



human settlements

Department:
Human Settlements
PROVINCE OF KWAZULU-NATAL

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STANDARDS FOR COMMUNITY RESIDENTIAL UNITS

1.0 PURPOSE OF THIS DOCUMENT

1.1 The purpose of this document is to set out the minimum standards for CRU development in KZN. This should warrant that new CRU developments ensure that residences are of a livable, accessible, positive impact on individuals living within these spaces and that their amenity, privacy and the aesthetics of their surroundings results in a pleasant living environment.

1.2 The material consideration of this document is to significantly impact the following:-

- Efficient use of materials
- Quality in design
- Quality of residential development

1.3 The document applies to new CRU developments that are multi-story in nature and covers the following:-

- General principles applying to the development proposal submission
- Basic guidelines applying to spatial requirements
- Standards specific to the type of development

2.0 GENERAL PRINCIPLES APPLYING TO DEVELOPMENT OF CRU

2.1 Use of Locally Manufactured Materials And Products:

Materials and products manufactured in South Africa shall be used in carrying out the work to which this specification refers, unless an imported product is prescribed specifically, or when no suitable locally manufactured product for the specific use is available.

2.2 Application of Clauses:

All clauses in this Standard which describe the materials and methods to be used in carrying out the work specified in the specification of work to be done, or indicated on the drawings, or included in the bills of quantities or in any detail drawings, or instructions issued by the Representative/Principal Agent to the Contractor during the progress of the work, shall be considered as applying to the performance of the contract.

2.3 Samples:

The Contractor shall furnish without delay, such samples and/or certificates as called for or may be called for by the Representative/Principal Agent. Materials and/or workmanship not corresponding with approved samples may be rejected.

2.4 Scale:

The scale to which the drawings are prepared is only to be made use of when no figured dimensions are given, either on the drawings or in the specification. Figured dimensions are always to be followed though they may not coincide with the scale of the drawings. Where possible dimensions are to be taken from all relevant existing buildings.

2.5 Interpretation of Drawings etc :

Should any part of the drawings, specification or bills of quantities not be clearly intelligible to the Any party or that the materials or articles to be used in the execution of the works be considered insufficiently described, the Representative/Agent shall be requested in writing, to make clear, also in writing, the requirements.

3.0 KEY CONSIDERATIONS FOR ALL CRU DEVELOPMENT

3.1 Does the development:

- Fall within the appropriate residential zone and density ranges for the particular municipality
- Meet criteria of what is considered to be quality living accommodation
- Meet the minimum floor areas
- Meet the standards of privacy
- Meet the thermal efficiency requirements of SANS 10400
- Have adequate ventilation and daylight requirements
- Ensure the long term safety and security of inhabitants
- Limit the impact of pollution

3.2 Minimum floor area standards must ensure an adequate amount of space is provided to achieve a pleasant and healthy living environment. The following table sets out the minimum room floor areas accommodation schedule required for units:-

1 BEDROOM UNIT	2 BEDROOM UNIT
BEDROOM 1	BEDROOM 1
LOUNGE	BEDROOM 2
KITCHEN/DINING	LOUNGE/DINING
BATHROOM	KITCHEN
	BATHROOM
Total m² - 35m²	Total m² - 45m²

3.3 The mix of units must be informed by the demand analysis. In the sector it has been noted that a viable development model.

3.4 The design strategy must focus on the role of the site to act as a significant public environment for positive functioning and sustainable area within the local context. The quality of the of the public space should be inclusive of edges, paths, landmarks, platforms, pedestrian zones, trees and landscaping, community gathering points and facilities as positive public elements.

3.5 The Community Residential Unit must be a positive spatial structure in relation to the public spaces and internal residential courts created by the strategic layout of the units.

3.6 The flexibility of the layout of housing units, both horizontally and vertically must allow for the possibilities of current recommended rental housing stock.

