



Kigali, **30 NOV 2022**

Reference No: 001/C/2022-2023/ OCBI/TSRLMC-ADF

REQUEST FOR EXPRESSION OF INTEREST (CONSULTANCY SERVICES)

EMPLOYER: Energy Development Corporation Limited (EDCL)

PROJECT: Transmission System Reinforcement and Last Mile Connectivity (TSRLMC) Project

ASSIGNMENT TITLE: Consulting Services to Carryout Feasibility Study for Reg Control Center and Communication Building

COUNTRY: Rwanda

FINANCING AGREEMENT REFERENCE: 2100155041016

PROJECT ID NO.: P-RW-FA0-009

Issued on: 30/11/2022

1. Background

The Government of Rwanda has received financing from the *African Development Fund* hereinafter called the **Bank** toward the cost of the Transmission System Reinforcement and Last Mile Connectivity Project and intends to apply part of the proceeds toward payments under the Contract for ***Consultancy Services to carrying out Feasibility Study for REG Control Centre and Communication Building.***

The services included under this assignment are conducting detailed assessment of current status of the SCADA System and REG's Distribution Management System, developing detailed architectural and technical studies of REG's Electricity Network Control Centre and Communication Centre Buildings and preparation of tender documents for recruiting an EPC Contractor. The Consulting firm will work in close cooperation with Rwanda Energy Group (REG) to develop Geotechnical study report, topographical survey report, Environmental and Social Impacts Assessment Report and associated permits (e.g., EIA certificate, etc.), preparation of detailed drawings showing offices based on the current situation of REG offices and drawing showing sitting arrangements of all REG employees (Headquarter). The implementation period for this assignment will be 7 months.

The Energy Development Corporation Limited (EDCL) now invites eligible consultants to indicate their interest in providing these services. Interested consultants must provide information indicating that they are qualified to perform the services (brochures, description of

similar assignments, experience in similar conditions, availability of appropriate skills among staff, etc.).

Consultants may constitute joint ventures to enhance their chances of qualification.

Eligibility criteria, establishment of the short-list and the selection procedure shall be in accordance with the African Development Bank's **"Rules and Procedures for the use of Consultants"** dated October 2015 which is available on the Bank's website at <http://www.afdb.org>.

The Consultant will be selected in accordance with the **Quality and Cost-Based Selection (QCBS)** method set out in the Procurement Regulations.


The detailed Terms of Reference (TOR) for the assignment can be found at the following website: www.reg.rw

Interested consultants may obtain further information at the address below during office hours from 0700 to 1700 hours.

Expressions of interest must be delivered by email to the address below not later than 22./12/2022 at 5:00 PM local time and mention **"CONSULTING SERVICES TO CARRYOUT FEASIBILITY STUDY FOR REG CONTROL CENTER AND COMMUNICATION BUILDING"**.

Energy Development Corporation Limited (EDCL)
KN 2 ST, Procurement Unit, 2nd Floor KCT
P.O. Box 3855 Kigali, Rwanda;
Tel: + (250) (0) 787172265
Email: procurement@edcl.reg.rw
copy to cuwajeneza@edcl.reg.rw and gndayisaba@edcl.reg.rw

Sincerely,


Digitally signed
by Umushashi
Gentile
Date: 2022.11.29
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Gentile UMUSHASHI
Head of Procurement Management Services


Félix GAKUBA
Managing Director



TERMS OF REFERENCE FOR RECRUITMENT OF A CONSULTANCY FIRM TO CARRYOUT FEASIBILITY STUDY FOR REG CONTROL CENTER AND COMMUNICATION BUILDING

1. BACKGROUND

Rwanda Energy Group (REG) through its subsidiaries Energy Utility Corporation Limited (EUCL) and Energy Development Corporation Limited (EDCL) develops, constructs, manages, operates and maintains the generation, transmission and distribution network of the Rwanda Electric Network. Specifically, the transmission network comprises a total of 971.75km, 110kV and 220kV circuits with interconnection to the transmission network of Burundi, DRC and interconnection with Uganda is at commissioning phase.

