DESCRIPTIVE MEMORY

TECHNICAL SPECIFICATIONS

TB WARDS

1. INTRODUCTION

This descriptive memoir refers to the executive project to build wards for tuberculosis patients as part of the "Health System Strengthening " project as part of the grant agreements between the Ministry of Health of the Republic of Mozambique (MoH) and the Global Fund to fight HIV, Tuberculosis (TB) and Malaria (GF) in Mozambique.

The following TB Wards are planned to be built for this phase:

- Gaza Province (HR de Chicumbane, CS de Maciene)
- Sofala Province (CS urbano de Macurungo),
- Province Zambezia (HD de Mocuba),
- Nampula Province (CS de Muhala Expansão)

1.1. Background

Mozambique is a priority country for TB and HIV, with a high burden for both TB and HIV components. According to the WHO Global TB Report 2013, the country has the third and fourth highest TB incidence and prevalence rates respectively among the 22 countries with high burden.

The estimated prevalence of TB (all forms) has remained stable over the past decade and it was estimated at 559/100,000 in 2013. Mortality is 69/100,000 for TB and HIV-negative patients and it has increased slightly over the past four years; mortality for HIV-infected TB patients is 148/100,000 and in a downward trend. The incidence (all forms) is 551/100,000 and on an upward trend.

The case detection rate (all forms) is steadily increasing, but it is still low at only 39% in 2016.

The current estimate is that the case detection rate is low, partly due to limited access to primary health care facilities.

There is a wide variation in TB burden in the 11 provinces. Five (5) provinces, namely Maputo City, Maputo Province, Gaza, Sofala and Manica are historically responsible for increased reporting. The prevalence of TB-MDR among new TB patients is estimated to be 3.7% and 20% among re-treatment patients.

The construction of 5 wards for patients with MDR-TB and 17 waiting shelters in the health facilities for tuberculosis control will ensure healthier conditions for patients, provide a better working environment for health professionals and reduce waiting time for patients and relatives while waiting for treatment. As a result, clinical care conditions for TB-MDR patients will improve.

By improving clinical care conditions, it is expected that infections will be reduced and patients with TB-MDR will be less reluctant to undergo treatment and, consequently, the treatment outcome of TB-MDR will be improved.

In this regard, UNDP is requested to provide technical support for Global Fund grants to MISAU of Mozambique. UNDP will ensure that measures for implementation are in line with the requirements of the Global Fund and the Country Coordinating Mechanism to achieve the goals and improve the system.

1.2. Project Description

The project includes the construction of a completely fenced hospitalization, made up of a ward and an open patio, dedicated only for TB patients. The ward building will have a covered area of about 370 m2 and the ground floor will be raised about 60cm from the ground level, with access through steps and ramps with a maximum slope of 10% for people with limited mobility.

The building is 45m long, divided by an expansion joint. The ward will consist of 10 bedrooms, 5 WC's, a reception area (with WC, storage) and a covered balcony.

The project has been conceived to guarantee the functionality of the proposed activity and to provide ventilated and airy environments.

The patio will be landscaped with resting benches.

2. TECHNICAL SPECIFICATIONS

The paragraphs below present the detailed technical specifications for the construction of the Wards.

2.1 Rules and Regulations

For this architectural project, the REGEU (General Regulation for Urban Buildings) has been taken into account.

The hydraulic installations were designed considering the technical standards and regulations of building and public water distribution and wastewater drainage systems.

For the design of the structure, the RSA stipulated for the determination of the most unfavorable combinations was used, and in accordance with the REBAP for the determination of the reinforcement, control of cracking and deformations.

In general, the construction standards and regulations specific to this kind of buildings, stipulated in the Government Gazette.

2.2 Civil Work

The construction will be of the conventional type with structure in reinforced concrete, masonry blocks of cement and sand and covering in sandwich plates, supported on a structure of metallic profiles.

In order to determine the reinforcement, a surcharge coefficient of 1.50 was applied for overload and permanent load.

The reinforced concrete pieces were sized using the finite element method, according to the automatic calculation processes, namely the CYPECAD software.

The project constitution should be verified in the drawn parts that confer the attributed functionalities.

All works should be executed in accordance with the written and drawn parts of the Projects, and in accordance with the technical specifications.

2.3 Preliminary Work

2.3.1 Cleaning the Construction Site

The cleaning of the construction site consists in removing from the construction site, up to 5m outside the foundations, all rubble, shrubs and grass, and then regularizing the site until it reaches the levels indicated in the project. Whenever there are discrepancies between the contour lines of the project and the existing relief, either by surface water runoff or by the action of the winds, the project quotas must be taken into account and landfill or earthworks must be carried out in order to make the shape of the land to which it is intended.

2.3.2 Work Implementation

The work implementation includes the demarcation of the parts of the work to be built, with the help of theodolite and tape measure taking as a basis the general plan of implementation and the plan of foundations, using the measures contained in them. No foundation should be executed without the approval of the technician of the work, after verifying the executed implantation.