3.7 Location is the key element in respect of creating an advantageous outlook for the poor. The following elements can be developed to inform design and make value based decisions:-

- Landscape and Green Network

- Public place, building form and scale
- Hierarchy and movement framework
- Urban block development
- Development parcels and plots
- A mix of land uses
- Climate, energy and resource efficiency

Findings

Design Methodology

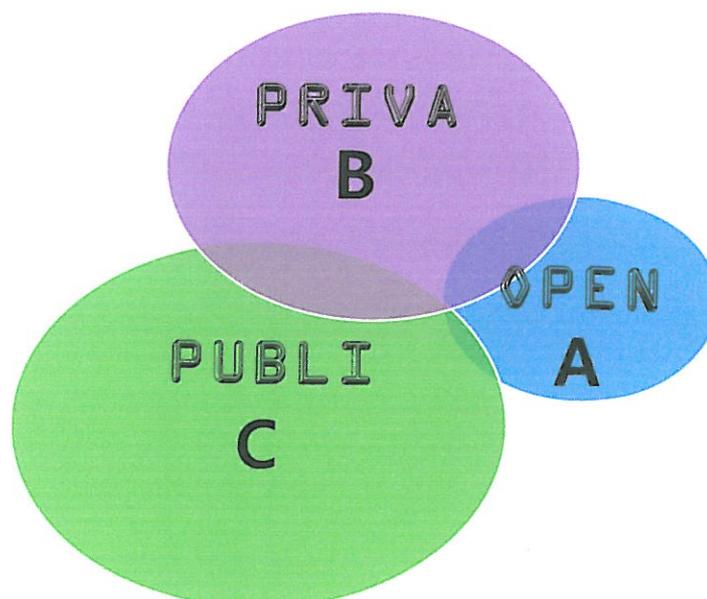
The design approach for the CRU units is primarily based on efficiency and quality in:

modularity
 space
 light
 ventilation
 services
 inter-operability

Layout of the units has been design around maximising space around public circulation and entrance into each unit as these areas do not form part of the rentable area.

Division of spaces

Portion A	Portion B	Portion C
Entrance - Open	Private Space - Bedroom and Bathrooms	Public Space - Kitchen, dining and Lounge (Open Plan)
Fire consideration - minimum dimensions	Bedroom will not be given ordination priority as these areas will not be used during the day.	Open plan arrangement orientated from the entrance.



Design

The two-storey design solution for both type 1 and 2 is preferred as it requires simple construction methods. The design was the ideal solution in terms of maximizing height which results in a reduction of construction costs per square meter, using a standard load-bearing masonry structure without having to rely on a costly concrete structural system.

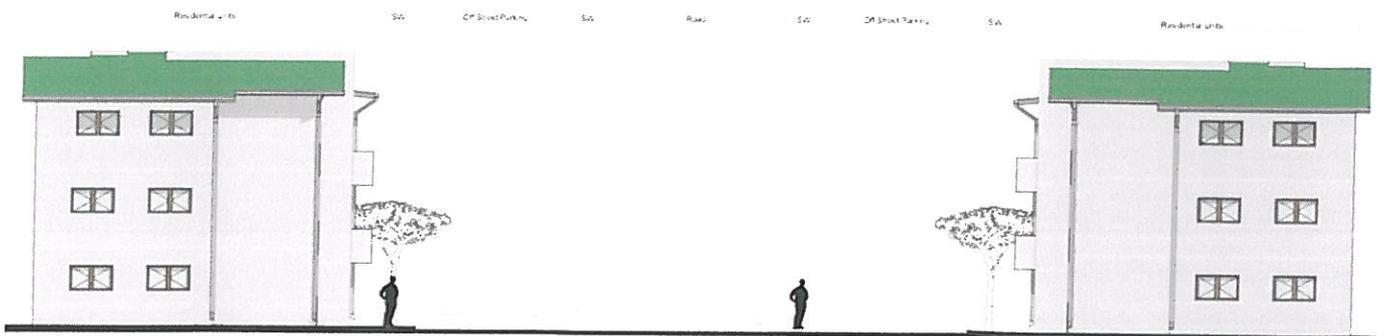
Stairs and landings between units, design results in the more ergonomic and cost effective method of reducing excess circulation space and costs, stair landings act both the landing and circulation space to access units. Stairs are in compliance with SANS 10400 Part T, Fire escape regulations with a minimum width to stairs, masonry double skin wall to separate both units to prevent any potential fire spreading between the residential units.