REG has old buildings serving as Electricity Network Control Centers. The Supervisory Control and Data Acquisition (SCADA) System that is been operating for more than 10 years is being upgraded and Distribution Management System (DMS) will be introduced to extend visibility/remote operation to medium voltage distribution network.

REG wants to construct two Centers to accommodate both the Electricity Network Control Center and Communication Headquarters Center.

The National Control Center made of 2 buildings, one acting as main control center while the other will be used as back up site, will be constructed nearby the existing National Control Center (at Gikondo, Kicukiro District).

The Communication Headquarters Center will be constructed in a new plot located in Muhima Sector, Nyarugenge District, Kigali City. (UPI: 1/01/06/07/108 and UPI: 1/01/06/07/121)

2. OBJECTIVE(S) OF THE ASSIGNMENT

The objective of this assignment is to develop the detailed Architectural and structural and technical studies of REG's Electricity Network Control Center and Communication Center Buildings

- A modern and functional building to house both main control centres for distribution system (SCADA/Distribution Management System) namely DNCC and for Generation and transmission (SCADA/Energy Management System) namely NCC
- A modern and functional communication building to house Communication Headquarters Centre.

2.1. National Control Centers:

10th Floor KCT, KN 2 ST, Nyarugenge District, P.O. Box 3855 Kigali, Rwanda
Tel.: + (250) (0) 787172265, email: info@edcl.reg.rw, website: www.reg.rw

- i. Establish a new state of art National Control Center building for both SCADA/EMS and SCADA/DMS software components for both Main and backup sites, Quality assurance, program development & dispatch training simulator and server rooms,
- ii. The security of the building, SCADA system and the telecommunication system put in place, which will be an underground building.
- iii. Relocation and integration of both SCADA, DMS and other corporate systems where appropriate

The SCADA/EMS shall include but not limited to the following features

- a) Real time monitoring (provide visibility) including flows on Tie-lines,
- b) Switching operations (remote control),
- c) Event recording for network analysis,
- d) Dispatch planning,
- e) Economic dispatch module (including thermal modeling and Renewable energy management system)
- f) System operations reports,
- g) Automatic Generation Control,
- h) Reserve monitoring
- i) Simulation tool for state estimation, load flow, fault/event and contingency analysis,
- j) Interface with other systems (like DMS)
- k) Training Simulator for engineering and test environment
- l) Security and Safety,
- m) System Architecture and Sizing
- n) Maintenance and Outage Scheduler
- o) Interchange Transaction Scheduling (ITS)
- p) Wide Area Monitoring System (Optional)
- q) Maintenance and support services (including power transformer state monitoring tool)
- r) Advanced Visualization System (integration with geographic view)
- s) IPP Management and embedded generation management module

2.2. REG Communication Headquarters building

Construction of a high-rise building (class: G + ≥ 10 + 2B) to accommodate Offices, meeting rooms, hardware, software and communication facilities and enough parking with at least the following features:

1. Requirement for strategic location for easy public access
2. The number of floors to be determined based on geotechnical data and required space

3. Sizeable Conference facility (to serve as the Main Auditorium that can be used for multiple purposes, i.e. Conferences, hall meetings, etc...) for the Assemblies & Taskforce Meetings with adequate presentations – projection screens and comprehensive sound facilities
4. IT Data center (Electrical room, Network room, data center hosting serves, control room, IT workshop and IT Training room etc). **Refer to ANNEX 1**
5. Parking area of at least 400 cars (it could be on ground or underground parking space)
6. High quality, comfortable and highly competitive office units.
7. A good standard canteen, First Aid unit (Clinic) and gymnasium

3. SCOPE OF SERVICES, TASKS (COMPONENTS) AND EXPECTED DELIVERABLES

3.1. General

The scope of work consists mainly with the following:

- Assessment of status of the Current installed SCADA/EMS and SCADA/DMS System (both hardware and software), propose appropriate building facilities for main and back up sites
- Analyzing existing systems to advise whether current SCADA/EMS is adequate to serve domestic and regional interests. Provide recommendations for required modules that could be mandatory for a regional control center
- Design for the two structures, main and backup site,
- Conduct geotechnical studies, environmental and social impact assessment of the two buildings,
- Preparation of tender document for both buildings and required system upgrades.

