NBRB | NATIONAL BUILDING REVIEW BOARD

Safe Building, Better Living

BUILDING INSPECTION BOOKLET

JUNE, 2020

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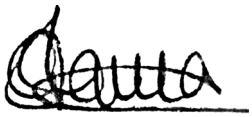
Foreword

The Government of Uganda enacted the Building Control Act, 2013 to consolidate, harmonise and amend the law relating to the erection of buildings - provide for building standards, establish a National Building Review Board (NBRB) and Building Committees, and promote and ensure planned, decent and safe building structures that are developed in harmony with the environment; and for other related matters. Section 9 of the Building Control Act, 2013 mandates the NBRB to monitor building developments in the country and to oversee, inspect and monitor the operations of Building Committees, among others.

As you may be aware, the country has witnessed in the recent past, an increase in the frequency of building related accidents – some fatal. A major cause of these accidents is a general lack of inspection of building operations. Reg. 27 of the Building Control Regulations, 2020 introduces a mandatory requirement for building operations to be inspected. This booklet has been developed to ensure adherence to the regulations as well as uniformity in reporting, and to form a basis for commencing works and issuance of occupation permits for ALL building developments in Uganda.

It is my very sincere hope that the material contained in this booklet shall serve as a useful tool to the Building Committees as they execute their mandate of ensuring compliance with the Act. Similarly, it should enhance the developers understanding of the legal and technical requirements associated with building site operations and management, and facilitate professionals in conducting inspections of building operations in compliance with the Act, the Code and the Regulations.

Finally, I wish to extend my heartfelt gratitude to Eng. Hans JWB Mwesigwa, Eng. Dr. Rachel Namuli and Eng. Dr. Christopher Senfuka (Uganda Institution of Professional Engineers); Arch. Kenneth Amunsiimire (Uganda Society of Architects) and Arch. Jerome Olowo Stowell (NBRB Secretariat) for the credible input and eventual preparation of this inspection booklet. I similarly thank their parent institutions for seconding to us such a dedicated team of true patriots.



Eng. Flavia G. Bwire

EXECUTIVE SECRETARY

Disclaimer

The material and information contained in this Inspection Booklet is for general information and ease of reference only. The information in the Booklet is not intended to substitute the laws, Regulations and Code cited in this Booklet. Users of the Booklet are encouraged to refer to the detailed text of the relevant law in order to make any business, legal or any other decisions.

1.0 PROJECT DETAILS

1.1	Project Name	
1.2	Developer	
1.3	Lead Consultant/Project Manager	
1.4	Contractor	
1.5	Start Date of Project	
1.6	Expected Completion Date of Project	
1.7	Date of Approval of Building Plans	
1.8	Is approval of building plans still valid? (Tick as appropriate)	Yes No
1.9	Building Permit No.	

2.0 DESCRIPTION OF WORKS
(Give a brief description of the project and its purpose)

2.1	Class of Building (Refer to Annex 1). (Tick as appropriate)	Class A Class B Class C
2.2	Function/purpose of Building	
2.3	Type of Construction	New works Renovations Alterations

3.0 PROJECT TEAM

3.1 DEVELOPERS TEAM

	DESIGNATION	NAME	SIGNATURE
a)	Contract Manager		
b)	Project Manager		
c)	Owners Engineer		
d)	Clerk of Works		
e)	Other, please specify _____		

3.2 CONSULTANTS TEAM

	DESIGNATION	NAME	SIGNATURE
a)	Project Manager		
b)	Architect		
c)	Civil and Structural Engineer		
d)	Mechanical Engineer		
e)	Electrical Engineer		
f)	ICT Specialist		
g)	Quantity Surveyor		
h)	Resident Engineer		
i)	Others, please specify _____ _____ _____ _____		

3.3 CONTRACTORS TEAM

	DESIGNATION	NAME	SIGNATURE
a)	Contract Manager		
b)	Foreman for Civil and Structural Works		
c)	Foreman for Mechanical Works		
d)	Foreman for Electrical Works		
e)	Foreman for ICT Works		
f)	Health and Safety Officer		
g)	Others, please specify _____ _____ _____ _____		

4.0 BUILDING ARCHITECTURE

4.1 BUILDING ARCHITECTURE FOR CLASS A AND B BUILDINGS

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	**UNC**	Improvement Recommended	**IMP**	Not Verified	**N/V**	Not Applicable