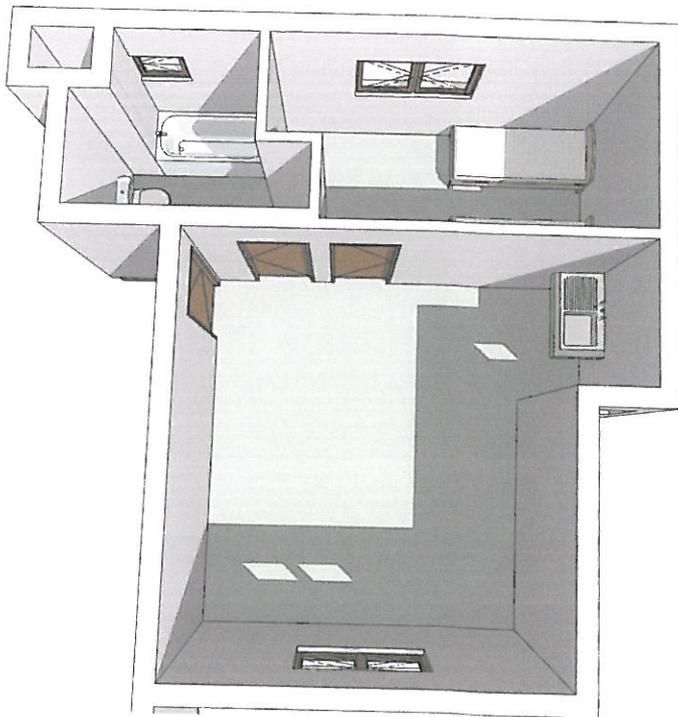
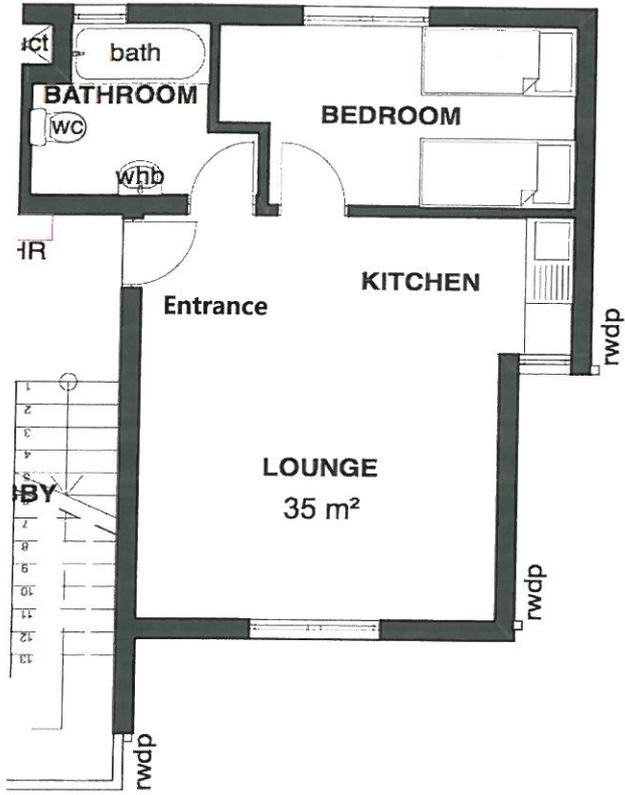
Internal spacial arrangements in residential units are open plan, giving the occupants the highest degree of versatility. This includes the kitchen with just a sealed pre-cast concrete plinth with drop in stainless steel sink that is in a predetermined position.

Sanware specified is the most economical solution using SABS approved products to provide occupants with a high standard of fixings. Bathrooms can easily be adapted to cater for paraplegic, by means of bathroom doors to open outwards and the inclusion of grab rails as specified in the specification document. (Please note that ground floor units are the only suitable units for paraplegic occupants).

