Contacts : 0999964042 ; 0823333165 ; Offic : 0894156948
e-mail : contact.emc2018@gmail.com, marckilenge@gmail.com, contact@emc-rdc.org
Site web : <https://www.emc-rdc.org>

On le 21/10/2022
Grand 9^e Rue
Canton de ~~St. Pierre~~ ~~St. Pierre~~ ~~St. Pierre~~
~~St. Pierre~~



Annex 2. Photos for public consultation



Picture 14. Public consultation with women vendors along the site



Picture 15. Public consultation with a female seller along the site

Picture 16. Public consultation with local youth



Picture 17. Public consultation with the DATA CENTER site architect

Picture 18. Public consultation with a female seller along the site

Annex 3. Public Consultation Lists

EMC SARL BUREAU D'ETUDES ET DES SERVICES « ENVIRONMENT AND MARKETING CONSULTING SARL »
 RCCM : 21-M-02609, IDN : 01-83-N25498P, N.J. A17209665H, INPP N°39531.00, CNSS N°010211215U1,
 N° AGREMENT MEED N°077/CAB/MIN/AA/MBL/SA/2018, AGREMENT ITPR N° 695/EC-C/05-21/KIN

CONSULTATION DU PUBLIC

Elaboration de l'Etude d'impact Environnemental et Social (EIES) du projet d'érection d'un centre des données (Data Centre) d'une superficie de 6500m2 dans la commune de Limeté 12eme rue Industriel/Kinshasa pour le compte de RAXIO RDC

Heure du début : 9h20' Heure de la fin : 11h30'

N°	Noms	Profession/occupation	Téléphone	Signature
1	NGELA CHIMENE	CUISINIERE	0904254430	<i>[Signature]</i>
2	ADELE AWA	CUISINIERE	0847642352	OK
3	DEGAULE NGAKA	SECURITE	0813844635	<i>[Signature]</i>
4	BEVANI MWAMBA	COIFFEUR	0903101259	<i>[Signature]</i>
5	TIMIMANGA KONGOLO	VENDEUR	0846757094	<i>[Signature]</i>
6	TRESOR YAU	JOURNALIER	0955576905	OK
7	J.C. BONTENGO	CHAUFFEUR	0903076980	<i>[Signature]</i>
8	KAYEMBE PIERRE	CHAUFFEUR	0890307027	<i>[Signature]</i>
9	DUDU LITUKA	CUISINIERE	0827550248	<i>[Signature]</i>
10	MUSHIYA BERTH	CUISINIERE	0992673766	<i>[Signature]</i>
11	ISHANOYA CHANTAL	CUISINIERE	0844629974	<i>[Signature]</i>
12	MUKUNZI SCHOLA	VENDEUSE	089030080	<i>[Signature]</i>
13	LWAMBA JUDETTE	VENDEUSE	0906739780	<i>[Signature]</i>
14	MIREILLE KALENGA	VENDEUSE	0905583702	<i>[Signature]</i>
15	PASCALINE MAXIESE	VENDEUSE	0907627435	<i>[Signature]</i>

Fait à *Kinshasa* le 21/01/2022

Siège : N°1, avenue Colonel Ebeya, Kinshasa/Gombe République Démocratique du Congo ;
 Contacts : 0999964042 ; 0823333165 ; Offic. : 0894156948 ; e-mail : contact.emc2018@gmail.com, marckilenge@gmail.com, contact@emc-rdc.org
 Site web : <https://www.emc-rdc.org>



CONSULTATION DU PUBLIC

Elaboration de l'Etude d'impact Environnemental et Social (EIES) du projet d'érection d'un centre des données (Data Centre) d'une superficie de 6500m² dans la commune de Limeté 12eme rue Industriel/Kinshasa pour le compte de RAXIO RDC


