



REHABILITATION AND EXTENSION PROJECT OF THE BEIRA CENTRAL WAREHOUSE

U.N.D.P / MISAU



DESCRIPTIVE AND JUSTIFICATION MEMORY ARCHITECTURE

SEPTEMBER 2020



1. Framework

The present specification refers to the Executive Project for the rehabilitation and expansion of Beira's general medicine warehouse, currently in operation. The work was developed by Consulmar Mozambique for MISAU - Ministry of Health, having been the subject of funding from the United Nations Development Program (PNUD or UNDP) in Mozambique.

Initially, a slight rehabilitation of the existing building was contemplated, along with an extension in height of the storage nave. However, as the process progressed and during the technical follow-up meetings, it was found that the scope of the project should change: not only the administrative building should be remodeled, but the entire demolition of the storage vessel, replacing it with a larger warehouse in plan and height, allowing for a storage volume substantially greater than initially planned. Finally, in the development of the project, the need for future expansion of the warehouse in the short to medium term was considered.

2. Description of the existing situation

The currently existing and functioning building consists of two bodies: a long rectangular administrative block, which works facing those who access the land and a warehouse with a substantially rectangular plant, adjacent to the first.

The administrative block has a central area with two floors and ends of the ground floor. Internally, the two-story area opens on a mezzanine to a double height void where product loads and unloads are made. On the ground floor, different storage and storage spaces are developed. On the first floor, work spaces (offices), meeting rooms and complementary spaces are located. On each floor there are toilets differentiated by men / women. The administrative area communicates with the nave through a double-height transition space, where the offices on the first floor also open, being separated from the nave by metal fences.



The storage nave is composed of two adjacent and intercommunicating spaces, each with a gable roof, divided by an alignment of pillars and a low gutter. These characteristics severely limit the product's storage capacity at height: in fact, products are currently arranged along the floor, resting directly on it. At the perimeter of the nave there is an alignment of upper windows that guarantee the illumination of the space.

In a building independent of this one, the deposit of flammable materials and products works. This construction corresponds to a cobblestone based on a punch, with a covered outdoor access area. Internally, the space is organized into three elongated and tall naves.

From the point of view of the state of conservation (here also referred to as condition), the following situations are verified:

- The administrative block is functional, with the floor and wall coverings generally in reasonable condition; however, the roof of this building was blown off at several points, and rain tightness was not guaranteed;
- Basic infrastructures work, despite being undersized for needs (number and type of outlets, lighting levels, etc.). The equipment, however, is obsolete, very degraded or does not exist (among these, there are frames, cold condensers, ventilation, among others);
- The ceilings on the second floor of the administrative block show clear signs of water infiltration, with spots and cryptoflowering.
- The central nave shows occasional signs of humidity and a low level of finishes. At the meeting
 with the administration building, there are marks of cracking of walls, possibly due to land
 settlements or differential movements between the two buildings;
- The flammable building has a very low standard of finishes and signs of humidity on the walls; the roof was severely affected by wind, so the interior spaces currently operate in the open.



3. General Principles of the Proposal

The proposal developed responds to three main objectives: i) to transform the current facilities into a central medicine distribution warehouse; ii) increase the storage capacity; and iii) allow for future expansion. To achieve these objectives, a generic program was followed, which was clarified in the process of technical meetings to monitor the work, until it was approved on September 11, 2020 and which presupposes i) the remodeling of the existing one (more profound than the initially planned, including for example the creation of outdoor sanitary facilities); ii) replacement of infrastructures by new installations; iii) improving the functionality of the complex, through the definition of internal circuits and safety levels, the creation of a dock area for the reception and dispatch of medicines capable of receiving large trucks and, finally, through the adoption of good practices in terms of fire safety; iv) air conditioning of the spaces, in particular the storage spaces, creating conditions of an international standard for the storage of these products.

Given the important limitations in terms of the storage capacity of the currently existing nave, it is recommended that it be completely demolished and the construction of a new nave. The new body has a structure that is out of step with the structural metrics of the administration building so as not to interfere with the foundations of the existing one, nor does it require expensive and difficult to carry out matching works. For the same reason, the new nave is located about 2m away from the administrative building, with the contact between them being made by a lower transition zone.

Access starts to take place in a different way: directly to the reception and exhibition docks with regard to products and supplies (in green, in figure 1), with the entry of employees in the current access area and visits (in red, in figure 1). Associated with the logistics area, there is a truck parking area, complementary to the four positions on the docks. Staff and visitors park in a dedicated car park, next to the access for people.