2.3.3 Construction of the barrel

The construction of the barrel includes the construction of the auxiliary structure of peripheral wood and exterior to the main structure, for the demarcation of masonry axles and foundations and marking of project quotas. The barrel should remain operational until the execution of the first two rows of masonry. The main marking points will remain on site until the final marking of the exterior arrangements.

2.3.4 Protection Against Termites

Protection against termites shall be carried out under all foundations by the uniform sprinkling of all surfaces with the product type “Tenure MTC- Sanachem industrial” strictly applied according to the manufacturer’s instructions.

Alternatively, protection against termites may be performed by a specialist company offering a guarantee of at least 10 years.

2.4 Land Movement

2.4.1 Excavation for Foundation Footings

They should be opened 60 cm wide for all walls. The depth should be at least 80 cm at the point to ensure the formation of a good bed for the foundations, according to the designed pieces.

2.4.2 Watering and Compaction

The bed of foundations and ground floors shall be properly compacted in mechanical bundles after regularization with washed inert sand.

2.4.3 Landfills

If it is necessary to make landfills, this will be done by placing successive layers of clean soil, each layer having a maximum thickness of 15cm, watered and compacted with mechanical mallet.

Soils removed from the excavation, if they are free of impurities, and plant materials, may be reused for filling the floor boxes and for shaping the exterior arrangements.

2.5 Foundations

2.5.1 Rockfill

It should be made in the foundation bed, and in the floor box, with hard stone, cleared land, sand or sludge, not sandy marl soils, not iced, not cracked, with regulated dimensions.

2.5.2 Cleaning Concrete

B15 cleaning concrete of 5cm thick will be used throughout the foundation area, above the sand layer in the excavation bed.

2.5.3 Foundation Base

The columns will be insulated, joined by a running base, in B25 reinforced concrete, with the dimensions shown in the drawings, resting on the cleaning concrete.

The bases shall be concreted “in situ”, using a suitable formwork, where the concrete shall be properly vibrated.

2.5.4 Ground Floor

The ground floor in B25 Concrete had been laid on two substrates, the lower substrate being 15cm thick of gravel, cleaned and compacted soil with mechanical mallets, and an intermediate substrate consisting of 10cm rockfill in medium stone, properly regularized and compacted.

2.6 Concrete

2.6.1 Concrete Floor

This concrete layer will be leveled with the help of a ruler that will rest on guideposts assembled before filling the slab and it will be 10cm thickness. This thickness will start to thicken about 30 cm from the outer face of the masonry until it reaches 20 cm thickness under the horizontal protection of the masonry.

2.6.2 Concrete in Beams

At the floor level, a 20cmx30cm floor beam will be used, and at the levels indicated in the drawings, there will be 20cmx30cm crowning beam. These beams will be made of reinforced concrete B25, with steel reinforcement A400, according to the structural drawings.

2.6.3 Lintel

The lintels will be made of reinforced concrete B25 with A400 steel armor and applied over all doors and windows as a beam, and under all windows, with 10cm overhang on each side.

2.6.4 Concrete in Columns

The columns will be 20cmx20cm, they will be made of reinforced concrete B25 with A400 steel armor, according to the structure drawings.

On the balcony the pillars will have a circular section with 25cm diameter.

2.6.5 Concrete in Slabs

At the dimensions indicated in the drawings, on the side areas of the building, two slabs will be located, made of concrete, reinforced B25, with 15cm thickness, reinforced with a double mesh, 10mm @ 15cm of A400 class steel, and supported by beams of reinforced concrete, according to the structural drawings.

2.6.6 Expansion Joint

An expansion joint should be made in the pavement on the V8 axis. The joint must have a minimum thickness of 5 mm and be filled with expanded polystyrene, coated on the closure with an asphalt product, after the execution of the edges is completed.

2.7 Masonry

2.7.1 Foundation Masonry

The foundation masonry will consist of masonry of 20cm solid blocks of concrete. The blocks will be laid with cement mortar and sand ratio of 1:4, running along the running base.

2.7.2 Lifting Masonry

The lifting masonry will be built in hollow blocks of cement and 15cm sand, laid with cement mortar and sand ratio of 1:3, as indicated in the project.

The blocks are laid with cement and sand mortar and are vertically aligned despite counterfeiting.

2.8 Roofs

The building's roof will be a 40mm thick insulated metal panel type in order to ensure thermal comfort and sound insulation to the internal environment. The sheets will be supported, on a metallic support structure consisting of trusses in INP 100 and purlins in lipchannel according to the roof detail in the project.

The roof trusses must be anchored to the top beam using 5 mm thick U flat iron metal plates, as detailed in the project. The lipchannel should have spacing of maximum 0.60 m. The roof sheets must be fixed with screws / nails following the guidelines:

- For ridge, 1st and 2nd row of the edge: nails in every wave
- Cover mean: Alternate nails every 2 waves on same line (alternate nail position between lines)
- The nails and washers must follow the guidelines of the plate manufacturer. The washers must be made of nylon or EDPM rubber.

All connections and fixings must be made with appropriate accessories, according to the specifications of the suppliers.

During the preparation of the work, the coverage programming project to be approved by the technician must be executed.