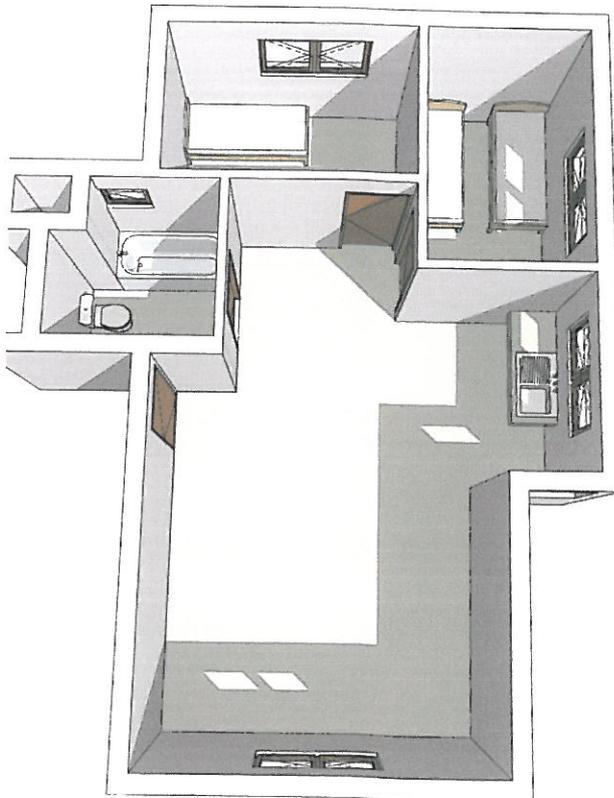
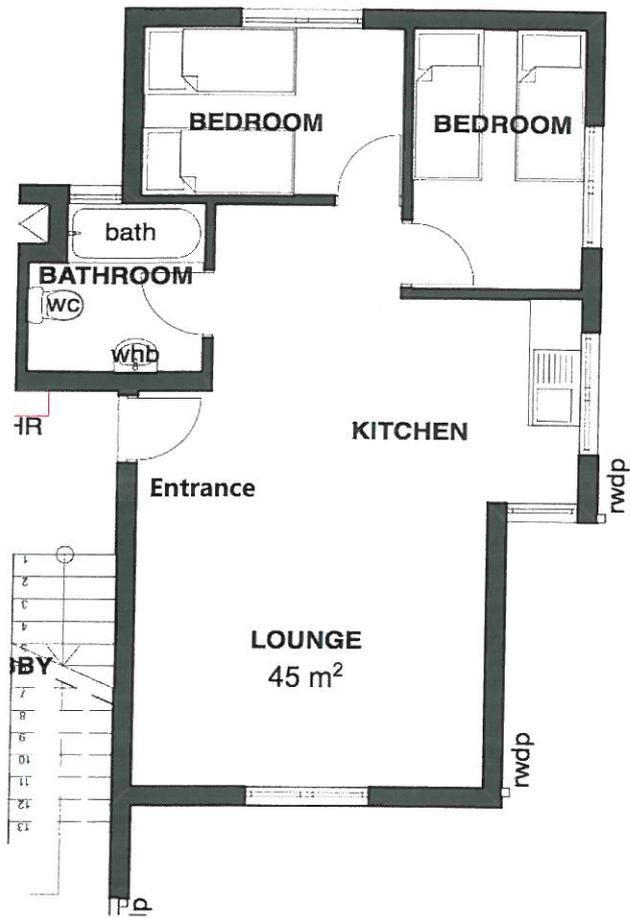
High zinc metal roof sheeting is the ideal solution to the wall due to its excellent performance in KwaZulu Natal and its 10 year warrantee, it will require little too no maintenance. The roof design is in compliance with SANS 10400 Part T Fire regulations, parapet walls allow for the units to be completely isolated, to prevent spread of fire in the event of a break out of fire and flames to spread into the adjacent residential unit.

Urban Design Control Scenario





One Bed Unit



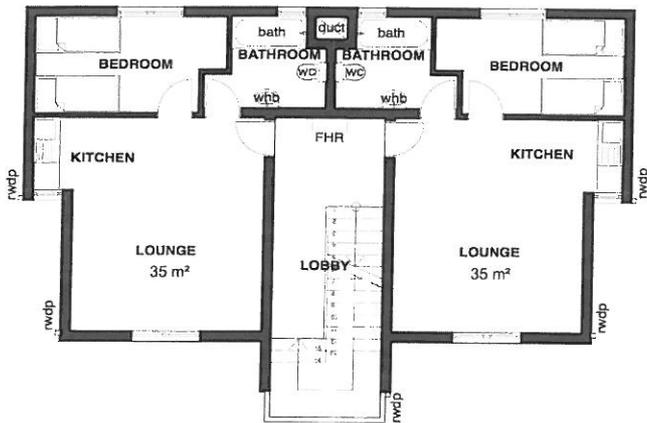
Two Bed Unit

Typologies

At this stage two different typologies have been proposed that would incorporate various combination of the two units described above. Combination of all three typologies is illustrated on the Appendix A