3.2. Detailed

- Complete all detailed topographic studies, Geotechnical study (Review of soil investigation report done before and see if there is need to conduct the second one), Environmental study, Architectural and structural and structure design, and preparation of Bill of Quantities (BOQ) & cost estimates of construction works as well as the formulation of recommendations.
- Feasibility study: Collect data of the current situation in REG offices to be used in the design and propose proper sitting arrangement and different equipment's layout. (Refer to Annex 3)
- Preparation of all documents, structure calculation notes, graphic plans (drawings and layouts) as part of provisional and final documents.

The Consulting firm/Architect will also work in close cooperation with REG to analyze and get a consensus on all the proposals.

3.3. TASKS (COMPONENTS)

3.3.1. PRELIMINARY STUDIES

3.3.1.1. General information for Buildings

- All drawings for the proposed project should be compiled into two similar booklets on A3 format whereas the site plan describing the overall placement of the project should be submitted on A0,
 - The application letter, application form, project brief, land ownership documents and all other support documents available on A4 formats have to be compiled into three similar booklets of A4 papers.
- a) Project Brief: descriptive summary on the project highlighting the name, title and address of developer and of the project.
- b) Type of project, compliance to zoning guidelines (Building coverage, Landscape coverage, Floor Area Ratios etc) and Rwanda building control regulations (Access for people with disabilities, emergency provisions etc), cost of project, implementation plan, Architectural and structural description, and environmental considerations among others.
- c) The Architectural and structural review the project proposal should also include a description of the design concept and the reasons of the stylistic, compositional and typological choices. In general a short description that allows complete understanding of the Architectural and structural approach. Specifically addressing the following key components:
- vi. object and context
 - ii. functional quality
 - vi. architectonical composition
 - iv. integration of competences
 - vi. environmental sustainability, and
 - vi. innovation
- d) For purposes of environmental review, the project proposal should also contain a description of the main materials and construction techniques adopted and any measures

taken for environmental sustainability. Specifically addressing the following checklist to support issuance of an Environmental Impact Assessment Certificate/Clearance:

- i. Application letter (addressed to the Chief Operating Officer-Rwanda Development Board.
- ii. Purpose, objectives and nature of project, including attributes such as size of project, design, activities that shall be undertaken during and after the establishment of the project, products and inputs, sources of inputs, etc.
- iii. Description of the proposed project site and its surroundings and alternative sites, if any, where the project is to be located.
- iv. Description of all planned activities and all materials to be used;
- v. Description of how the proposed project and its location conform to existing laws, regulations and policies governing such project and the use of the site/area proposed for its location.
- vi. Description of any likely environmental impacts that may arise due to implementing various phases/stages of the project and proposed mitigation measures thereto.
- vii. Description of all mitigation and compensating measures to reduce, minimize or offset the negative impacts;
- viii. Description of any other alternatives, which are being considered (e.g. sitting, technology, construction and operation procedures, sources of raw materials, handling of wastes etc., decommissioning/closure and site restoration).
- ix. Any other information that may be useful in determining the level of EIA required.
- x. Attachments: cadastral(deed) plan/lease contract of the land, project designs etc,

e) Façade of the whole project

- i. A collection of information on existing situation.
- ii. Site geotechnical survey.
- iii. The proposal for a detailed Architectural and structural and technical studies program on the basis of data collected.
- iv. Establishment of sketches.
- v. A report describing the project: various perspectives and materials chosen
- vi. Global cost estimate of the Project.
- vii. Layout plans on scale 1/100 of the various floors.
- viii. Site plan as well as external installation works 1/100
- ix. Longitudinal and transversal sections
- x. 4 color perspectives (front, rear, right and left side)