ITEM No.	**DESCRIPTION**	**OUTCOMES (Use codes above. Provide comment where appropriate)**	**QUERY RECTIFIED (Y/N)**
4.1.1	**PRE-CONSTRUCTION DOCUMENTATION (NBR)**		
	a) Approved Plans b) Building Permit c) Demolition Permit d) Hoarding Permit e) Land Survey Report f) Construction Drawings and Specifications g) Supervision Agreements h) NEMA Certificate i) Traffic Impact Assessment j) OSH Approval k) ARB Project License Plate l) Inspection Job Card m) Site Instruction Book n) Copies of relevant building codes o) Contractor's work programme p) Relevant Insurance cover q) Site Health and Safety Policy r) Excavation Plan s) Materials Test Certificates t) Supervision Progress Reports u) Site Meeting and Inspection Reports v) Contractor's Method Statement of Work w) Unpriced Bills of Quantities		
4.1.2	**SITE OPERATIONS & PRELIMINARIES**		
4.1.2.1	**Site Operations (Reg. 29, BCR, 2020)** a) Safe and secure fencing. b) Operations confined within site boundaries. c) Site signboard location, complete building team members contact details.		
4.1.2.2	**Demolition Work** a) BC approval. b) Health and safety. c) Public convenience. d) Public safety. e) Building conditions during demolition. f) Demolition method suitability.		
4.1.2.3	**Hoardings to be Erected During Building Operations (P55, NBC Building Standards)** a) Building Committee opinion. b) Building Committee permission.		
4.1.2.4	**Special Hoarding (P56, NBC Building Standards)** a) Application to Building Committee for building works with barricade or hoarding on part of street or public way. b) Proper lighting of barricade/hoarding from sunset to sunrise. c) Conformity with Building Committee requirements. d) Removal as required by Building Committee. e) Consent from Electricity company/ministry for site works nearer than 7 feet to any overhead electric line.		
4.1.2.5	**Advertisements on Hoardings (P58, NBC Building Standards)** a) Building Committee Permission		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.2.6	**Temporary Site Buildings (Reg. 30, BCR, 2020)** a) Builders shed. b) Location approved by BC. c) Condition of sheds. d) Notification by BC. e) Security personnel accommodation compliance with public health, and neighbours consent.		
4.1.2.7	**Sanitary facilities (Reg. 31, BCR, 2020)** a) Location approved by BC. b) Site workers: facilities ratio. c) Non-offensive placement. d) Hygiene. e) Removal after building operations.		
4.1.3	**SITING OF BUILDINGS-(P4, NBC Building Standards)**		
4.1.3.1	**Siting of Buildings** a) Building Committee Approval b) Sanitary Conditions c) Outbuildings Nuisance d) Removal/management of offensive landfill material		
4.1.3.2	**Drainage of Site-(P5, NBC Building Standards)** a) Site subsoil dampness b) Drainage type used		
4.1.3.3	**Control of Buildings in Swampy Sites (P6, NBC Building Standards)** a) Subsoil water level b) Use of pit latrine c) Reinforcement of pit latrine walls		
4.1.3.4	**Plot frontage.(P7, NBC Building Standards)** a) Presence of access road b) Road reserve width		
4.1.3.5	**Building Lines (P8, NBC Building Standards)**		
4.1.3.6	**Access to Lanes and Passages (P9, NBC Building Standards)**		
4.1.3.7	**Paving and Gates to Passages (P10, NBC Building Standards)**		
4.1.3.8	**Paving and Draining of Yards (P11, NBC Building Standards)**		
4.1.3.9	**Plot Coverage (P12, NBC Building Standards)**		
4.1.3.10	**Building Setbacks (P13-P15, NBC Building Standards)** a) Front b) Rear c) Sides		
4.1.3.11	**Plot Area**		
4.1.3.12	**Access to Utilities (P18, NBC Building Standards)**		
4.1.3.13	**Boundary Fencing (P19-P20, NBC Building Standards)** a) Materials b) Transparency c) Sloping site measures d) Razor wire height e) Broken glass f) Electric fencing		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.3.14	**Landscaping and Parking (Reg. 15, BCR, 2020)** a) Site and neighbourhood aesthetics. b) Screening against environmental hazards. c) Hazardous substance or activity containment within building curtilage. d) Use of indigenous flora and local materials. e) Parking provided within site boundaries. f) Number of car parking slots.		
4.1.4	**SUBSTRUCTURE**		
4.1.4.1	a) Type of foundation b) Footings/bases sizes c) Materials used: • masonry • steel reinforcement • aaggregate • cement • sand • DPM • anti-termite treatment • backfill material d) Site safety e) Basements: • lighting • ventilation • drainage • accessibility • fire protection • surface finishes • site safety		
4.1.5	**SUPERSTRUCTURE**		
4.1.5.1	**Floor Height**		
4.1.5.2	a) Materials used • External Walls • Internal walls b) Floor slab construction c) Room sizes d) Natural lighting e) Ventilation f) Roofing g) Flat roofs h) Site safety		
4.1.5.3	**Canopies (P27-P37, NBC Building Standards)** a) Conformity with neighbouring buildings i. Canopy height ii. Pavement width beneath canopy iii. Materials of pavement iv. Canopy width v. Canopy condition vi. Conformity with existing canopies vii. Canopy drainage viii. Water discharge to pavement ix. Canopy soffit sealing x. Canopy loading xi. Canopy fireproofing		
4.1.5.4	**Balconies and Bay Windows Overhanging Streets (P38-P39, NBC Building Standards)** a) Doors and windows not to open outwards.		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.5.5	**Stairs (P41-P42, NBC Building Standards)** a) Building height b) Separate access from upper floors c) Main staircase height (storeys) d) Number of steps in flight e) Landing length f) Number of flights g) Provision for turning h) Width of door opening to landing i) Variation in riser dimensions and tread goings j) Tapered treads • Distance from narrower end of tread • Going • Horizontal angle between successive risers • Variation in goings and riser dimensions k) Winders • Type of dwelling unit • Number of successive winders • Turning angle of winders l) Dwelling houses (single): • Width • Rise • Tread • Headroom • Winders m) Multiple dwellings and warehouses with less than 10 employees • Width • Rise • Tread • Headroom • Winders n) Warehouse buildings with more than 10 employees • Width • Rise • Tread • Headroom • Winders		
4.1.5.6	**Bannisters of Balconies and Stairways (P43, NBC Building Standards)** a) Number of handrails b) Position of handrails c) Continuous outer handrail d) Projection of handrails e) Spacing of bannisters for stairways and balconies f) Safe infilling below handrails g) Balustrade height: • above nosing at staircase rake and • at landings. h) Balustrade strength i) Provision of central handrail where stairway exceeds 2.4 m width j) Stairway ventilation k) Stairway lighting l) Stairway materials fire safety compliance		
4.1.5.7	**Pedestrian guarding for siting. P44 NBC Building Standards** a) Balcony edges b) Floor gallery edges c) Sunken area of building d) Vehicle parks Exceptions: Ramps used for vehicle access and loading bays.		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.5.8	**Vehicle Barriers (P45, NBC Building Standards NBS)**		
4.1.5.9	**Ramps (P46, NBC Building Standards)** a) Vehicle ramp • Gradient • Width • Distance from street boundary b) Pedestrian ramp • Gradient • Width c) Pedestrians and vehicle ramp • Walkway width • Walkway kerb height		
4.1.5.10	**Staircases in Buildings Intended for Separate Occupation (P47, NBC Building Standards)** • Lighting at storey above ground • Ventilation at highest point		
4.1.5.11	**Escalators to be in Addition to Staircases** a) As means of emergency exit		
	Means of escape: a) Height of building (storeys /m)		
4.1.5.12	**Enclosure and Position of Lifts and Motor Rooms (P50, NBC Building Standards)** a) Motor room conditions. b) Lift shaft smoke outlet position, area and fitting materials. c) Motor room ventilation. d) Domestic and public buildings lift enclosure materials.		
4.1.5.13	**Lifts (P51, NBC Building Standards)** a) Compliance with OSH Act, 2006. b) Clear space between lift shaft bottom and lowest point of cage floor. c) Lift shaft pit bottom conditions. d) Lift pit floor drainage. e) Counterbalance safety provisions. f) Lift Inspections Report.		
4.1.6	**PRECAUTIONS AGAINST FIRE (P52, NBC Building Standards)** a) Construction materials b) Number of fire escapes c) Secondary means of access d) Fire resisting floors e) Fire resisting stairs and staircases f) Fire resisting passages g) Placement of refuse bins h) Refuse bin site floor finish and walling i) Roofing and Draining of refuse bin sites		
4.1.7	**SCAFFOLDING (P54, NBC Building Standards)** a) Platforms and gangways scaffolding width and height. b) Toe boards and guard rails on open sides. c) Building committee assessment of damage risk to persons and property. d) Scaffolding above 6m height constructed in approved steel.		
4.1.8	**ASSEMBLY BUILDINGS**		
4.1.8.1	**Arrangements (P59, NBC Building Standards)** a) Occupancy classification type. b) Position of main floor in relation to level of exit street.		
4.1.8.2	**Sites Safety (P60, NBC Building Standards)** a) Building Committee opinion. b) Protection against fire from adjacent properties. c) Building Committee prohibition on use of defective structure.		
4.1.8.3	**Area per Person (P61, NBC Building Standards)**		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.8.4	**Fire Resistance Ratings (P62, NBC Building Standards)** a) Floors b) Walls c) Stairs d) Ceilings e) Doors f) Windows		
4.1.8.5	**Floors and Slope of Floors (P63, NBC Building Standards)** a) Slope of floors b) Passage and Aisle steps dimensions		
4.1.8.6	**Height of Galleries (P64, NBC Building Standards)** a) Clear height of first floor or balcony extending over pit, stalls or area. b) Height between floor of the highest [part of the gallery and lowest part of the ceiling over the part.		
4.1.8.7	**Width of Aisles P65 NBC Building Standards**		
4.1.8.8	**Gangway Around Auditorium (P66, NBC Building Standards NBS)**		
4.1.8.9	**Pit Floor (P67, NBC Building Standards)**		
4.1.8.10	**Stairs in Assembly Buildings (P68, NBC Building Standards)**		
4.1.8.11	**Planning of Lobbies (P69, NBC Building Standards)**		
4.1.8.12	**Stage Space (P70, NBC Building Standards)**		
4.1.8.13	**Ventilation (P71, NBC Building Standards)**		
4.1.8.14	**Doors (P72-P75, NBC Building Standards)** a) Swinging of doors. b) Panic bolts and locks on doors. c) Door fastening prohibited. d) Outlet doors.		
4.1.8.15	**Exits (P76-P82, NBC Building Standards)** a) Notice on Exit Doors. b) Separate exits for each level. c) Width of exits. d) Number of exits. e) Exits to be spaced apart. f) Separate and independent exits.		
4.1.8.16	**Lighting (P83, NBC Building Standards)** Efficient lighting all the time during whole period of use for: a) entrance halls, b) passages, c) staircases, d) gangways and e) other means of approach to public room or building.		
4.1.8.17	**Artificial Lighting (P84, NBC Building Standards)** a) Ensure no darkness in building in the event of accident or power breakdown. b) Two separate systems of electric lighting from two separate supply sources. c) All exit lamps remain lit during building use by public.		
4.1.8.18	**Means of Warning and Escape (P85, NBC Building Standards)** a) Early warnings of fire. b) Appropriate means of escape from building to safety place outside the building. c) Safety place is safely and effectively used at all times.		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.8.19	**Internal Fire Spread (P85, NBC Building Standards)** a) Internal wall lining adequately resists fire spread over its surface(Fire Rating). b) If ignited internal lining has reasonable fire growth rate or heat release rate.		
4.1.8.20	**Temporary Proscenia (P86, NBC Building Standards)** a) Building Committee Permission required. b) Ensure performers safety. c) Ensure audience safety. d) Fire resistance treatment of scenery curtain and temporary proscenium.		
4.1.8.21	**Cinematograph Chambers** a) Cinematograph equipment (P87, **NBC Building Standards**) b) Cinematograph room construction		
4.1.8.22	Owner to cover costs of alterations or additions required by notice issued under the Building Code P88, NBS **NBC Building Standards**.		
4.1.9	**BUSINESS OR INDUSTRIAL BUILDINGS**		
4.1.9.1	**Offices in Shops (P89, NBC Building Standards)** a) Lighting for shop part used as office to be according to Code 111 & 117. b) Exemptions by Building Committee.		
4.1.9.2	**Offices in Industrial Buildings (P90, NBC Building Standards)** a) Lighting for factory or workshop part used as an office to be as per Code 82 and 83. b) Building Committee exemption on parts considered to be adequately lit and ventilated.		
4.1.9.3	**Size of Rooms in Industrial Buildings (P91, NBC Building Standards)** a) Floor area according to Table 4, Schedule 1.		
	Further Requirements (P92, NBC Building Standards) a) Provided more than 20 persons work in shops and offices at any one time, provisions for public buildings and assembly buildings design apply as stated in Codes 59, 60 and 63-66 to the shops and office buildings.		
4.1.9.4	**Division of a Large Multipurpose Building (P40, NBC Building Standards)**		
4.1.10	**SCHOOL BUILDINGS**		
4.1.10.1	**Classrooms (P93, NBC Building Standards)** a) Classroom dimensions to suit number of learners intended for the room. b) 1.1 m minimum aisle width. c) 3 m minimum mean height. d) Measurements as per design population standards in Schedule 1, Table 4.		
4.1.10.2	**Halls (P94, NBC Building Standards)** Minimum 0.5 m^2 floor space per learner.		
4.1.10.3	**Lighting and Ventilation (P95, NBC Building Standards)** a) Classroom lighting in accordance with Code 112 &113. b) Classroom ventilation in accordance with code 115 & 116.		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.10.4	**Accommodation for Boarders (P96, NBC Building Standards)** a) Suitable and sufficient dormitories in addition to classrooms for every boarding school. b) Separate dormitories for each gender. c) Minimum floor area per learner as per Schedule 1, Table 4 considering 2.78 m^2 for learners under 12 years of age. d) 3.7 m^2 for each learner where double decker beds are used. e) Beds placed at least 300 mm from dormitory walls. f) Distance between adjacent beds not less than 1100 mm. g) Unobstructed passage of at least 1100 mm in dormitory with two or more lines of beds. h) Bed fabrication to ease regular disinfestation. i) Dormitory lighting in accordance with Code 111 & 112. j) Dormitories with secure, sufficient and accessible latrines and showers.		
4.1.10.5	**Accommodation for Meals (P97, NBC Building Standards)** a) Separate accommodation required for meals. b) Dining area not to communicate with dormitory except via properly ventilated passage. c) 0.75 m^2 area per learner using dining.		
4.1.10.6	**Kitchens and Water Supply (P98, NBC Building Standards)** Kitchen required for every boarding establishment. a) Suitable size, type and construction. b) Sufficient water supply for washing and bathing of users. c) Sufficient supply of wholesome drinking water always. d) Accessible, uncontaminated water supply where no piped water supply exists.		
4.1.10.7	**Latrine Accommodation (P99, NBC Building Standards)** Proper and sufficient latrine units mandatory for all schools. a) Latrine to learner ratios according to types. a. WCs, 1:15 persons for boarding facilities or 1:25. b. WCs for non-boarding facilities up to 100 persons, 1:40 for above 100 persons. c. Pail closets: i. 1:12 for boarding facilities and ii. 1:12 for non-boarding up to 48 persons. 1: 24 for above 48 persons. d. Urinals: i. 50% reduction in male latrines where latrines are provided, ii. 1 stall/basin:25 males or iii. 560 mm channel length for every 25 males. b) Schools with both boarding and non-boarding learners. c) Separate latrines for learners of each gender. d) Separate latrines for staff, for each gender. e) Privacy and effective screening of latrines of each gender from the other. f) 18 m maximum distance of dormitory from latrine. g) 45 m maximum distance of classroom from latrine.		
4.1.10.8	**Floors (P100, NBC Building Standards)** Impervious floors with every part regularly cleanable.		
4.1.10.9	**Playgrounds (P101, NBC Building Standards)** Open space of sufficient size required and where possible adjacent to every school for playground use by learners.		
4.1.11	**RESIDENTIAL BUILDINGS**		
4.1.11.1	**Size of Rooms Intended to be Used as Dwellings (P102, NBC Building Standards)** a) Superficial area of habitable room at least 9 m^2. b) Area per person at least 3.7 m^2, except: i. at least 7.4 m^2 for additional habitable rooms and ii. At least 3.7 m^2 for ironing rooms.		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.11.2	**Provision of Kitchens, Stores and Bathrooms for each Dwelling (P103, NBC Building Standards)** a) Kitchen area not less than 7.4 m^2 and height of 2.6 m. b) Hotel kitchen meets size parameters in Schedule 1. c) Outside kitchen at least 2.3 m^2 and 2.6 m high. d) Approved smoke extraction. e) Window sizes as per Code 111 & 113. f) Refuse disposal and drainage means. g) Size of cupboard more than 2.8 m^3 to be provided lighting. h) Bathroom size at least 1.5 m^2 and 2.4 m mean height and not less than 2.1 m height. i) Sufficient bathroom lighting as per Code 111 & 113.		
4.1.11.3	**Position of Blocks of Flats and Hotels (P104, NBC Building Standards)** a) Plots should be approved by Building Committee where no zoning exists. b) Number of blocks of flats permitted on the plot. c) Effect of residential plot development on adjoining residential plots.		
4.1.11.4	**Construction of Buildings of More than Two Storeys (P105, NBC Building Standards NBS)** a) Fire escapes required. b) Access to building for public services required. c) Drainage of waste, foul and storm water required. d) Additional escape means and refuse disposal via secondary staircase within 27.4 m from entrances. e) Location of central sites for refuse containers. f) Construction of refuse sites with impervious floor, approved roofing, drainage and fly proofing.		
4.1.11.5	**Kitchens in Flats (P106, NBC Building Standards)** Code 103 (2)(a) and (e) not applicable to communal dining and catering.		
4.1.11.6	**Facilities to be Provided for all Residential Rental Premises Tenants (P107, NBC Building Standards)** a) Latrines (refer to Mechanical Installation standards). b) Lighting in all common circulation areas. c) Water supply. d) Food storage space. e) Kitchen and ablution facilities. f) Waste and foul water drainage.		
4.1.12	**LIGHTING AND VENTILATION**		
4.1.12.1	**Provision of Windows (P111, NBC Building Standards)**		
4.1.12.2	**Area of Windows (P113, NBC Building Standards)**		
4.1.12.3	**Space Opposite Windows (P114, NBC Building Standards)**		
4.1.12.4	**Window and Ventilation Requirements for Soilwater Fitting Apartments (P115, NBC Building Standards)**		
4.1.12.5	**Ventilation of Rooms (P116, NBC Building Standards)**		
4.1.12.6	**Ventilation of Public Buildings (P117, NBC Building Standards)**		
4.1.12.7	**Warehouse Lighting and Ventilation (P112, NBC Building Standards NBS)**		
4.1.13	**BUILDING MATERIALS**		
4.1.13.1	**General Requirements (P118, NBC Building Standards)**		
4.1.13.2	**Testing (P119, NBC Building Standards)**		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified	N/V	Not Applicable