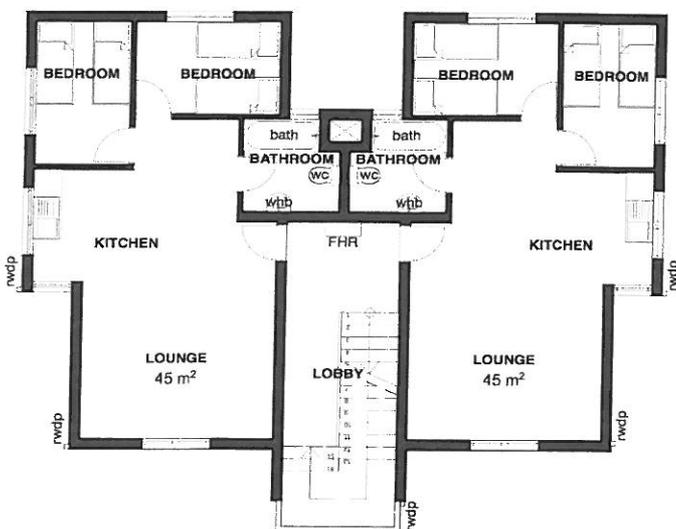
Type 1 - 1 Bedroom Apartment

- Consisting of two 35m² units
- Common access staircase.
- Centralised wet services.



Type 2 - 2 Bedroom Apartment

- Consisting of two 45m² units
- Common access staircase.
- Centralised wet services.



4.0 SPECIFICATION MATERIALS AND METHODS FOR CONSTRUCTION OF CRU

4.1 General:

- All construction and materials to comply with the empirical rules of SANS 10400 unless otherwise agreed to through rational design.
- All drawings must be scaled, fully annotated, and all dimensions and specifications are to be checked and verified before submitted to the department for perusal.
- Should any part of the drawings, specification or bills of quantities not be clearly legible to the Department or that the materials or articles to be used in the execution of the works be considered insufficiently described, the Representative/Agent shall be requested in writing, to make clear, also in writing, his/her requirements, failing which the Department shall deem application for approval of funding incomplete and return for further investigation.

4.2 Standards for CRU Development

- **Foundations** – In the event that the bearing capacity of the founding material exceeds 150KPa, it is recommended that a 1000mm X 400mm strip footing is adopted. In the event bearing capacity of the founding material is less than 150KPa, it is recommended that a 1000mm X 400mm strip footing supported on piles placed at 1.5m spacing is adopted. The piles must have the capacity of not less than 150KN. The foundations to be founded at a minimum of 1m below NGL. For deep excavation it might be necessary to step the footings to limit the excavation depths and maintain 1m below NGL. These foundation solutions assume that a 13.7m X 9.5m X 8.1m double storey masonry structure is adopted. Shoring of trenches for foundations is not likely to be required at depths of up to 1.2m but must be assessed on site by the Engineer. Irrespective of the foundation method adopted, it is imperative that site drainage and landscaping is implemented in all areas to prevent surface ponding. Where differential settlements or differential heave movements are expected, the founding solution adopted has to mitigate these conditions. For each site a detailed geotechnical investigation should be conducted and the foundations to be sized not to exceed the bearing capacity limits.
- **Excavation Inspection and Control Testing** – It is recommended that all foundations be inspected by a competent person prior to placing of the blinding layer and concrete. Regular checks on the quality and compaction of the backfill to the engineered terraces should be made.
- **Floors (surface beds)** – The surface beds are to be 100mm in thickness covered by 25 mm screed on 250 micron polythene damp proof sheet taken up at the sides and overlapping seal with damp proof course in wall on an approved fill appropriately poisoned compacted to engineer's detail. Expanded polystyrene, plaster and cost effective insulation are to be applied around the vertical edge of the perimeter of floor. The top of concrete bed must be a minimum of 150mm from adjacent ground level or external access areas. Surface bed to be cast in panels with 395 mesh placed in centre of surface bed. Mesh reinforcing to be discontinued at panel interfaces. Mesh splices are to be overlapped by 300mm. The edge interfaces of the adjacent panels to be formed with a nosing tool.
- **Staircase and floor slab** – The rises and steps of staircase to be as per the Architects details. The reinforcement to be provided in staircase to be as per the Structural details. The floor slab is to be 250mm thick and reinforcement to be as per Structural details.
- **Floor Finishing** – Pigmented, cement-based, self-levelling floor covering for application onto wood floated screeds. To produce a 2mm smooth, decorative layer that is unaffected by rising damp. For interior use only. Sub floors to be prepared strictly in accordance with manufacturers recommended procedures. Screeded with 3:1 cement plaster of thickness required, but in no case less than 12 mm, all steel trowelled to true and smooth surfaces. The sand used in the plaster shall be of such fineness as will allow for the screed being trowelled to a surface suitable to receive the finishes. All to manufacturers specification. In accordance with SANS 10109, SANS 50197, SANS 1083, SANS 50197