2.9 Finishes

2.9.1 Plastering

All walls, beams and pillars will be plastered with cement mortar and sand to the line 1:5, after carrying out all preparatory work.

2.9.2 Screeds

The floor finishing will be in polished screed of cement and sand ratio of 1;3.

2.9.3 Coatings

The floors of the wet areas will be covered in porcelain tiles of color and stratum to be defined.

In masonry of wet areas, (WC; s) in all its width and a height of 2.10m, tile, selected (20cmx30cm) and of first quality, of color and stratum to be defined will be applied.

2.9.4 Painting

Top quality paints suitable for the purposes for which they are intended, CIN brands, colors yet to be chosen will be applied. Every building must be painted in two coats, after applying the appropriate insulators.

2.9.5 Frames

All frames of windows and doors of the building will be made of natural aluminum, according to the map of the openings. Glass with 5mm minimum thickness will be applied to the windows, on the doors by aluminum sheets.

The necessary chrome hardware must be applied to all of them.

2.10 Hydraulic Installations

2.10.1 Water Supply

The water supply design was carried out according to the scheme presented, with sufficient capacity to cover water needs.

The water supply network is in Hidronil tubes, of sections indicated on the same.

All connections and pipe bends must be made with appropriate accessories, according to the suppliers' specifications.

2.10.2 Water Sizing

A minimum residual pressure of 5mca (Article 23 of the RSPDADAR) shall be adopted for devices using the network and a maximum of 60mca (according to the RSPDADAR in force in the country) to ensure the water supply to buildings with

adequate pressure, consistent with the (average) degree of comfort required in the buildings under study. Taking into account the fact that the minimum and maximum water speed should be between 0,5 m/s and 2,0 m/s respectively (according to article 23 of the RSPDADAR), in order to avoid possible incrustations caused by low speeds and to reduce noise and possible water hammering (hydraulic shock) due to very high flow speeds, the network sizing was done adopting an average speed of 1,25 m/s, according to the calculation flow rates, which correspond to the determined load losses.

2.10.3 Dimensioning Hot Water

For the hot water supply, mini hot water supply systems were designed, made up of six electric heaters with a capacity of 40 liters each. The terms must be of good quality in order to satisfy not only the customer, but also the quality requirements established in the RSPDDAR, in force in the country, regarding the supply of cold and hot water.

The same principles applied to the cold-water network were considered when designing the distribution network.

2.10.4 Sanitary Appliances

All sanitary appliances, such as lavatories, stalls, polybans, toilets, etc., will be of high quality, of the type indicated in the architecture and the choice of colors of these appliances will be up to the construction owner, and it may delegate the supervision if deemed convenient.

2.10.5 Leakage Test

After the assembly of the nets is completed, the entire piping shall be washed and before the shafts are covered, the net shall be tested section by section at a pressure equal to 1.5 times the nominal pressure of the piping, i.e. 10 [kg/cm2] x 1.5 with a minimum of 900KPa and during the first 30 minutes there shall never be a reduction of the test pressure. All hydraulic materials, including hydromechanical

equipment and other parts of the system, shall also be subjected to the appropriate tests, and the opinion of the monitoring body shall be given for their application on site.

2.11 Sewerages

The entire sewerage network will be carried out in plastic tubes materialized in uPVC - rigid vinyl polycrystalline or equivalent, class 4, 6 and 10 for internal and external plumbing respectively.

All connections and pipe bends must be made with appropriate accessories, according to the suppliers' specifications.

2.11.1 Gray Waters

The gray waters will be directed to the drain with marked dimensions, passing first through the manholes, according to the designed parts. The white water from the treatment booths will pass through the chemical boxes before being inserted into the sewer drainage system.

2.11.2 Black Water

The black waters will be directed to the inspection boxes and from these, to the septic tank that will be executed in the places indicated in the sewer drawings. The white water (pre-treated) in the pit will later be channeled to the respective infiltration drain.

2.11.3 Connection to Sanitary Appliances

As planned, the connection of the connecting branches of the sanitary appliances will be made using siphons, and in some cases siphoned floor boxes will be installed for the union of the individual discharge branches, according to the drawings and specifications techniques. It is proposed to install floor drains in all bathrooms, in order to facilitate the drainage of water lost on local pavements.

2.11.4 Septic Tank

A septic tank will be built with capacities indicated in the general sewage system deployment drawing, into which the waste will be channeled, as indicated in the sewage network drawings. The septic tank will be maintained in accordance with normal sanitary regulations by the competent authority.

2.11.5 Drains

The drain, with a 180cm section, built in masonry walls with open joints, the bottom will be in gravel and the lid in reinforced concrete slab, according to the detail drawings.

2.12 Electrical Installations

The electrical installation must be carried out in accordance with the applicable rules and regulations and in accordance with the diagram shown.

3. FINAL PROVISIONS

For all issues omitted in this specification, it is recommended to follow the regulated techniques, the process of its construction, as well as to use the best materials and the usual procedures set out in the laws in force in the Republic of Mozambique.

Maputo, 5th February 2020.