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.13.3	**Second-hand Material (P120, NBC Building Standards)**		
4.1.13.4	**Other Standards (P121, NBC Building Standards)**		
4.1.13.5	**Water Quality (P122, NBC Building Standards)**		
4.1.13.6	**Sand or Fine Aggregate (P123, NBC Building Standards)** a) Quality b) Size c) Material source		
4.1.13.7	**Coarse Aggregate (P124, NBC Building Standards)** a) Quality b) Size		
4.1.13.8	**Cement (P125, NBS)** Compliance with UNBS Standards.		
4.1.13.9	**Bricks and Blocks (P126, NBC Building Standards)** a) Hardness b) Durability c) Combustibility d) Maturity e) Crushing Resistance f) Size, Shape and Surface		
4.1.13.10	**Stresses in Brick and Block Walling (P127, NBC Building Standards)** a) Bearing Pressure b) Special materials test results		
4.1.13.11	**Mortar (P128, NBC Building Standards)** a) Mix ratio. b) Variational mix ratio authorised by competent person and approved by Building Committee.		
4.1.13.12	**Concrete (P129, NBC Building Standards)** a) Component materials. b) Mix ratios. c) Presence of ash, slag, clinker or similar material in concrete. d) Coke breeze not authorised as ingredient. e) Results of Bearing Pressures on load bearing concrete.		
4.1.13.13	**Slenderness Ratio of Pier (P130, NBC Building Standards)**		
4.1.13.14	**Stresses in Wrought and Cast Iron (P131, NBC Building Standards)**		
4.1.13.15	**Timber (P132-P136, NBS)** a) Quality b) Strength c) Free from defects d) Well seasoned e) Protection from insects and vermin f) Stress Test Results g) Stress Test Results on timber columns h) Special timber Stress Test Results i) Timber column lengths not to exceed thirty times its diameter		
4.1.13.16	**Damp-Proof and Anti-proof Courses (P137, NBC Building Standards)** a) Durability b) Impervious to moisture c) Ability to withstand wall loads and prevent wall movement d) DPM Material e) DPM thickness		

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ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.1.14	**INSPECTION OF BUILDING WORKS STAGES**		
	Reg. 27, 1-8, BCR, 2020 a) BC Notification of work commencement • 14 days prior for demolitions • 7 days prior for new works • 7 days prior for maintenance works b) Signed BC Notifications c) Approved drawings copy on site d) Building Permit copy e) Request for inspection (Form 7) f) Inspection notice by BC		
4.1.15	**DESIGN AND PLANNING OF BUILDINGS**		
4.1.15.1	**BUILDING OPERATIONS BY MINISTRIES, DEPARTMENTS AND AGENCIES OF GOVERNEMNT**		
4.1.15.1.1	**Design requirement (generally)** a) Functionality • User need suitability • Activities technical requirements • Spatial requirements • Service requirements • Design meets functional goals b) Sustainability • Environmental issues • Resilience to natural disasters c) Economy • Considers whole life cycle cost • Operation costs • Maintenance costs • Life span • Return on Investment d) Performance Requirements • Energy efficiency • Durability • Life-cycle performance • Occupant comfort • Occupant safety e) Safety • Risk foresight • Risk protection • Health measures • Safety measures • Security measures Fire protection		
4.1.15.1.2	**Deviation from Approved Plan (Reg. 39, BCR. 2020)** • Application for deviation • Plot coverage • Building height • Building depth • Structural system • Other dimensions (specify) • Change in usage Non-compliant building operations		
4.1.15.1.3	**Occupation Permit Application (Reg. 34, BCR, 2020)** • As built drawings • Certificates of service installations fitness Certificate of practical completion		

4.2 BUILDING ARCHITECTURE FOR CLASS C BUILDINGS

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified	N/V	Not Applicable

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
4.2.1	**Temporary Buildings (P53, NBC Building Standards)** a) Conditions of authorisation b) Period of authorisation required c) Site plan d) Application to erect temporary building. i. Layout drawings clearly indicating structure dimensions, plot boundary lines, roads, sidewalks, distances to adjacent structures, public access route building location, room locations and names. ii. Size. iii. Form. iv. Construction materials and their fire ratings. v. Proposed use of temporary buildings. vi. Lighting. vii. Ventilation. viii. Fire safety measures. ix. Structural details. x. Authorisation: Initial authorisation of 1 year. xi. Approval of extension. e) Certificate of Satisfactory Structural Condition		

Notes:

BCR - Building Control Regulations
NBC - National Building Code
Reg. - Regulation

5.0 CIVIL AND STRUCTURAL WORKS

5.1 CODES OF PRACTICE AND STANDARDS

In the design and supervision of the buildings, it is incumbent on the professional to state the approved codes of practice and standards he used. For purpose of this booklet, he is expected to use:

- The National Building Code 2019,
- Building Control Regulations 2020,
- The Standards by the Uganda National Bureau of Standards marked as US or US-ISO and other marks and
- any approved and relevant documents in practice, such as the British Standards.

5.2 BUILDING ELEMENTS

It is incumbent on the professional to specify the elements designed for, such as reinforced concrete; steel and other metals; masonry and clay products; timbers, composite materials, plastics and any others.

The design and supervision must include all structural elements which must be added in case they are not indicated in this booklet.