- **Structural Concrete** – Concrete strength for structural elements to be 30MPa unless otherwise specified.
- **Tiling** – 300mm x300mm tiles colour range and finish to architects specification, with 100 mm high skirting cut from floor tiles.
- **Walkways** – 25 mm screed non slip granolithic finish to fall to edge on 100 mm bed suitably stepped.
- **External Walls** – 230mm Common bricks. All construction of masonry and mortar to double skin walls to comply with SANS 10400-B-2012-Part B-Structural Design & SANS 2001-CM1-2012-Construction Works-Part CM1-Masonry Walling. Brick force every 5th course.
- **External Plaster** – Plaster to be cement plaster between 13 - 16mm thick with mix of 1:5 cement / sand, with a steel trowel finish to brickwork. "V" joints cut into junctions between brick work and concrete.

External Paintwork – Prepare, stop and apply one filler coat and finish with two coats PVA paint. All paint to be SABS approved.

- **Internal Walls** –90 mm concrete block minimum 7 MPa for internal walls not exceeding a height of 2,7m per floor. . All joints and perpend to be no less than 10mm thick square recessed, all to comply with SANS 10400 part K. Brick force every 3rd course.
- **Tiling** - Ceramic tile splash backs at wash hand basin, kitchen sink and bath. Required to protect walls from moisture from water splashing. (Hygiene & maintenance considerations) ceramic wall and floor tiles to comply with SANS 1449/ 13006 - B1a & SANS 10107
- **Internal Plaster** – Cement plaster 1 coat work on brick and block work shall be composed of 4 parts of sand to 1 part of cement for internal work and 5 parts of sand to 1 part of cement for external work, all measured by volume, and mixed as described for by manufacturer. One coat work on concrete ceilings and beams were required.
- **Internal Paintwork** – apply one coat plaster primer and two coats low sheen pure acrylic to manufacturers specification to all internal surfaces where required.

- **Roof** – metal roof with minimum 12⁰ pitch, colour of choice, to achieve absorption R-value of 0,7 over timber purlins 50mmx75mm on insulation, on 150mmx38mm timber trusses. 9mm gypsum board ceiling fixed to 38mmx38mm timber battens fixed to tie beam suitably finished. Insulation laid as sarking slightly ditched between trusses under timber purlins.

- **Windows** - Aluminium Windows to comply with SANS 1653

- **Glazing** - Any window used in the glazing of any building shall be fixed in a manner and a position that will ensure it safely sustains any wind loads which can be reasonably expected, not allow penetration of water to the interior of the building and be apparent in the case of clear glazing, to any persons approaching such glazing.

Buildings with up to 15% fenestration area to net floor area per storey will be adequate in complying with the minimum energy performance requirements. Buildings exceeding this must comply with SANS 204 of the National Building Regulations (NBR). All fenestration air filtrations shall be in accordance with SANS 613 of the NBR. All safety glazing must be in accordance with the requirements of SANS 1263-1 of the NBR.

- **External Doors** – 813x2032x40 SA PINE BB Door with galvanised mild steel door frame for 230mm brick work complete with galvanised mild steel butt hinges all suitably finished and fitted to manufacturers specification, 3 lever lockset to be installed on all external doors. To Comply with SANS 545