Notes

- ✓ All the plans will be presented on A3 format
- ✓ The preliminary design file will be given in 3 hard copies and soft copies (PDF and Editable formats)

3.3.2. FEASIBILITY STUDY

Make a Feasibility Study and submit the following Deliverables:

- Geotechnical study report
- Topographical survey report
- Environmental and Social Impacts assessment Report and associated permits (e.g., EIA report and provide EIA certificate, etc.)
- Drawing showing offices based on the current situation of REG offices
- Drawing showing Proper sitting arrangements of all REG employees (Headquarter)

3.3.3. DETAILED DESIGN

Currying out a detailed study (full design stage)

General requirements:

- All drawings for the plot with a surface area under 1 ha has to be compiled into two similar booklets on A1 format whereas for the plot with a surface area over 1 ha, the site plan and all drawings describing the overall of the plot will be submitted on A1,
- The project brief, the bills of quantities, the geotechnical, the structural calculation notes and all documents available on A4 formats have to be compiled into two similar booklets

The following documents will be checked into A3 or A4 Booklets:

- a) A copy of right of ownership and a copy of the deed plan including a copy of a receipt of payment of the plot location fees for the current year,
- b) A copy of the Project brief including the project implementation plan,
- c) A copy of structural calculation notes including the soil test results
- d) Perspectives vis a vis surroundings and a topographic map,
- e) A copy of the site plan detailed measurements/designs for all paving, steps, walls, curbs and gutters.

- f) A copy for any Architectural and structural, water, plumbing, drainage, general arrangement of natural and/or artificial ventilation and lighting, electrical, mechanical and structural drawings.
- g) A copy of Bills of quantity
- h) Environmental Impact Assessment clearance.
- i) Construction permit certificate from City of Kigali
- j) Safety measure plan (Fire Management)
- k) Disaster prevention
- l) A free technical assistance to the client for the tender document preparation which shall be done by the procurement unit of the client

Any other particulars, which the applicant feels, would be of assistance to the committee

Notes

- 1) All drawings/plans must be stamped and signed by an architect and Engineer from a competent design consultancy firm (which has submitted the profile in One Stop Center or is officially registered with the Rwandan Architects and Engineers Association),
- 2) All designs or Site improvement activities shall be done in conformity with the relevant Rwanda laws, regulations and guidelines,
- 3) Where applicable, the details of any special provisions for persons with disabilities shall be given on all plans and drawings

Architectural and structural drawings

- ✓ Layout plans on scale 1/100 of the various floors;
- ✓ Site plan as well as external installation works 1/100 } Longitudinal and transversal sections
- ✓ Color perspectives (front, rear, right and left).
- ✓ Other drawings will be made up:
 - ✓ Situation plan oriented on scale 1/100;
 - ✓ block/mass plan oriented on scale 1/100 (on A0 format);
 - ✓ External works (access ways, parking, gardens...);
 - ✓ Building plans (on A0 format) on scale 1/50;
 - ✓ Wall plans (on A0 format) on the scale 1/50 according to the orientation with all the doors, windows and other openings;
 - ✓ Roof plan (on A0 format);

- ✓ Transversal & longitudinal sections on scale 1/50, 1/100& 1/200.
- ✓ Indication on the plans of all materials for interior and external elements

All the plans will be presented in A3 format unless otherwise stated

Technical details and drawing

- ✓ Plans of electrical and telephonic installations, on scale 1/200.
- ✓ Plans of water supply and sewerage, water valves and rain water collection and disposal on scale 1/200;
- ✓ Structural calculations (geotechnical survey and lab tests are on Consultant's charge);
- ✓ Description of materials and their use and installation, and the standards to be used.