5.3 DESIGN REPORT

It is incumbent on the professional to prepare a design report which must include desirable aspects of professional structural design that ensures ***strength, safety*** and ***economy*** as below.

a) Assurance that the building:
   i) achieves an acceptable level of probability that it shall perform satisfactorily during its intended life,
   ii) sustains all loads and deformations of normal construction and use and
   iii) affords adequate durability and resistance to the effects of misuse and fire.

b) The design ensures that due regard is given to economy in design, structural safety, serviceability and durability.

c) The design ensures that the building is designed and constructed in such a way that it is not unreasonably susceptible to damage by effects of fire, explosion, impact or consequences of human error.

d) The design ensures there is use of suitable materials. It should indicate need for quality control and good supervision, which are complementary to design calculations to produce safe, serviceable and durable structures.

e) The design should provide specifications, standards for materials, production, workmanship, maintenance aspects to be complied with and ensure that the design objectives are realised.

f) The report should show how the design has assured that potential damage is avoided by appropriate choice of one or more of the following:
   i) avoiding, eliminating or reducing the hazards to which the structure can be

subjected,

ii) selecting a structural form which has low sensitivity to hazards considered,

iii) selecting a structural form and design that can survive adequately the accidental removal of an individual member or a limited part of the structure, or the occurrence of acceptable localised damage,

iv) avoiding, as far as possible, structural systems that can collapse without warning and

v) tying the structural members together.

f) The design report shall show that the structural design is/was based on the most critical limit state (**either the ultimate limit state** or **the serviceability limit state**) and a check should be included to show that the other limit state was not exceeded.

g) The ultimate limit states used shall show how the following have been achieved:
   i) safety of the people and
   ii) safety of the structure and its contents.

h) The ultimate limit state design shall show how the building/structure will withstand:
   i) loss of equilibrium of the structure or any part of it, considered as a rigid body,
   ii) failure by excessive deformation, transformation of the structure or any part of it, including supports and foundations,
   iii) failure caused by fatigue and other time dependent effects and
   iv) failure caused by the effect of earthquakes, segmental and overall robustness of the structure.

i) The serviceability limit states shall show how the building/structure will assure:
   i) the functioning of the structure or structural members under normal use,
   ii) the comfort of people and
   iii) the appearance of the construction works.

j) The serviceability limit states shall show how the building/structure will withstand/resist:
   i) deformation and displacements which affect the appearance or effective use of the structure or cause damage to finishes or non-structural elements,
   ii) vibrations which cause discomfort to people, damage to the structure or to the materials it supports, or which limit its functional effectiveness,
   iii) damage, including cracking, which is likely to affect appearance, durability or the function of the structure adversely,
   iv) observable damage caused by fatigue and other time dependent effects and
   v) damage caused by earthquakes.

k) The design report shall show the design philosophy that includes or fulfills:
   i) idealisation of the structural elements or the structure, their connectivity and their load path,
   ii) boundary conditions that are to be imposed onto the structure and to the individual structural elements,
   iii) material properties,
   iv) weather conditions,

v) probability of change of use of the structure,

vi) determining which method of analysis or analysis software is suitable,

vii) determining which method of design or design checks to adopt,

viii) method of construction likely to be used and

ix) the temporary works and quality of workmanship to be used.

l) The design report shall show how the limit state design was carried out by:

i) setting up structural and load models for relevant ultimate and serviceability limit states that should consider the various design situations and load cases and

ii) verifying that the limit states are not exceeded when design values for actions, material properties and geometrical data are used in the models.

m) The design report shall show how a design value was obtained:

i) by using the characteristic or representative values in combination with partial and other factors or

ii) in exceptional cases, directly except that the values obtained directly should correspond to at least the same degree of reliability for the various limit states.

5.4 CIVIL AND STRUCTURAL WORKS IN CLASS A, B AND C BUILDINGS

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	**UNC**	Improvement Recommended	**IMP**	Not Verified		Not Applicable	
ITEM No.	**DESCRIPTION**						**OUTCOMES (Use codes above. Provide comment where appropriate)**		**QUERY RECTIFIED (Y/N)**	
5.4.1	**PRECONSTRUCTION DRAWINGS AND DOCUMENTS**									
5.4.1.1	a) Approved civil and structural engineering plans, drawings and diagrams Geotechnical Survey Report b) Topological Survey Report c) Structural design report with calculations to prove adequate strength, safety and economy in all the structural elements d) Excavation Plan where applicable e) Detailed methodology for temporary support, where needed f) Specifications covering all civil and structural works									
5.4.2	**CIVIL OR STRUCTURAL PLANS**									
5.4.2.1	Civil or Structural engineering plans, drawings and diagrams shall contain the following, where applicable a) Excavation details b) Foundation details c) Column details d) Beam details e) Beam-Column connections f) Slab details g) Staircases h) Ramps i) Lift wells j) Roof details k) Retaining structural details									
5.4.2.2	Civil or Structural engineering plans, drawings and diagrams shall be drawn to suitable scales but not smaller than 1:100, 1:50, 1:20, 1:5, 1:2 or 1:1									
5.4.2.3	Correct interpretation of Civil or Structural engineering plans, drawings and diagrams									
5.4.2.4	Works executed in accordance with the designed and approved plans									

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
5.4.3	**STRUCTURAL SYSTEM OF THE BUILDING**		
5.4.3.1	Appropriate structural forms, systems and materials used in different parts of the building e.g. reinforced concrete, pre-stressed concrete, steel, masonry and timber etc		
5.4.3.2	Identification of critical structural elements without redundancies for example long span structures		
5.4.4	**LOADING ON THE STRUCTURE**		
	a) Appropriate loading conditions, indicating the usage at different parts of the building and identifying any misuse, abuse or deviation from intended use. b) Is the loading condition is compatible with the intended purpose of the structure. c) Does the misuse, abuse or deviation from intended use given rise to excessive loading which can adversely affect the building structure?		
5.4.5	**CONSTRUCTION TECHONOLOGY**		
	a) Acceptable Construction methods employed b) Adequate timelines within which to execute proposed works c) Timely execution of already embarked on works		
5.4.6	**CONSTRUCTION MATERIALS**		
	a) Materials on site are in accordance with the standards and specifications used in design. b) Material testing and approvals available on site for example Laboratory concrete cube test for compressive strength after 7 days, 14 days and 28 days and laboratory test for steel, timber or any other materials for the relevant parameters as per code of practice. c) Proper storage of materials to minimize deterioration d) Other Quality control measures in place.		
5.4.7	**EXCAVATIONS (Reg. 14, BCR, 2020)**		
	a) Permit for works exceeding 2 m depth below ground. b) Special Geotechnical conditions handled by engineering design. c) Foundation excavation design. d) Excavation on solid rock e) Safety of nearby buildings f) Implementation of NEMA Conditions		
5.4.8	**UNSTABLE SOILS OR SLOPES (Reg. 16, BCR, 2020)**		
	a) Notification of Building Committee. b) Observed conditions on site or environs likely to cause unstable soils c) Measures to contain differential movements and other effects detrimental to building.		
5.4.9	**MEASURES FOR STABILITY OF SITE (Reg. 32, BCR, 2020)**		
	a) Develper's measures to maintain site stability. b) Structural temporal works approval prior to excavation commencement. c) Adequate temporary support system for the excavation d) Precautionary measures specified by BC implemented e) Open excavations maintained in safe condition. f) Effect of building works on neighboring properties managed evidenced by presence of a dilapidation report to record the existing condition of structures prior to your construction works commencing.		
5.4.10	**SIGNS OF STRCUTURAL DEFECTS AND DETERIORTATION**		
	a) Building tilt/ settlement b) Structural deformation c) Major structural defects (e.g. structural cracks, decayed timber member) d) Minor structural defects e) Non-structural defects f) Recommended remedial actions proposed and implemented		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
5.4.11	**ADDITIONS OR ALTERATIONS TO THE STRUCTURE**		
	a) Presence of additions or alterations b) Impact of the additions or alterations to the structure c) Approvals for the additions or alterations obtained in accordance Building Regulation 39		
5.4.12	**TEMPORARY SUPPORT SYSTEMS**		
	a) Adequate temporary support systems for the structural elements such as excavations, slabs etc provided b) Stability of the structural supports from effects of agents of weathering, construction activities in the surrounding areas and other infrastructure ensured		
5.4.12	**INSPECTION STAGES**		
5.4.12.1	**Generally (Reg. 27,9(a), BCR, 2020)** i) Setting out of foundation of buildings. ii) Foundations excavated and level pegs for concreting. iii) Foundations concreted. iv) Trenches for drainage work excavated to levels and gradients. v) Drains laid and joined and ready for testing. vi) Reinforcing steel fixed in position before concreting. vii) Concrete shuttering ready for striking. viii) Walls completed to wall-plate level. ix) Roof frame-work completed before covering. x) Practical completion before occupation.		
5.4.12.2	**RC Structures, Elements (Reg. 27, 9(b), BCR, 2020)** i) Foundations • placement of reinforcement • inspection date • concreting date ii) Retaining walls • placement of reinforcement • inspection date • concreting date iii) Columns • placement of reinforcement • inspection date • concreting date iv) Beams and slabs • placement of reinforcement • inspection date • concreting date		
5.4.12.3	**Structural Steelwork (Reg. 27, 9(c), BCR, 2020)** • Erection date • Inspection date • Cladding date		
5.4.12.4	**Structural Timberwork (Reg. 27, 9(d), BCR, 2020)** • Erection date • Inspection date • Cladding date		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
5.4.13	**STRUCTURAL ELEMENTS**		
5.4.13.1	**Foundations** a) Appropriate foundation designed and provided b) The approved foundation design is in agreement with the precise soil conditions c) The approved foundation design is not practicable and therefore there is need to review the design. The amendments made on site are satisfactory or they require approval of the BC. Where BC approval it required, it has been obtained prior to continuation of the works. d) Adequate foundation to sustain both combine dead and imposed loads and transmit the loads without causing failure or impairing the structure. e) Foundation is safe from the aggressive environment such as chemicals f) Foundation at a depth equal or greater than 1m to protect the building against swelling, shrinking and erosion of the sub-soil. g) Setting out of foundation of the works properly executed h) Foundations excavated and level pegs for concreting. i) Foundations concreted, erecting or otherwise, depending on type and material used (concrete, steel, etc).		
5.4.13.2	**Structural framework comprising of columns, beams, slabs, wall (Materials may be structural steel, timber, masonry, reinforced concrete, precast concrete etc)** a) Structural framework executed in accordance with the approved designs and plans. b) Critical elements within the framework identified and appropriately executed in accordance with design c) Connections between the structural elements appropriately executed with adequate sizing and proper placement of the connections. d) Adequate shuttering, propping and striking. e) Appropriate construction technology most especially for reinforced concrete structures allowing concrete to achieve the desired strength prior to subsequent loading. f) Identified defects corrected and their impact on the building ascertained g) Material tests carried and approved out for all key elements		
5.4.13.3	**Ring Beams** a) Ring beam appropriate sized and constructed in accordance with approved plans b) Adequate reinforcement provided c) Adequate formwork provided d) Quality of materials examined through material testing and approval e) Identified defects corrected and their impact on the building ascertained		
5.4.13.4	**Staircases** a) Staircase constructed in accordance with approved plans b) Adequate reinforcement provided c) Adequate formwork provided d) Quality of materials examined through material testing and approval e) Identified defects corrected and their impact on the building ascertained		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
5.4.13.5	**Lift/Shaft Walls** a) Lift/Shaft Walls constructed in accordance with approved plans b) Adequate reinforcement provided c) Adequate formwork provided d) Quality of materials examined through material testing and approval e) Identified defects corrected and their impact on the building ascertained		
5.4.13.6	**Retaining Walls** a) Retaining walls constructed in accordance with approved plans b) Adequate reinforcement provided c) Adequate formwork provided d) Adequate temporary support systems provided e) Quality of materials examined through material testing and approval f) Identified defects corrected and their impact on the building ascertained		
5.4.13.7	**Roof** a) Roof structure constructed in accordance with approved plans b) Roof plates are properly bolted to the ring beam and that the rafters are connected to the plate by bolts or acceptable connectors. c) Appropriate roofing sheets used d) Quality of materials examined through material testing and approval e) Identified defects corrected and their impact on the building ascertained f) Appropriate gutters, drop pipes and roof drainage installed g) Erection, connection, jointing or otherwise, depending on material and type used (steel, timber, etc) properly executed h) Waterproofing valleys and any other surfaces provided		
5.4.3.8	**Perimeter Walls** a) Perimeter walls constructed in accordance with approved plans b) Adequate reinforcement provided where necessary c) Adequate formwork provided where necessary d) Quality of materials examined through material testing and approval e) Identified defects corrected and their impact on the building ascertained		
5.4.3.9	**Internal Roads/Drives-Surface Drainage** a) Internal Roads/Drives-Surface drainage provided in accordance with approved plans b) Adequate materials provided and used c) Quality of materials examined through material testing and approval d) Identified defects corrected and their impact on the building ascertained		
5.4.3.10	**Foul Water Drainage and Sewerage** a) Foul Water Drainage and Sewerage constructed in accordance with approved plans b) Adequate materials provided and used c) Quality of materials examined through material testing and approval d) Identified defects corrected and their impact on the building ascertained		