- **Internal Doors** - 813x2032x40 HOLLOWCORE MASONITE faced doors with galvanised mild steel frames for 90 mm brick work with galvanised mild steel butt hinges all suitably finished and fitted to manufacturers specification, 2 lever lock sets to be installed to all internal doors. To Comply with SANS 545
- **Sanitary Ware** - All Sanware to be SABS approved
 - Basins - White glazed ceramic wash-hand basins: SANS 497
 - Water Closets - White glazed ceramic water closets: SANS 497
 - Flushing Cisterns - White glazed ceramic water closets: SANS 497
 - Sinks - Stainless steel sinks with draining boards for domestic use: SANS 242
 - Taps - SANS 226, class as suitable to dynamic supply pressure
 - Traps - Plastic waste traps: SANS 1321, part 1
 - Traps - Rubber waste traps: SANS 1321, part 2
 - Taps - SANS 226, class as suitable to dynamic supply pressure
 - Taps - SANS 226, class as suitable to dynamic supply pressure
- **Hot and Cold Water Reticulation** – Any hot or cold water reticulation installation must comply with SANS 10400 P of the NBR. For applications above ground only class two copper piping and fittings or better to be used. For application below ground class two or class three copper piping and fittings to be used.
- **Ceiling** - To comply with SANS 428/1039/1707/1783-4/ of the NBR
 - Skimmed & Painted - Where ceilings are concrete
 - Rhino board - Skimmed and painted with gypsum cornice
 - Applicable standard: SANS 2001-Construction Works Part CT2: Structural Timber work (roofing)
 - sawn softwood brandering: SANS 1783-4
 - Eucalyptus brandering: SANS 1707-2
 - Gypsum Board
 - . gypsum board: SANS 266, 6,4 mm thickness
 - . brander spacing: 400 mm (300 when plastered)
 - Gypsum Cornices
 - . gypsum coved cornice: SANS 622
 - Wood Trim - To comply with Hardwood: SANS 1099
 - . gypsum coved cornice: SANS 622
- **Roofing**
 - To comply with SANS 2001-CT2/10177-7 & Part L of the NBR
 - To comply with SANS 10237
 - SANS 1381-4 class B
 - Zincalume Z200 metal sheeting, (contains higher zinc content
 - Carries a min 10 year warrantee,
 - Suitable for the sub-tropical region
 - Robust/long lasting
 - Requires little or no maintenance. (colour fast application to reflect heat)
- **Sewer Reticulation and Storm water Drainage** – All to engineers design. In the case of material specification all sewer reticulation to comply with SANS 10400 P and Q of the NBR. In the case of material specification all storm water drainage to comply with SANS 10400 R of the NBR, pipe installation to be in accordance with SANS 2001 DP1: Earthworks for buried pipelines and prefabricated culverts.
- **Gutters & Downpipes** – PVC-U gutters and downpipes: to comply with SANS 11
Downpipes to comply with SANS 967

- **Lighting, Electrical and ventilation** – Requirements for electrical, DB boards, stove points, minimum suitably placed light and plug points for each room and where applicable externally, all standard fittings to be used. External lighting to be strategically positioned. In the case of material specification SANS 10400 O of the NBR to take precedent.

- **Other Finishes and fittings –**

Underside of floor slab to be finished with one coat primer and two coats of low sheen pure acrylic, material specification and application to manufacturers' detail.

Ceilings to be installed only at truss level, all edge to edge suitably primed and finished, with gypsum cornices

Toilet, wash hand basin and kitchen sink must be specified for approval. Toilet roll holder, and soap dish to be included in bathroom finish.

Bath area, wall area around kitchen sink and wall area around wash hand basin bathroom to be tiled with white glazed tiles three rows above kitchen sink and bathroom wash hand basin.

100 litre wall hung heat pump water heater to be installed in all units to manufacturers specification.

ELECTRICAL AND ELECTRONIC DESIGN STANDARDS

1. Introduction

Ibaya Consulting Engineers was appointed by Human Settlements Department – KZN to provide professional electrical and electronic services for the design and costing for different typologies for community residential units (CRUs) guided by the department's guidelines. The section below covers the design criteria as follows:

- 1). Bulk Power Supply
- 2). Lighting Installation
- 3). Small Power Installation
- 4). Communication Installations – Telephone and Television
- 5). Lightning Protection and Earthing Systems
- 6). Schedule of applicable Legislation, Standards and Specifications for the entire installation

2. Power Supply

2.1 Proposed Power for the New Installation

The design allowed for the main power kiosk, cables to individual block of flats and to each units distribution board and common areas distribution board. There is also a meter frame per block of flats with meter and circuit breaker per unit and common area distribution board.

Each unit's distribution board has lights, geyser, stove and plugs circuit breaker. Also included in the unit's distribution board is the load control relay (LCR) to limit the power drawn by the geyser and stove simultaneously. The distribution board will also have keypad for prepaid system.