The file to be given will have to include detailed design details and graphic in three (3) copies

3.4. EXPECTED DELIVERABLES

i) National Electricity Control Center and its back-up site

Deliverables	Expectations	Timeframe to complete from effectiveness
Inception report	Presentation of Implementation roadmap, team presentation, Presentation of study methodology, field visits, data collection and analysis techniques, , understanding of the assignment and stakeholders	2 nd Month
1 st draft report	Having fully benchmarked and fully understood REG's SCADA, DMS and future expectations to serve as a regional center, develop a proposal with clear justification including also the following preliminary Design's data: <ul style="list-style-type: none"> - Demonstrate viability of the project in economic, environmental, and technical aspects - Geotechnical and soil Investigations Report - Topographical Surveyed data - Environment and Social requirements 	4 th Month

	- Proposal of layouts arrangements	
Draft final Report on the proposed scope of the Control Centres	Presentation of report and scope for control buildings, additional hardware and modules comprising at least the following: <ul style="list-style-type: none"> - Architectural and structural, structural, Mechanical, electrical, and plumbing drawings - Calculations notes - Bill of materials - Technical Specifications and Data Sheets - 	7 th Month
Environmental and Social Impact report	Full EIA and SMP report	
Final Report Presentation	Submission of Final Report and presentation to various stakeholders	11 th Month
Submission of final report accommodating stakeholders comments/inputs	<ul style="list-style-type: none"> - Final report including EIA/ESMP - Tender documents, - Designs for both structures 	12 th Month

ii) REG's Building for Communication Center and Offices

Deliverables	Expectations	Timeframe to complete from effectiveness
Preliminary Design File	<ul style="list-style-type: none"> - Geotechnical and soil Investigations Report - Topographical Surveyed data - Environment and Social requirements - Proposal of Sitting and layouts arrangements 	2 nd Month
Detailed design file	<ul style="list-style-type: none"> - Architectural and structural, structural, Mechanical, electrical, and plumbing drawings - Calculations notes - Bill of materials - Technical Specifications and Data Sheets 	6 th Month

	- Environmental and Social Impacts assessment Report and associated permits	
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4. REQUIRED FIRM SPECIFIC EXPERIENCES

The consulting Firm must submit evidence of firm's previous experience in works associated with Geotechnical investigation and Architectural and structural design of similar or higher capacity accomplished within the last 10 years:

S/N	Name of similar Project	Minimum number of Projects
1	Geotechnical Studies of high-raised building class: G + ≥ 10 + 2B	10
2	Architectural and structural and structural design for high-raised building class: G + ≥ 10 + 2B	10
3	Architectural and structural design for High Voltage Substation (110kV and above) Control Buildings including telecommunication system using SCADA	5

The information will be provided using the following table:

S/N	Name of similar Project	Scope of Work	Time of Service	Reference	Service Completion Certificate
1					
2					
3					
4					
5					

5. TEAM COMPOSITION & QUALIFICATION REQUIREMENTS FOR THE KEY EXPERTS

Expertise	Responsibility	Qualification and experience
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Team leader/ Lead consultant	Will be the team leader and shall undertake the overall coordination of the Consultancy activities	The Project Manager /Team Leader (PM) should have minimum Master's degree in architecture or Engineering with at least 15 years of working experience and 10 years of being team leader in similar projects.
Telecommunication expert/specialist	In charge of Telecommunication	The Expert should have a bachelor's degree in electronics, telecommunication of electrical and electronics with at least 10 years, proven experience with operational Technologies and in experience with supervisory Control and data acquisition SCADA and Energy Management System for electric Utilities. The consultant should have an extensive experience cyber security and system protection.
Power system protection analysis and protection development specialist	In charge of design for Protection system	The specialist should preferably have a master's degree in electrical engineering with at least 15 years of hands-on experience in power system engineering with main focus on protection and control/automation
Architect	will prepare detailed design incorporating the design work done by other consultants and prepare all necessary production drawings with all details and specifications necessary for regulatory approval and preparation of bill of quantities.	Minimum qualification is A0 in Architecture with at least 10 years of working experience in similar project and registered by the relevant professional registering bodies
Civil / Structural Engineer	Will prepare the structural / civil engineering drawings and specifications necessary for the preparation of tender of construction work.	Minimum qualification is A0 in Civil engineering with at least 10 years of working experience in similar project and registered by the relevant professional registering bodies
Geotechnical Engineer	Will prepare the geotechnical investigation reports	A0 in Geotechnical engineering or civil engineering with at least 5 years' experience in investigation of subsurface conditions and materials; relevant physical/mechanical and chemical properties of materials