Notes:

Reg. - Regulations
BCR. 2020 - Building Control Regulations. 2020

6.0 BUILDING SERVICES

6.1 MECHANICAL INSTALLATIONS

6.1.1 MECHANICAL INSTALLATIONS IN CLASS A AND B BUILDINGS

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.1.1.1	**DESIGN DRAWINGS AND DOCUMENTS**		
6.1.1.1.1	Approved design drawings.		
6.1.1.1.2	Design Report.		
6.1.1.1.3	Technical Specifications.		
6.1.1.1.4	Unpriced BoQs.		
6.1.1.2	**WATER SUPPLY AND DISTRIBUTION (P4-P23, NBC Standards for Mechanical Installations)**		
6.1.1.2.1	State of joints and connections of pipes.		
6.1.1.2.2	Pipes properly installed.		
6.1.1.2.3	Ensure water good quality.		
6.1.1.2.4	Stop cocks, valves, pipes, ball valves/insulating valves.		
6.1.1.2.5	Pumps and equipment, alternating power supply, availability of automatic control.		
6.1.1.2.6	Air compressors of the reciprocating type, suitability of installation.		
6.1.1.2.7	• Pump properly installed. • Water meter appropriately positioned.		
6.1.1.2.8	Hot water system properly installed. • Allowing for cleaning and disinfection of supply system. • Testing done.		
6.1.1.3	**FIRST FIX MECHANICAL INSTALLATIONS**		
6.1.1.3.1	**SANITARY FITTINGS, PLUMBING AND DRAINAGE WORKS (P24-P88, NBC Standards for Mechanical Installations)**		
6.1.1.3.1.1	Plumbing done well.		
6.1.1.3.1.2	• Eaves gutters of 7 mm^2. • Cross section area to every 7 m^2 of horizontal roofed surface laid to the right gradient.		
6.1.1.3.2	**DRAINAGE WORKS (P55-P78, NBC Standards for Mechanical Installations)**		
6.1.1.3.2.1	Connection to public sewer appropriately one. • Appropriate material used. • Surface water pipes laid properly.		
6.1.1.3.3	**SEPTIC TANKS (P79-P84, NBC Standards for Mechanical Installations)**		
6.1.1.3.3.1	Submission to NWSC the disposal plan from septic tank, dip pipes. Examination of tank ventilation.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.1.1.3.4	**CESSPOOLS (P82-P84, NBC Standards for Mechanical Installations)**		
6.1.1.3.4.1	Cesspool not situated within 2m of any spring, well stream of water.		
6.1.1.3.4.2	Cesspool emptying not through any building.		
6.1.1.3.4.3	Cesspool capacity determined by Building Committee to store soil for one month at 135 litres per day.		
6.1.1.3.5	**TESTING AND DRAINAGE WORKS**		
6.1.1.3.5.1	Application to NWSC for sewage testing.		
6.1.1.3.6	**HEATING, VENTILATION AND AIR CONDITIONING (P89-P116, NBC Standards for Mechanical Installations)**		
6.1.1.3.6.1	Air conditioning and ventilation systems done well. • Appropriate materials used. • Ensure there are openings. • Connections and openings are tight to prevent distribution of combustion products under fire.		
6.1.1.4	**SECOND FIX MECHANICAL INSTALLATIONS**		
6.1.1.4.1	**DUCT COVERINGS, LININGS, ADHESIVES AND INSULATIONS (P92, NBC Standards for Mechanical Installations)**		
6.1.1.4.1.1	Ducting appropriately done. • Appropriate materials used. • Adhesives and insulation with flame spread rate below 25. • Underground ducts laid appropriately. • Clean out or pump out connection provided.		
6.1.1.4.2	**FIRE DAMPERS (P94, NBC Standards for Mechanical Installations)**		
6.1.1.4.2.1	Test to ISO 12941.		
6.1.1.4.3	**SMOKE DETECTOR CONTROL (P95, NBC Standards for Mechanical Installations)**		
6.1.1.4.3.1	Air handling system to incorporate smoke detector control when required.		
6.1.1.4.4	**EXHAUST DUCTS AND OUTLETS (P96, NBC Standards for Mechanical Installations)**		
6.1.1.4.4.1	Prevent back draft under wind.		
6.1.1.4.4.2	Check for provision of removal of condensation where this is a problem.		
6.1.1.4.4.3	To discharge to outside.		
6.1.1.4.5	**INTERCONNECTION SYSTEMS**		
6.1.1.4.5.1	In residential occupancy, air from one suite not to circulate in any other suite.		
6.1.1.4.5.2	Exhaust ducts must exhaust through a storage garage.		
6.1.1.4.5.3	Public corridor should not be part of supply return or exhaust air system serving adjuring areas.		
6.1.1.4.6	**FIRE SAFTEY (P117-P122, NBC Standards for Mechanical Installations)**		
6.1.1.4.6.1	To give earliest warning of fire.		
6.1.1.4.6.2	Fire alarm systems designed to avoid false alarm?		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	**UNC**	Improvement Recommended	**IMP**	Not Verified		Not Applicable	

ITEM No.	**DESCRIPTION**	**OUTCOMES (Use codes above. Provide comment where appropriate)**	**QUERY RECTIFIED (Y/N)**
6.1.1.4.6.3	• Alarm system works reliably. • At least two audible sounders installed in building.		
6.1.1.4.6.4	Firefighting equipment installed visible with symbols as required by Building committee.		
6.1.1.4.6.5	Hose reels for firefighting installed in all building of more than 250 m^2.		
6.1.1.4.6.6	Hydrant bonnet colour coded Green orange and red to show discharge rate.		
6.1.1.4.6.7	One hydrant for a maximum of 1000 m^2.		
6.1.1.4.6.8	Hydrant to provide at least 300m hose 16mm internal diameter nozzle.		
6.1.1.4.6.9	Sprinkler system properly installed. • Adequate pressure and how to measure.		
6.1.1.4.6.10	Portable fire extinguishers in approved positions complying to ISO: 111162:26.		
6.1.1.4.6.11	Firefighting lift for building exceeding 18 m.		
6.1.1.4.6.12	Testing and certification of Fire Alarm System.		
6.1.1.5	**LIFTS (P145-P167, NBC Standards for Mechanical Installations)**		
6.1.1.5.1	Building 15 m or more must have provision for lift. • Appropriate lift fitted to standard. • Inspection doors have a minimum height of 1.4 m and 6 mm width. • Emergency doors have a minimum height of 1.8 m and width of 5 mm.		