Figure 1 - Scheme of access, outside circulation and parking.

Internally, control / security levels differ according to the user. Thus, the public only has access to the reception or results collection area of the laboratory. Access to the work areas on the upper floor is controlled by a window at the top of the stairs. Access to the warehouse spaces is controlled at two levels: an initial access control between the reception and the general sanitary facilities / storage area and, in a second level, a face-to-face control and access by a tourniquet to the storage spaces. The delivery and dispatch of material and medicines is controlled through a checkpoint at the top of the ship, with a view of the ship and the spaces for receiving and shipping the product. Finally, outside the building, sanitary facilities and changing rooms are provided that can be used by users or drivers, without the need for them to enter the building. This organization scheme is summarized in figure 2, where the arrows represent the accesses and the circles represent the control points.





Figure 2 - Access scheme and access control levels

4. Storage capacity

There are different storage spaces in this central warehouse, namely: i) the main aisle, for pallet storage, with about 2,430 m2, ii) the small volume warehouse, with about 500 m2, iii) the psychotropic products warehouse, defended through an AK47 type weapon-proof ballistic security door, iv) reagent store, v) surgical product store, vi) flammable store, located in a separate building, and vii) expired store.

4.1. Pallet storage racks

Pallet storage is the critical determinant of this intervention. In this perspective, the developed solution allows the placement of 11 double racks over the entire length of the nave, with heights varying between 5 and 7 levels of pallet placement. The spacing between racks was established by comparison



with the operation of the Zimpeto warehouse, and a spacing between racks of 2.60m was established, sufficient for the movement and operation of the larger forklifts. Thus, the total number of pallets foreseen in the project is 4,809 units in the warehouse, complemented by 459 units in the reception, quarantine and product shipping areas, making a total of 5,259 pallets.

4.2. Small volumes

Medicines sent in boxes or for organization in small volumes will be placed on shelves with 2.0m high shelves divided into 5 levels, 1m wide and 50cm deep.

4.3. Transport equipment

Different sizes of cargo transport equipment are provided: forklifts, pallet stackers and manual pallet trucks. The first ones will be electrically operated, so a parking area dedicated to this equipment has been provided, with battery charging stations. The boom of this equipment should have a minimum reach of 3.2 meters in height and a capacity to reach 11.8 meters. The supply of this equipment is outside the scope of this project.

4.4. Cold installations

There are currently cold storage spaces, in good condition, except for cold production equipment. Thus, in the present project new mechanical equipment for cold production is considered.

5. Constructive solutions

From a constructive point of view, current and easy to implement solutions are proposed, appropriate to the nature of the program and the intended uses for the spaces.

The administrative area will be the subject of a rehabilitation, with the correction of the anomalies detected, replacement or repair of the coverings and improvement of the standard of the installations (electricity network, lighting, etc.). It is also foreseen the replacement of the roofing sheets, in fiber



cement - a carcinogenic material -, damaged by the recent extreme weather events. Thus, it is expected:

- Application of new floors on the ground floor, directly over existing floors, whether it be ceramic tiles based on existing screeds (in public and circulation areas), or new screeds based on existing ones (in storage spaces and warehouses)).
- The new walls and ceilings will be plastered and painted. The existing walls and ceilings will be repaired and painted.
- The new sanitary facilities will have ceramic tiles at floor level and on a panel up to 2.10m high, with the rest of the space plastered and painted. Sanitary ware and equipment were chosen to withstand extreme usage loads (including anti-vandalism) to ensure their durability, for all types of users.
- At the level of the first floor, it is proposed to maintain the existing pavement in the circulation.
 In the work spaces, given the low ceiling height and to simplify the work by reducing demolitions, it is proposed to apply a PVC floor covering directly over the existing floor, ensuring the transitions between different floors with finishing profiles of pavement.
- The ceilings and walls of the upper floor will be subject to a more extensive intervention, to
 remove the existing moisture stains and efflorescences, before receiving the repair of mortars
 and new paint. Due to the low height of the ceilings, the application of false ceilings is not
 recommended, except in spaces directly under the roof.
- Outside, it is proposed to apply aluminum frames or metal doors. Shading is also planned for the new spans that delimit the reception area.