Expertise	Responsibility	Qualification and experience
Team leader/ Lead consultant	Will be the team leader and shall undertake the overall coordination of the Consultancy activities	The Project Manager /Team Leader (PM) should have minimum Master's degree in architecture or Engineering with at least 15 years of working experience and 10 years of being team leader in similar projects.
Telecommunication expert/specialist	In charge of Telecommunication	The Expert should have a bachelor's degree in electronics, telecommunication of electrical and electronics with at least 10 years, proven experience with operational Technologies and in experience with supervisory Control and data acquisition SCADA and Energy Management System for electric Utilities. The consultant should have an extensive experience cyber security and system protection.
Power system protection analysis and protection development specialist	In charge of design for Protection system	The specialist should preferably have a master's degree in electrical engineering with at least 15 years of hands-on experience in power system engineering with main focus on protection and control/automation
		determination; stability of natural slopes and man-made soil deposits evaluation; assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation
EIA Expert	Will prepare necessary Environment Impact assessment report and follow up on approval by RDB, this will be used during the implementation of the project	Minimum A0 in environment Engineering and REMA recognized EIA registration course/ Registered EIA Expert with REMA with at least 5 years of professional experience in EIA
Electro-Mechanical Engineer	Will prepare the Mechanical & Electrical engineering drawings	Minimum qualification is A0 in Mechanical/Electrical engineering with at least 10 years of working experience and registered by the relevant professional registering bodies

Expertise	Responsibility	Qualification and experience
Team leader/ Lead consultant	Will be the team leader and shall undertake the overall coordination of the Consultancy activities	The Project Manager /Team Leader (PM) should have minimum Master's degree in architecture or Engineering with at least 15 years of working experience and 10 years of being team leader in similar projects.
Telecommunication expert/specialist	In charge of Telecommunication	The Expert should have a bachelor's degree in electronics, telecommunication of electrical and electronics with at least 10 years, proven experience with operational Technologies and in experience with supervisory Control and data acquisition SCADA and Energy Management System for electric Utilities. The consultant should have an extensive experience cyber security and system protection.
Power system protection analysis and protection development specialist	In charge of design for Protection system	The specialist should preferably have a master's degree in electrical engineering with at least 15 years of hands-on experience in power system engineering with main focus on protection and control/automation

6. REPORTING REQUIREMENTS AND TIME SCHEDULE FOR DELIVERABLES

6.1. Reports and Duration

As the studies are carried out, reports will be provided at each stage to allow a regular follow up by the Client. In addition to printed documents and drawings which must be submitted in 3 copies, all the documents will be also on CD. The overall duration is 12months and details are per expected project deliverables.

The Consultant must provide the following documents:

- The preliminary design.

➤ The Detailed design/ construction drawings+ draft tender documents: Tender Documents as well as a confidential estimate of works

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➤ Validation of Design by REG and other invited institution (RHA and Kigali city master plan)

The Consultant is held to provide regularly progress report of the study, encountered possible difficulties that shall affect the duration of the studies.

The consultant has to present the Project Design to Client and other invited institutions (RHA and Kigali city etc) for validation.

REG will have one Month to check the various documents presented to each stage and to require possible modifications of the submitted document. These modifications will have to be transmitted in writing to the Consultant who will incorporate them during the drafting of the following stage.

7. CLIENT'S INPUT AND COUNTERPART PERSONNEL

The client shall put at the disposal of the Consultancy firm all the relevant documents and data concerning the typical designs of REG's Electricity Network Control Center and Communication Center Buildings.