Heure du début : 9h30

Heure de la fin : 11h00

N°	Noms	Profession/occupation	Téléphone	Signature
1	NKUNA NOELLE	VENDEUSE	—	ok
2	MULUMBA ZADIO	JOURNALIER	—	OK
3	BONICEME RUDY	JOURNALIER	—	ok
4	LUANZISA CHRISTIAN	MAGON	—	ok
5	KIAMPA DIEU	AJOUFEUR	0822249542	ok
6	JOEL MBANGI	JOURNALIER	—	ok
7	BENJAMIN BADOXIN	MAGON	—	ok
8	MUKIESE METO	SECURITE	0900935753	
9	REGAULE KUMBULU	MAGON	0823792075	ok
10	JACQUES SAKASAKA	MAGON	0 —	ok
11				
12				
13				
14				
15				

Fait à Kinshasa le 22/10/2022

Annex 4. Minutes of the focus group (public consultation)

 BUREAU D'ETUDES ET DES SERVICES « ENVIRONMENT AND MARKETING CONSULTING SARL »
RCCM : 21-M-02609, IDN : 01-83-N25498P, N.I. A1720965H, INPP N°39531,00, CNSS N°010211215U1,
N° AGREMENT MEED N°077/CAB/MIN/AAN/MBU/SAA/2018, AGREMENT ITPR N° 695/EC-C/05-21/KIN

PROCES VERBAL N° 01/CP/2022

DE LA CONSULTATION DU PUBLIC DU 01 / 10 / 2022 RELATIVE A L'ELABORATION DE L'ETUDE D'IMPACT ENVIRONNEMENTAL ET SOCIAL (EIES) DU PROJET D'ERECTION D'UN CENTRE DES DONNEES (DATA CENTRE) D'UNE SUPERFICIE DE 6500M2 DANS LA COMMUNE DE LIMETE 12EME RUE INDUSTRIEL/KINSHASA POUR LE COMPTE DE RAXIO RDC

L'an deux mil vingt et deux jour du mois de octobre, s'est tenue au la séance de consultation du publique en focus group dans le cadre de l'élaboration du projet repris en concerne. Cette rencontre a connu la participation des autorités locales, forces vives et populations riveraines

Etaient présents : voir la liste de présence (ou la fiche de consultation du public) jointe en annexe.

L'ouverture de la séance a été faite par l'autorité locale ou son représentant / leader Mme/Mr Chimisa, fonction : chef communautaire

Mr/Mme Oscar KAT, Expert SECUR ENV et animateur du focus group pour le compte du Bureau d'Etude EMC Sarl qui situé le contexte de la mission. L'expert a fait une présentation succincte du projet en précisant que la mission s'inscrit dans le cadre d'évaluer des impacts positifs et négatifs du projet et le contexte de la présente consultation du public.

Après lecture et approbation des thèmes des discussions, les débats se sont focalisés autour des points suivants :

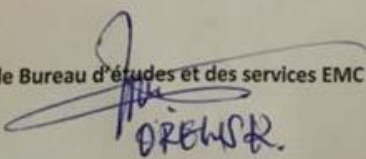
1. Bref exposé des activités du projet, leurs impacts sur la population et l'environnement ainsi que les mesures préconisées pour gérer ces impacts ;
2. Préoccupations et suggestions environnementales et socio-économiques de la population par un jeu de questions et réponses ainsi que les initiatives et acteurs de la conservation de l'environnement ;
3. L'approbation du projet.

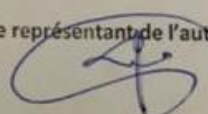
Après les échanges et débats, il a été retenu les éléments suivants :

1. la construction du data center a une impacte positif sur la population et les opérateurs d'activités de télécommunication.
2. la prise en compte de la main d'œuvre locale.
3. L'ensemble de la population approuve le projet et sollicite la prise en compte de leurs préoccupations.

Somme toute, les échanges débutés à 9h30 se sont achevés autour de 11h30.

Fait à Kinshasa, le 21/10/2022

Pour le Bureau d'études et des services EMC SARL  OREWSK

Pour le représentant de l'autorité/Leader locale 

Siège : N°1, avenue Colonel Ebeys, Kinshasa/Gombe République Démocratique du Congo ;
Contacts : 0999964042 ; 0823333165 ; Offic : 0894156948 ; e-mail : contact.emc2018@gmail.com, marcklenga@gmail.com, contact@emc-rdc.org
Site web : <http://www.emc-rdc.org>