Notes:

NBC - National Building Code

6.1.2 MECHANICAL INSTALLATIONS IN CLASS C BUILDINGS

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	**UNC**	Improvement Recommended	**IMP**	Not Verified		Not Applicable	**N/A**

ITEM No.	**DESCRIPTION**	**OUTCOMES** (Use codes above. Provide comment where appropriate)	**QUERY RECTIFIED (Y/N)**
6.1.2.1	**DESIGN DRAWINGS AND DOCUMENTS**		
6.1.2.1.1	Approved design drawings.		
6.1.2.1.2	Design Report.		
6.1.2.1.3	Technical Specifications.		
6.1.2.1.4	Unpriced BoQs.		
6.1.2.2	**WATER SUPPLY AND DISTRIBUTION (P4-P23, NBC Standards for Mechanical Installations)**		
	Water supply appropriately done: • Joints and connections correctly done. • Appropriate materials used. • Water quality maintained. • Appropriate pump-room size and pump properly fitted with power supply. • Appropriate hot water supply. • Testing done.		
6.1.2.3	**FIRST FIX MECHANICAL INSTALLATIONS**		
6.1.2.3.1	**SANITARY FITTINGS, PLUMBING AND DRAINAGE WORKS (P24-P88, NBC Standards for Mechanical Installations)**		
6.1.2.3.1.1	Plumbing done well.		
6.1.2.3.1.2	• Eaves gutters of 7 mm^2. • Cross section area to every 7 m^2 of horizontal roofed surface laid to the right gradient.		
6.1.2.3.2	**DRAINAGE WORKS (P55-P78, NBC Standards for Mechanical Installations)**		
6.1.2.3.2.1	Connection to public sewer appropriately done: • Appropriate material used. • Surface water pipes laid properly.		
6.1.2.3.3	**SEPTIC TANKS (P79-P84, NBC Standards for Mechanical Installations)**		
6.1.2.3.3.1	Submission to NWSC the disposal plan from septic tank, dip pipes. Examination of tank ventilation.		
6.1.2.3.4	**TESTING AND DRAINAGE WORKS**		
6.1.2.3.4.1	Application to NWSC for sewage testing.		

Notes:

NBC - National Building Code

6.2 ELECTRICAL INSTALLATIONS

6.2.1 ELECTRICAL INSTALLATIONS IN CLASS A, B AND C BUILDINGS

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	**UNC**	Improvement Recommended	**IMP**	Not Verified		Not Applicable	