Annex 1: Requirements for IT Data Center

I. Data Center

Often, what many people refer to as a ‘server room’ or ‘data center’ is actually a ‘hub room’ containing a few racks of routers and servers to distribute data from remote servers.

The planned datacenter construction shall be constructed with energy saving features, sustainable materials, and other environmental efficiencies in mind. In other words, it shall be a green datacenter.

I) Rooms and Sizing

No	Name	Usage	Proposed Width	Proposed Height
1	Electrical room	Hosting electrical and UPS	15*15m	3.5 m
3	Network room	Hosting network devices &Fiber optic infrastructure	10*15 m	3.5 m
3	Data center	Hosting servers and racks	15*15 m	3.5 m and above
4	Control room	Monitoring room	10*10 m	3.5 m
5	IT Workshop	Repair & Maintenance	-	-
6	IT Training Room	IT and Systems training	-	-

II) Connectivity

The datacenter shall be a carrier neutral facility with access to multiple fiber providers and diverse paths for fiber access.

III) Cabling

Both electricity and Data cables must pass through underground trays and sometimes ceiling trails.

Data cable may pass through ceiling and power cable pass under raised floor. It is better they do not cross pass each other.

Each rack should have its own switch for better cable management

Each rack would be better it relates to two sources of power for redundancy, easy maintenance with minimum service downtime.

IV) Electrical Power

The datacenter shall be powered by an efficient power generation system taking into consideration the amount of electrical equipment installed into the room.

The power system shall be allowed to be extended to future needs.

It is necessary that the installations allow both the on-grid connection and the external power inputs such as generators.

In some instances of power outage, business-critical systems will need to be maintained beyond the duration the UPS batteries will support. It is therefore important that servers have access to a standby power supply source, own/independent dedicated Generator, preferably from the outside face of the building.

A strong Electrical generator shall be installed for the purpose with xxxxxx capacity (to be determined by Electrical department).

80 KVA or more dedicated to only the datacenter and its affiliated rooms shall be installed.

Two independent and separate electrical power supplies into the room, to allow you to connect servers with two different power supplies, then a blackout of one supply will not lead to a general interruption of the services.

V) Security, Access (Physical access, Logical access)

The fundamental demands for security controls to a data center are to ensure the main objectives of IT security, namely confidentiality, availability, and integrity.

The degree of security concern and the response vary greatly, but in general datacenter rooms are left locked with access provided through biometrics, keypad, or card-swipe. Ideally, there is a log of who entered and when. Often closed-circuit cameras monitor the room.

Doors shall be metallic and locked manually and electronically as described above.

Entrance recorded: Access to the datacenter rooms should be recorded and reviewed, so that it not only prevents unauthorized access but also detects unauthorized access or access attempts.

The surrounding of the datacenter shall be protected, and the building made from concrete blocks.

There shall be a perimeter security fence and CCTV, Microwave, Motion Detectors (200+), Bollards, Security Booths at Entrances and in each datacenter rooms.

Physical security: Administrative controls and Physical/Technical controls.

Administrative control: Facility construction; the datacenter is ideally planned and designed with the blueprint of a building.

They can be fully mounted with access control, air conditioner, fire distinguisher, UPS, raised floors and suspended ceilings.

VI) Fire protection, detection and suppression

The room shall be equipped with Water/Smoke Detection and associated Alarm Panel for water Detection (Even a single drop) and Alarm Panel for smoke Detection. These shall meet the standard of datacenter environment control.

VII) Environmental control

An environmental monitoring system (EMS) is often used in facilities of this type to regulate temperature, humidity, and power supply, and even to detect water leaks from pipes or ceiling. EMS can also monitor the status of UPS, batteries, and cooling systems. This capability can typically be incorporated via the UPS interface and can be available on web browser so that it is accessible from any location.