The storage vessel will be the object of a new construction. By its nature (logistical space), the architectural intervention is relatively small, including:

- Exterior walls with double masonry panels, air box and thermal insulation.
- The walls are blocked by structural elements in reinforced concrete.
- The floor slab will be executed directly on the existing slab, which will work as a lost formwork; in the remaining area, the rubble from the demolition of the existing pavilion will be used as the basis for the new slab. The slab will be mechanically stroked, with the application of a surface hardener.



- The interior walls will remain in plain cement block, with only a painting, except in the case of compartmentalization through metal fences.
- The roof structure and the underside of the roof will remain in view.
- To ensure the natural lighting of the space, it is envisaged the application of translucent plates complementary to the roof plate, allowing a relatively homogeneous zenith light in the space.
- Externally, the walls will be plastered and painted, except in areas covered with sheet metal in the continuation of the roof.

The guardhouse will be built with a reinforced concrete structure and cement masonry walls, plastered and painted. Inside, coating solutions similar to those used in the administrative block are provided. The cover will consist of a metal plate identical to the one used on the ship. The frames will be in anodized aluminum in natural color, with laminated glass.

The flammable material block will undergo a slight recovery, with repair of the floor and wall coverings (interior and exterior) and painting. The cover will be entirely replaced by a new sheet metal cover.

All situations of structure and coverage are dimensioned to withstand cyclonic winds in the order of 200 km / h.

6. Table of areas of the proposed spaces

Users Access	24.30 m ²	Expired	41.71 m ²
Entrance / Reception	164.60 m ²	Laboratory	71.50 m ²
Lobby Stairs	47.79 m ²	Deliveries (Laboratory)	23.09 m ²
Transition Zone	79.62 m ²	Antechamber	20.00 m ²
Control	24.61 m ²	Cold Area	66.90 m ²
Collection	48.20 m ²	Cold Area	87.98 m ²
Small volumes	500.95 m ²	W.C. Women	6.46 m ²
Psychotropic	48.10 m ²	Men's W.C.	11.03 m ²
Preparation and Aviation	220.03 m ²	W.C. Changing Rooms (Women)	19.69 m ²

Administrative block - Ground floor



Circulation	100.17 m ²	W.C. Changing Rooms (Men)	20.20 m ²
Reagents	31.35 m ²	W.C. Visits	4.41 m ²
Surgical material	65.92 m ²		

Administrative block - First floor

Circulation	19.00 m ²	It Cabinet	15.40 m ²
Circulation	7.60 m ²	Data Center	16.40 m ²
Control	8.00 m ²	Ups Room	17.40 m ²
Meetings 01	12.10 m ²	Storage	18.40 m ²
Meetings 02	20.60 m ²	Storage	19.40 m ²
Chief Office	15.00 m ²	Refectory	20.40 m ²
Sub-Chief Office	4.50 m ²	W.C. Men	21.40 m ²
Secretary	4.80 m ²	W.C. Ladies	22.40 m ²
Open-Space	12.20 m ²		

Ship

Reception	136.78 m ²	Circulation	181.83 m ²
Quarantine	132.07 m ²	Main Warehouse	2428,52 m ²
Expedition	149.72 m ²	Charging Batteries	72.26 m ²
Control	12.52 m ²		



7. Conclusion

This document constitutes the descriptive memory of the executive project for the rehabilitation and extension of the Beira general medicine warehouse, developed by Consulmar. The text is documented by the technical documentation attached to the project and by the drawn parts.

Maputo, 22 September 2020

Pedro Lima Gaspar (Architect)



LIST OF DRAWINGS

AE01	Alteration plan - ground floor	1/200
AE02	Alteration plan - first floor	1/200
AE03	Changes - Elevations	1/200

A General proposal

A.01	Implantation plan and exterior arrangements	1/200
A.02	General plan - ground floor	1/200
A.03	General floor plan - first floor	1/200
A.04	Elevations	1/200
A.05	Cross sections	1/100
A.06	Furniture plant	1/200

B Maps

B01	Finishing map	No scale
B02	Map of outer spans	1/50
B03	Map of interior spaces	1/50
B04	Interior span map	1/50
B05	Map of interior spaces	1/50
B06	Map of benches	1/50

C Partial detailed drawings

C01	DPP1 - Sanitary installations	1/50
C02	DPP2 - Guardhouse	1/50



D Details

D01	Detail of carpentry: Vi5, Vi7 and Vi8	1/2
D02	Detail of carpentry: Wi1 to Wi3	1/2
D03	Detailing of shade blades	1/5