ITEM No.	**DESCRIPTION**	**OUTCOMES** (Use codes above. Provide comment where appropriate)	**QUERY RECTIFIED (Y/N)**
6.2.1.1	**DESIGN DRAWINGS AND DOCUMENTS**		
6.2.1.1.1	**DESIGN DRAWINGS** • Approved design drawings, technical specifications, shop drawings, Bills of Quantities and Design Report on site including: i) mains and standby power supply, ii) power reticulation, iii) lighting layout, iv) small power layout, v) fire detection system and vi) solar PV system. • Approximate position of existing services indicated on drawings.		
6.2.1.2	**FIRST FIX ELECTRICAL INSTALLATIONS**		
6.2.1.2.1	**SUB-STATION AND SWITCH ROOM (P4, NBC Standards for Electrical Installations)** Floor level of sub-station is above the highest flood level of the locality.		
6.2.1.2.2	**CONDUIT (P16, NBC Standards for Electrical Installations)** • Steel conduit is not less than 20 mm diameter. • Conduit boxes have covers. • Heavy gauge, solid drawn or welded steel, galvanized or sheradised conduit with black enamel used externally. • High impact, rigid grade plastic conduit used internally. • Galvanised conduit used in damp areas. • Solid drawn conduit used in flameproof installations. • Fixing screws for conduits, switches and box covers are made of appropriate material. • Conduit terminated at a main switchboard, distribution board, consumer's unit or any metalclad accessory has screwed sockets in good mechanical and electrical contact with the metal case. • A draw box is used where there are more than two right angle bends. • Conduits concealed in the building fabric are arranged as a "looping-in" system without the use of elbows, tees or bends. • Conduits are at least 150 mm away from gas piping, steam and hot water systems. • Expansion couplers used where conduit crosses expansion joints, with an earth wire running between the nearest conduit box from each side of the coupling and solidly bonded at each box.		
6.2.1.2.3	**MOUNTING HEIGHT OF ACCESSORIES (P17, NBC Standards for Electrical Installations)** • Switchgear, distribution boards and consumer's units mounted with lower edge at 2000 mm from finished floor level. • Light switches, other than ceiling switches fixed at 1400 mm from finished floor level to the centre of the switch. • Isolators and switch fuses, other than those mounted on busbar chambers or providing local control fixed at 1400 mm from finished floor level to the underside of the isolator or switch fuse. • Socket outlets in offices and corridors are fixed 300 mm from finished floor level to the underside of the socket outlet.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.2.4	**DUCTS FOR UNDERGROUND CABLES (P26 and P27, NBC Standards for Electrical Installations)** • Ducts provided at points of entry into the buildings. • Where cables cross under roads or paved areas, earthenware ducts are provided as: i) 1 cable, 2 x 100 mm or 150 mm ducts. ii) 2 cables, 3 x 100 mm or 150 mm ducts. iii) 3 cables, 4 x 100 mm or 150 mm ducts. iv) 4 or 5 cables, 6 x 100 mm or 150 mm ducts. v) 6, 7 or 8 cables, 9 x 100 mm or 150 mm ducts. Ducts are clear of gas or water pipes, drains and sewers.		
6.2.1.3	**SECOND FIX ELECTRICAL INSTALLATIONS**		
6.2.1.3.1	**PROTECTIVE DEVICES (P8, NBC Standards for Electrical Installations)** • Every installation and circuit is protected against overcurrent. • There is a suitably located efficient means for cutting off all voltage. • Where one of the conductors of the installation is connected to earth, there is no single pole switch, other than a link for testing purposes, or a switch for controlling a generator.		
6.2.1.3.2	**SWITCHBOARD (P10, NBC Standards for Electrical Installations)** • Switchboards for the control of equipment rated at 240 V/415 V are standing, of uniform height, flush mounted and totally enclosed with a rigid frame. • Each switchboard is controlled by a suitable isolating switch or circuit breaker. • The arrangement of the switchboard is such that: i) all parts which may have to be adjusted or handled are readily accessible, ii) the course of every conductor can be readily traced, iii) conductors that are not arranged for connection to the same system are kept well apart and can readily be distinguished and iv) all bare conductors are placed and protected to prevent accidental short circuits. • The base of the switchboard is effectively sealed. • Ventilation louvres on the switchboard have a mesh gauze of non-corrosive material. • All bolts, nuts, screws, hinges and handles of the switchboard are corrosion resistant. • Cabling access to the switchboard is from the rear. • The switchboard has hinged lockable doors at the front with termite resistance neoprene gaskets and handles. • Doors of the switchboards are electrically bonded to the main frame. • Busbars are made of electro-tinned copper and are of uniform section. • Busbars are run in separate screened compartments. • Surge arresters have been installed on the 240V/415 V busbar of the low voltage switchboard. • Suitably sized compression type cable glands have been provided for all cables. • Glands used for armoured cables have provision for sealing the armour wires. • Lugs have been provided for connection of the cable armouring to earth. • Lamp fittings are pre-lamped from the front of the switchboard and are locked against rotation. • Exposed terminals on the rear of door mounted components are shrouded.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.3.3	**SWITCHGEAR (P10-P11, NBC Standards for Electrical Installations)** • Switches are clearly labelled. • Interlocks are installed. • "ON/OFF" switches and circuit breakers are lockable. • Switchgear to disconnect live conductors, is such that the neutral conductor cannot be disconnected or reconnected before the phase conductors. • Switchgear is of 240 V or 415 V grade, single pole and neutral, double pole and neutral, triple pole and neutral or quad pole and neutral.		
6.2.1.3.4	**ISOLATION (P12, NBC Standards for Electrical Installations)** • Switchboard with exposed bare conductors not located in an area set apart for the purpose, is suitably enclosed. • A clear passageway has been provided for exposed bare conductors. • Insulating stands or screens have been provided.		
6.2.1.3.5	**CABLES (P14, NBC Standards for Electrical Installations)** • Cables are PVC insulated and PVC sheathed. • Cables are of minimum 240 V rating, and not less than 1.5 mm^2. • Cables forming sub-circuits connected to different distribution boards are not drawn in the same conduit. • Surface cables are not installed within 300 mm of galvanized iron roofs. • PVC/XPLE cable are used for outdoors, buried underground and protected by conduit, where rising above the ground. • Not more than one phase of an AC installation is brought into a fitting in the lighting or single phase power circuits, unless indicated otherwise. • Flexible cords are, visible, fire resistant and not less than 0.75 mm^2. • Cable joints are in a terminal block, of suitable current rating. • Flexible cables and conduit wiring connections are in a suitable connector. • Lighting switches are connected in the phase line. • Ceiling switches are not less than 300 mm from the point they control. • Sheathed cables are secured by saddles or clips. • Cables are mounted on timber battens where they cannot be mounted directly on the building. • Holes in walls to where cables pass have sleeves, with bushed or belled ends. • There is no moisture ingress through service cables entering the building. • Cables are colour coded appropriately.		
6.2.1.3.6	**TRUNKING (P15, NBC Standards for Electrical Installations)** • Trunking is secured at appropriate intervals. • The trunking trough is clear of obstructions and continuously open, except when passing through walls and floors. • Each group of cables comprising a circuit, installed in trunking, is half hitched at 600 mm intervals, and the circuit reference is clearly identified.		
6.2.1.3.7	**EXCAVATION FOR UNDERGROUND CABLES (P32, NBC Standards for Electrical Installations)** • Trenches were excavated appropriately to lay underground cables at a minimum depth of 600 mm below finished ground level. • Trenchless excavation is used when crossing roads and pathways unless otherwise approved. • Upon completion of laying and testing of cables, trenches were appropriately covered. • Services near cable routes that were uncovered are adequately supported. • Damaged services have been reinstated.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.3.8	**LAYING UNDERGROUND CABLES (P24, P25, P27, P28, P29 and P31, NBC Standards for Electrical Installations)** • Cables are buried in open ground appropriately prepared, or drawn into earthenware or other ducts when crossing roadways, paths exceeding 1500 mm in width, and on entry into buildings. • Cables were appropriately laid and spaced. • Cables are separated from gas and water mains. • Cables to termination points in sub-stations or buildings enter via glazed earthenware pipes, sealed appropriately. • Cables with a run of more than 1800 mm inside a building are cleated or saddled to walls or ceilings. • Jointing of underground cables is minimised as approved. • Underground cable terminations and joints are appropriately labelled. • Appropriate warning covers and tape are provided over all underground cables except XLPE SWA PVC cables. • Cable ducts sealed appropriately after installation and final tests. • Cable runs are clearly marked. • Armouring is efficiently bonded.		
6.2.1.3.9	**MAINS POWER SUPPLY**		
6.2.1.3.9.1	**FEEDER PILLAR (P33, NBC Standards for Electrical Installations)** • The feeder pillar is a "dwarf type" tailless unit, that is weatherproof, of robust construction, with hinged lockable doors, mounted on a firm base and protected from ingress of rainwater, vermin or termites or other danger within the enclosure. • The fuse ways are clearly identified.		
6.2.1.3.9.2	**EARTHING (P34, NBC Standards for Electrical Installations)** • Appropriate earthing is provided adjacent to supply terminals. • The earth continuity of conduit and trunking installations is reliable and permanent. • All parts not solidly connected to earthing are connected thereto by a solid copper conductor and bonding clamps. • All services entering the installation at earth potential are efficiently bonded to the main earth points. • The resistance of the earth continuity system does not exceed 8 ohms. • All flexible metallic tubing has an insulated earth conductor. • The size of the earth conductor is not less than 4 mm^2.		
6.2.1.3.9.3	**LIGHTNING PROTECTION (P35, NBC Standards for Electrical Installations)** • Lightning protection system provided consisting of 20 x 3 mm copper or aluminium tape sections, with similar clips, test clamps and copper bond earth rods. • The tape from the earth test position to the earth electrode is copper only. • Aluminium and copper junctions are suitably jointed. • The earth resistance does not exceed 10 ohms.		
6.2.1.4	**THIRD FIX ELECTRICAL INSTALLATIONS**		
6.2.1.4.1	**DISTRIBUTION BOARDS AND CONSUMERS UNITS (P5, NBC Standards for Electrical Installations)** Distribution Boards, Consumer's Units, circuit breakers, fuses and switches are clearly marked.		
6.2.1.4.2	**LIGHTS** RCDs are installed in circuits for security lighting.		
6.2.1.4.3	**SWITCHES (P19, NBC Standards for Electrical Installations)** • Lighting switches are 5 A or 15 A, of insulated pattern, single pole, quick make and slow break for AC circuits, and quick make and quick break for DC circuits, unless otherwise approved. • Ceiling switches are suitably mounted with a pull cords.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.4.4	**SOCKET OUTLETS (P19, NBC Standards for Electrical Installations)** • Single phase socket outlets are 3 pin rectangular, shuttered, unless otherwise approved, with the third pin effectively earthed. • Three phase socket outlets are of 4 pin scraping earth pattern. • Three phase with neutral outlets are of 5 pin scraping earth pattern. • Socket outlets are switched type unless otherwise approved. • RCD protected socket outlets are installed in wet areas.		
6.2.1.4.5	**WATER HEATER OUTLETS** • The water heater is the only equipment connected to the circuit, for water heaters with a capacity of 15 litres or more. • The flexible cord of the water heater is heat resistant. • The water heater has a 20 A Double Pole switch and an overheat protection cut-out.		
6.2.1.5	**TESTING OF ELECTRICTAL INSTALLATIONS (P37, NBC Standards for Electrical Installations)** The tests below were carried out on the complete installation and on each circuit. i) Continuity of bonding conductors ii) Continuity of circuit protective conductors iii) Continuity of ring final circuit conductors iv) Insulation resistance tests v) Insulation of non-conducting floors vi) Polarity vii) Earth fault loop impedance viii) Earth electrode resistance ix) Phase sequence x) Operation of residual current operated devices		
6.2.1.6	**SOLAR PV SYSTEMS**		
6.2.1.6.1	**PHOTOVOLTAIC PANELS (P39-P41, NBC Standards for Electrical Installations)** • The photovoltaic panels have a quality mark. • The photovoltaic panels are positioned to avoid shading. • Where shading is unavoidable, it has been compensated for by reducing the daily energy output in the system design. • The photovoltaic panel is inclined at an angle of between 10 and 20 degrees to the horizontal plane, facing due north or south, for fixed panels.		
6.2.1.6.2	**LIGHTNING PROTECTION FOR PHOTOVOLTAIC PANELS (P42, NBC Standards for Electrical Installations)** • The photovoltaic panels are installed at a point lower than the highest point of the building. • The support frame of the PV panels has a short lightning rod which is the highest point of the building.		
6.2.1.6.3	**PHOTOVOLTAIC PANELS SUPPORT STRUCTURE (P43, NBC Standards for Electrical Installations)** • The photovoltaic panels support structure is durable and weather and corrosion resistant. • The photovoltaic panels structure is securely fixed.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.6.4	**ROOF MOUNTING OF PV PANELS (P44, NBC Standards for Electrical Installations)** • The mounting of PV panels on roofs is done to prevent leakages and corrosion of roofing materials. • Where the solar PV panels form part of the roof, the roof is weathered properly and there is suitable ventilation beneath the solar PV panels.		
6.2.1.6.5	**GROUND MOUNTING OF PV PANELS (P45, NBC Standards for Electrical Installations)** • Ground mounted PV panels are well supported, fenced and not mounted closer than 800 mm from the ground.		
6.2.1.6.6	**BATTERIES (P46-P47, NBC Standards for Electrical Installations)** • Batteries are of deep discharge type and have a long-life cycle. • Each battery is marked with the date of manufacture and installation. • Batteries are installed in enclosed equipment. • At least 20 mm free space has been left between the batteries and the wall and top of the batteries enclosure. • The batteries enclosure is ventilated, securely fixed and made of durable materials, and if made of wood, it is well preserved against insects, termites, rot or acid.		
6.2.1.6.7	**CONTROLLER (P48, NBC Standards for Electrical Installations)** • A controller is installed. • The rated capacity of the controller can handle the maximum short circuit current from the PV array, and the maximum load. • The controller and circuit breakers or fuses bear the manufacturer's PV quality mark. • The controller has a warning and remote alarm (if installed in a room that is not used).		
6.2.1.6.8	**INVERTER** • The inverter has adequate ventilation. • The inverter has clearly labelled DC rated isolation on the DC side. • The inverter has a lockable AC isolator on the AC side. • Where the inverter is sited away from the consumer's unit, a lockable AC isolator is installed next to the consumer's unit. • The inverter has simple separation between the AC and DC side, if not the solar PV array frame is bonded.		
6.2.1.6.9	**CIRCUITS OF SOLAR PV SYSTEMS (P48, NBC Standards for Electrical Installations)** • There is a warning of low battery for non-essential circuits. • The system is protected against damage due to accidental short-circuits. • The peak demand of each circuit does not exceed 80% of the rated capacity of the fuse or circuit breaker. • Each fuse or circuit-breaker is clearly marked. • All equipment is rated at a minimum of 1.15 times the maximum voltage, and 1.25 times the maximum current produced in the system.		
6.2.1.6.10	**CONDUIT (P59, NBC Standards for Electrical Installations)** • Surface mounted conduit with single wire conductors is installed appropriately. • PVC conduit is used under floors. • Steel conduit is used where heavy or unpredictable loads may occur. • Under floor conduit is not less than 20 mm diameter.		
6.2.1.6.11	**CONDUCTORS (P54, P60, NBC Standards for Electrical Installations)** • The correct type of cables are used for the DC and AC installation and they are correctly labelled and colour coded. • The rated current carrying capacity at 35°C is not exceeded. • Minimum cross section area of the conductors is 2.5 mm^2. • The cables from the solar PV panels are tied to the array frame, for a roof mounted installation. • The cables are installed appropriately.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.6.12	**VOLTAGE DROP (P60, NBC Standards for Electrical Installations)** • The voltage across any system component is not less than 5% of the battery terminal voltage, and not less than 10.5 V. • The voltage drop between the PV panels and batteries does not exceed 1.0 V or 5%, measured at maximum charging current.		
6.2.1.6.13	**CABLE CONNECTIONS (P62, NBC Standards for Electrical Installations)** • Cables are connected using junction boxes, block connectors or soldering joints with insulating sleeves. • The rated capacity through the cable joints is not less than that of the circuit to which they are a part of.		
6.2.1.6.14	**UNDERGROUND CABLES AND CONDUITS (P63, NBC Standards for Electrical Installations)** • Underground cables are at least 600 mm below the surface and are clearly marked. • Underground cables are used across all areas with vehicular traffic • The underground cables and conduits can withstand vertical loads. • Suspended cables are mounted so that the lowest point is at least 2700 mm above ground level. • Cables are suitably held in position. • Ultra violet resistant cables are used outdoors. • Attachments of cables or conduit are made with appropriate fasteners. • Cable holes through the roof are drilled at the top of corrugations, sealed and waterproofed with ultra violet-resistant silicon sealant or its equivalent. • Cables passed through roofs are contained in roof-entry boxes. • Cables fixed through or passing through flammable are shielded in non-flammable conduits. • Fittings are fastened to suitable supports.		
6.2.1.6.15	**LIGHTS (P65, NBC Standards for Electrical Installations)** • A metal lamp fitting or shield is installed on lamps next to thatched or flammable ceiling materials. • Lamps with enclosures or detractors can be opened. • RCDs are installed in circuits for security lighting.		
6.2.1.6.16	**SOCKETS (P66, NBC Standards for Electrical Installations)** • It is not possible to reverse the polarity of the socket outlets. • 240 VAC mains sockets are used where a 240 V outlet is provided from a DC-AC inverter. • Circuit breakers and earthing are provided. • Installations that have DC sockets are wired so that the large diameter pin in the plug is always positive. • All positive connections are made with red insulated wire and negative connections are made with black insulated wire. • RCD protected socket outlets are installed in wet areas.		
6.2.1.6.17	**SWITCHES (P67, NBC Standards for Electrical Installations)** • Standard switches for 240 VAC are not used as an alternative to special switches for 12 VDC, 24 VDC and 48 VDC, except as approved. • All switches are rated at twice their expected load current. • All switches include a clear visual indication of their state.		
6.2.1.6.18	**LABELLING OF COMPONENTS OF SOLAR PV SYSTEMS (P54, NBC Standards for Electrical Installations)** All solar PV equipment is suitably and legibly labelled.		
6.2.1.6.19	**WARNING ON SOLAR PV INSTALLATIONS** The warnings below are provided: • dual supply, indicating the isolation point for the solar PV system and the mains power supply, • live DC cable, • PV junction boxes and • battery enclosure.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.6.20	**TESTING OF SOLAR PV SYSTEM (P55, NBC Standards for Electrical Installations)** The tests below have been carried out on the DC side of the solar PV installation. a) Voltage drops (BS 7671:2018, Appendix 4). (b) Open circuit voltage (V_{OC}). c) Short circuit current (I_{SC}). d) Solar irradiance. e) Insulation resistance.		
6.2.1.6.21	**WARRANTIES AND COMPONENTS OF SOLAR PV SYSTEM (P56, NBC Standards for Electrical Installations)** a) Light bulbs, 1 year. b) Batteries, 1 year. c) PV modules, 5 years. d) Wiring to PV modules, 5 years. e) Controller, 3 years. f) Inverter, 3 years.		
6.2.1.7	**FIRE DETECTION AND ALARM SYSTEM** • An automatic fire detection and alarm system is installed in: i) buildings in which people sleep, ii) covered shopping complexes and large or complex places of assembly, iii) buildings with phased evacuation, iv) in compensation for a reduction in standards of certain other fire protection measures, v) in lieu of vision between an inner room and its associated access room or vi) as a means of automatically operating other fire protection measures. • The fire detection and alarm system includes manual call points and point detectors. • There is a fire alarm control and indicating panel. • There is a zone plan next to the fire alarm control and indicating panel. • The fire detection and alarm system has been tested.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.2.1.8	**EMERGENCY LIGHTING** Emergency lighting is installed in the following areas: i) each exit door, ii) escape routes, iii) intersections of corridors, iv) outside each final exit, v) on external escape routes, vi) on emergency escape signs, vii) stairways so that each flight receives adequate light, viii) changes in floor level, ix) windowless toilets and toilet accommodation exceeding 8 m^2, x) at fire fighting equipment, xi) at fire alarm call points, xii) at equipment that would need to be shut down in an emergency, xiii) in lifts and xiv) in rooms of area greater than 60 m^2.		
6.2.1.9	**AS-BUILT DRAWINGS** As-built drawings are provided for all electrical installations.		