• AIR CONDITIONING

Larger server rooms with more racks, arranged in rows might be better served by a floor-mounted system. ‘Downflow’ units may be more appropriate in spaces where increased cooling loads and air distribution are needed. To accommodate floor cooling, a raised floor is often installed in the room, with the air-conditioning (precision air conditioning) subsequently distributed through the floor void.

Redundant systems may need to be available in case one should fail or need maintenance.

• CEILING

Extensive project experience has shown that built or false ceilings are generally unsuitable features for server rooms.

Chiefly, this is due to the overhead space requirements for an air conditioning return air path and down flow unit. Incorporating ceilings will only complicate the already limited Headroom available, but for some hub rooms and smaller server rooms they are Occasionally left in place.

To prevent this, the ceiling inside the server room is made in a thin layer of aluminum and the clearance between cable trays and ceiling must be considerable at least a minimum of 0.9m to 1m.

• FLOORING & RAISED FLOORS

The cables and cooling apparatus required for a server room or data centre often makes raised flooring a ‘must’ for these facilities. Access is much easier with a raised floor.

Raised flooring usually comprises of panels finished with a high-pressure laminate material and installed atop pedestals (long thin columns which supports a statue, or a tall column-like structure on which something rests), allowing for easy removal for access to the space below.

Raised floor components may also need to be grounded. Whether raised or not, flooring materials need to be antistatic to prevent sparks from occurring. Fire suppression for floors raised over a certain height may also be required by code. Raised floors can also raise additional design questions, such as whether ramps will be required for the movement of equipment in and out of the room.

A ramp may be necessary a removable ramp may be considered

G WIRE SERVER CAGES PARTITION PANEL

Inside the serve room, rows of rack are separated by wire mesh

VIII) Monitoring room

There shall be monitoring systems for each piece of equipment in the datacenter and its affiliated rooms. These includes a monitoring system for the UPS and power systems, a monitoring system for network devices & servers and network flows, a monitoring system for camera and security access and a monitoring system for SCADA.

The output of the monitoring systems shall be on large screen display wall mounted.**Annex 2: Requirement for NCC & DNCC Controls**

1. The facility (NCC & DNCC) description

Modern and functional buildings to host the (NCC) and (DCC) control room, offices and Back-up site. The Control Room Building shall be equipped with various rooms for various purposes:

- ▲ Primary Control Centers /Real time control rooms (x2)
- ▲ Test/Quality Assurance System room (x2)
- ▲ Program and Development System (PDS) room (x2)
- ▲ Training and Simulation rooms (x2)
- ▲ Engineering and Development rooms (x2)
- ▲ Server rooms (x2),
- ▲ Staff Changing room (x1)
- ▲ Stores room (2)
- ▲ Security camera room (x1)
- ▲ Physical fence for access control (x3)
- ▲ Logical access for security doors access control (all critical doors)
- ▲ Auxiliary power supply room (01)
- ▲ DC power Supply room (01)
- ▲ Meeting Room (02)
- ▲ GIS and Modelling Room (01)

ANNEX 3: REQUIRED AREA FOR REG COMMUNICATION CENTER

1. STAFF OFFICES

Staffs with 5% Increment Every Year and considering 8 Sqm/Person							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Needed Area 8 Sqm/Person
REG	76	80	84	88	92	97	776
EUCL	600	630	662	695	729	766	6,126
EDCL	340	357	375	394	414	435	3,480
Nyarugenge Branch	25	27	29	31	33	35	280
Total (Sqm)	1041	1093	1148	1205	1265	1329	10,662

2. CONFERENCE & BOARD ROOMS

Board & Conference rooms			
Rooms	Number	Square meters	Total (Sqm)
Big Conference rooms	1	500	500
Computer training room	2	80	160
CEO Conference room	1	60	60
MD Conference room	2	60	120
Departmental Conference rooms	12	40	480
Mini Store	2	100	200
Generator room	1	25	25
Canteen	1	500	500
Cafeteria	1	200	200
Gymnasium	1	500	500
First Aid Unit (Clinic)	1	200	200
Breast feeding room	2	25	50
Lobby	1	500	500
Total			3,495