Each block will have common area distribution board for supplying the lobby area, staircase and wall mounted external lights. The main power kiosk will also supply the area lighting including car park.

3. Lighting Installation

The designed allowed for two types of light fittings as detailed in the table below. Lights are suitable placed per room and also in the lobby area. The external lighting for each block is provided by means of wall mounted light fittings which is same as the units internal light fittings except that it has black trim ring. The internal light fittings have white trim rings to match the ceiling. Light fittings are standardized for ease of keeping spares for maintenance purposes e.g. lamps.

Each room has individual light switch which is a Crabtree classic range or other approved. These should be mounted at 1100 AFFL or at the same height as the door angle but complying with SANS 10400.

External lights are controlled by means of a photocell.

Table 1: Light Fittings Schedule

Type	Description	Area
A	Rondo Mini 2x11W energy saving robust enclosed bulkhead light fitting with a white trim ring.	Inside units
B	Rondo Mini 2x11W energy saving robust enclosed bulkhead light fitting with a black trim ring.	Wall mounted external lighting

4. Small Power Installation

Each bed room is provided with a double 16A round-3 Pin switched socket outlets mounted 300mm above finished floor level. The kitchen is provided with a stove isolator mounted and double 16A round-3 Pin switched socket outlets mounted at 1200 AFFL.

The lounge is provided with one double 16A round-3 Pin switched socket outlets and a single 16A round-3 Pin switched socket outlets also mounted at 300mm AFFL. There is also a ceiling mounted geyser isolator.

All 16A round-3 Pin switched socket outlets and stove isolator are flush mounted

5. Communications

5.1 Telephone installation

Each unit is provided with one flush mounted telephone outlet point. A provision is made for 300x300 mm flush mounted steel telephone junction box with a wooden backing board.

5.2 TV Installation

Each unit is provided with one flush mounted telephone outlet point. A provision is made for 300x300 mm flush mounted steel TV junction box.

6. Lightning Protection and Earthing Systems

An allowance has been made for conduits, excavation, backfilling, earth rods, bonding and termination of down conductor, bonding conductors and complete termination of bond conductors in joint box as well as allowance installation of 50 mm² bare conductor in the ground and interconnection of the earth electrode and electrical earth conductor running with feeder cables to the buildings.

The geysers will be earthed with standard copper tape earth strapping and 2, 5 mm² bare copper earth wire. The washing basins and all cold and hot water piping will be earthed by means of standard copper strapping at regular intervals of 6m and connected to the electrical earth system at the distribution board.

7. Applicable legislation, standards and specifications

The entire electrical installation shall be carried out in accordance with the following standard specifications, regulations and amendments thereto:

- 1). SANS 10142-1 The Wiring of Premises Part 1: Low Voltage Installations
- 2). SANS 10292 Earthing of Low-Voltage Distribution Boards
- 3). SANS IEC61084 Part 1 to Part 2 Electrical Installation Ducting and Trunking
Systems on Walls and Ceilings
- 4). SANS IEC 61035 Part 1 to 2.4 Electrical Installation Conduit Fitting
- 5). SANS 767 Part 1 to Part 2 Electrical Circuit Breakers
- 6). SANS IEC 60099 Electrical Surge Arrestors
- 7). SANS 101114 Code of Practice for Interior Lighting Part 1: Artificial Lighting of
Interiors
- 8). SANS 10313: 1990 Code of Practice for The Protection of Structures Against
Lightning.
- 9). The Occupation Health and Safety Act No 85 of 1993
- 11). The local Authority by-laws and any special requirements of the Supply
Authorities the area or district concerned.
- 12). Local Fire Regulations
- 13) SANS 10400 O of National Building Regulations.

NBR conformance

The designs confirm with all National Building Regulations & Sans. However a strategy must be developed for fenestration heat loading in the case of poor orientation. This may require solar shading in the form of built shelves or screens. This includes fire compliance.

Disclaimer: These norms and standards are general guidelines as to design which may be appropriate for your particular project. The department makes no representation as to the particular products or materials identified in this document and makes no endorsement of any product, material, or construction method so identified. The department disclaims any warranties, expressed or implied, relating to these specifications and it is the sole responsibility of the Project Manager and all associated professionals to provide the necessary warranties, guarantees and professional indemnities as applied within the built environment. For all other

material specification and application, rules and regulations not mentioned herein the department wishes to point out that the application of the National Building Regulations takes precedence.