Notes:

NBC - National Building Code

6.3 ICT INSTALLATIONS IN CLASS A AND B BUILDINGS

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.3.1	**DESIGN DRAWINGS** There are approved design drawings on site of the following: a) Private Automatic Exchange System (PABX), b) Local area data network (structured cabling), c) Closed Circuit Television (CCTV) and d) Access Control.		
6.3.2	**POWER SUPPLY** • Buildings containing essential ICT rooms have a local duplicated supply of mains power. • Several small ICT rooms use a shared secondary electricity distribution system. • Distribution boards for mains power supply, standby power supply and uninterruptible power supply are located in separate cabinets. • Distribution Boards supplying essential ICT rooms have each circuit breaker installed in a separate case, isolated from the busbar. The cable connections for each circuit breaker are isolated from each other. • Distribution Boards in ICT rooms have plug-in circuit breakers. • Distribution Boards in ICT rooms have 10% spare circuits and 30% free space. • Overvoltage protection is installed in the Distribution Boards supplying power to essential ICT rooms. • ICT rooms have emergency shut-down switches for mains power supply and UPS. The switches are protected to prevent unintentional disconnection. • The distance between electricity distribution boards and active or passive ICT equipment is at least 1000 mm. • All electrical installations in ICT rooms have colour coded labels. • All circuits are labelled with a circuit number.		
6.3.3	**STANDBY POWER** • Major buildings with essential ICT rooms have diesel generators providing standby power with an output of at least 1½ to 2 times the calculated load. • If the generator is to supply other loads, this is allowed for. • The generator has an outdoor diesel tank with at least 72 hours capacity.		
6.3.4	**UPS POWER SUPPLY** • A centralised online UPS is installed to supply ICT rooms. • The UPS is electrically isolated during normal inverter operation and in static bypass mode of operation. • For UPS installations of greater than 50 kVA, the distribution boards for the mains power supply, standby power supply and UPS power are located in another room away from the server room, UPS room or battery room, but adjacent to these rooms. • The UPS has manual bypass switching. • The UPS has static bypass switching.		
6.3.5	**UPS AND BATTERY ROOM** • UPS installations of greater than 50 kVA and with long discharge time are located in a dedicated UPS and battery room. • The UPS and battery room has a cooling system. • The UPS and battery room with a high load level of up to 1500 kg/m² is located in the basement of the building. • The battery room is ventilated.		
6.3.6	**POWER DISTRIBUTION UNITS (PDUs)** • Power Distribution Units are installed in equipment racks connected to power sockets on cable trays.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.3.7	**CONDUIT AND CABLING** • ICT rooms and conduit paths for IT cables are located at a safe distance from installations which emit electric fields. • All cable penetrations for EMC cables are limited to a small area of the wall. • Separate conduit paths or racks are installed for electric power supply, generic cabling and patch cords in server rooms, Equipment Rooms (ERs) and Telecommunication Rooms (TRs). • In larger server rooms, telephony/data cables are laid on racks beneath the ceiling and power cables are laid on racks beneath a raised floor. • Cable installations beneath raised floors do not block circulation of cooling air. • The height of the raised floor is a minimum of 400 mm. • The sub-floor of the raised floor was lowered so that the raised floor is at the same height as the floors in adjacent rooms. • The raised floor can withstand the weight of the ICT equipment. • If a raised floor could not be installed because of limited ceiling height, cooling racks and chambers have been installed. • All operating computer equipment cables, distribution networks cables and backbone cables are installed on racks accessed from the front. • The smallest clearance at all surfaces on racks and cabinets where access is required is 1200 mm. • Telephone cables are high conductivity copper conductors of 3 kg or 9 kg per mile weight and are polythene insulated PVC sheathed overall. • Telecommunication cables have surge protection installed and are earthed. • Outdoor cables are laid in conduit. If more than one cable is installed in a conduit, these are pulled simultaneously. • Manholes are provided for accessing the cables. Distances between manholes are short. • The bottom of the trench in which the conduit is laid is free from stones and sharp edges. • The foundation of the trench in which the conduit is laid is at least 100 mm deep and is composed of appropriate fill material. • The area where the conduit lies is appropriately backfilled. • Cable entry is through rooms that are a safe distance from power cables or transformers, have easy access to the pathway to the ICT room and have floor drains. • All cabling that penetrates fire barriers is fireproofed. • All cables are labelled. • Trunking or conduit containing signal cables and power cables cross each other at right angles.		
6.3.8	**ICT ROOMS** • There is a free space of 1200 mm between all rack surfaces to which access is required. • ICT rooms containing active equipment are not used as store rooms. • Store rooms containing inflammable materials are not located adjacent to ICT rooms. • Water pipes running through ICT rooms are for supply of cooling installations only. • Floor drains in ICT rooms are fitted with non-return valves. • Humidity sensors are installed in floors close to cooling units and near water pipes running through the ICT room and drains in ICT rooms. • Water pipes running through ICT rooms and pipes serving cooling units in ICT rooms are insulated. The pipes are at the same earth potential as the ICT installations. • ICT rooms are air tight. • An early detection fire detection system is installed in ICT rooms. • Fire extinguisher systems are installed in ICT rooms.		
6.3.9	**CEILING HEIGHT IN ICT ROOMS** • The minimum ceiling height in ICT rooms is 2600 mm from the floor to the underside of cable racks and light fittings. • There is at least 400 mm clearance from the tops of cable racks for patch cables, to the underside of any ceiling mounted installation in ICT rooms.		
6.3.10	**LIGHTING IN ICT ROOMS** • Lights are installed to illuminate the outsides, insides and between racks. • Emergency lighting is installed. • The light intensity on the horizontal plane is 500 – 800 lux, and on the vertical plane is 200 lux.		

OUTCOMES	Acceptable Condition	√	Unacceptable Condition	UNC	Improvement Recommended	IMP	Not Verified		Not Applicable	

ITEM No.	DESCRIPTION	OUTCOMES (Use codes above. Provide comment where appropriate)	QUERY RECTIFIED (Y/N)
6.3.11	**EARTHING OF ICT ROOMS** • Floor coverings in ICT rooms are earthed. The resistance between any point in the floor covering and earth is between 1 and 10 MΩ. • Racks, cabinets, chassis, ventilation installations, room cooling units, pipes, cable racks and floors of ICT rooms have the same earth potential. • All ICT rooms have their own earth rail for connecting the conductive structural and equipment surfaces. • There is a dedicated mesh earth bonding network in essential ICT rooms. • In small ICT rooms where no mesh earth bonding network is installed, an insulated earth cable is provided. • Patch panels are earthed appropriately.		
6.3.12	**ACCESS CONTROL SYSTEM** • Access Control System has 24 hour battery backup. • Access Control system connected to UPS.		
6.3.13	**CCTV** • CCTV has 24 hour battery backup. • CCTV connected to UPS.		
6.3.14	**AS-BUILT DRAWINGS**		

Notes:

NBC - National Building Code

ANNEX 1: CLASSES OF BUILDINGS

Class A Building: Buildings with high social impact or located in sensitive ecosystem.

1) Hospitals (Medical Centres, Clinics, etc.)
2) Schools
3) Churches
4) Shopping Malls and Arcades
5) Multi-storeyed Buildings – more than 12 m high (Offices, Accommodation and Mixed Use)

Class B Buildings

1) Multi-storeyed Buildings – less than 12 m high (Offices, Accommodation and Mixed Use)
2) Single-storeyed Buildings (Offices, Accommodation and Mixed Use)

Class C Buildings

1) Temporary Buildings/Structures – more than 30 m^2 (Tents, Marquees, Farmhouses, Sheds, Garages, Hoardings, etc.)
2) Minor Buildings – less than 30 m^2 (Stalls, etc.)

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