Chapter 2. Contents of the Project

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2-1 Basic Concept of the Project

2-1-1 The Project and its Higher Objectives

"Health Sector Strategic Framework 1999-2004" is South Africa's health sector development plan at national level. It emphasizes the need to

1) consolidate achievements in improving access to care and advancing equity,
2) deal decisively with the HIV/AIDS epidemic and its ramifications which threatens to undo our developmental gains
3) stabilise the hospital sector, and
4) adopt a multidimensional approach to ensure steady improvement in quality of care

In accordance with the Framework, the Limpopo DOHW make a strategic plan with a vision that "A caring and developmental health and welfare system which promotes well-being, self-reliance and humane society in which all people in the Limpopo province have access to affordable and good quality services".

The Project is in accordance with "District Health Services" and "Provincial Hospital" plan raised in the Strategic Plan for April 2003-March 2004 by the Limpopo DOHW and it can contribute to achievement of above goals.

The Limpopo DOHW attributes poor provision of health services and malfunctioning of hospital to its incomplete health system and they try to improve them by using the budget of "District Health Services" and "Provincial Hospital". They put more than half of the Limpopo DOHW's budget to "District Health Services". Despite their effort, it is not easy to improve the whole health service provision system in the province. Thus the Limpopo DOHW has requested the Government of Japan for procurement of medical equipment and construction of clinics in the Greater Tzaneen SD where 3 tribes live together and where more delicate considerations in providing health services are needed.

This Project targets at improvement of primary and secondary health services through procurement of medical equipment and construction of clinics in the Greater Tzaneen SD (population of 380,000, data of 2002).

2-1-2 Basic Concept of the Project

The Project involves the following inputs to achieve the above mentioned goal.

- *Provision of equipment with Letaba regional hospital*
- *Provision of equipment with Dr. C. N. Phatudi district hospital*
- *Provision of 27 clinics*
- *Provision of equipment with 4 Health centres*
- *Provision of 4 V.P. shelters for mobile clinic*

The Requested Japanese Assistance will include the following inputs.

- *Procurement of medical equipment to Letaba regional hospital*
- *Procurement of medical equipment to Dr. C. N. Phatudi district hospital*
- *Procurement of medical equipment to 24 clinics*
- *Construction and procurement of medical equipment to 3 clinics*
- *Procurement of medical equipment to 4 Health centres*
- *Procurement of vehicles for mobile clinic activities*
- *Construction of 4 V.P. shelters for mobile clinic*
- *Technical assistance by consultant (Instruction on* Management Method of Equipment Maintenance) to Letaba hospital

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Equipment Planing

1) Basic Policy

a. Assistance to improve quality of health services of the lower income class

More than 200 thousand out of 380 thousand population of the Greater Tzaneen SD are either seasonal workers or the jobless and their family suffering poverty. Most of their diseases are the life-style related diseases, such as STD, hypertension, upper respiratory disease, mental disorder, diarrhea, HIV/AIDS, etc. Each health facility in the project site offers their services practically free of charge.

The Requested Japanese Assistance shall aim at primary health facility (district hospital, health centre and clinic) and secondary health facility (regional hospital) which are responsible for health improvement of the people suffering poverty in the Greater Tzaneen SD.

b. Assistance to strengthen regional health and referral system

The Requested Japanese Assistance shall include assistance for revitalization of regional and referral system which is not functioning properly.

c. Scale of assistance according to the present staff allocation

In most of the facilities of the project site, as few as 70% against the staff allocation plan are filled. They always suffer shortage of personnel, which has caused delay in their activities.

Thus, the scale of the Requested Japanese Assistance shall be set up according to the present condition of staff allocation.

2) Equipment Policy

a. Selection of equipment

① Regional / District Hospitals

They already have such basic equipment as stethoscope, blood pressure monitor. Even if they lack, they can

purchase them with their budget to be allocated as of the fiscal year 2003.

The equipment that are urgently needed due to breakdown or superannuation shall be excluded from the assistance and shall be procured by South African side. On the other hand, the equipment that need to be periodically renewed for their normal activity shall be examined on its validity and suitability according to their actual activities and availability of doctor, etc.

② 4 Health centres / 27 Clinics

Most of the facilities still use the basic equipment for nurse that were procured in 1994 to 97 at the opening of facility. Renewal has been delayed for a long time. The Limpopo DOHW is responsible for procurement of equipment but they are not able to allocate enough budget. Therefore, the basic equipment for nurse shall be examined under the Requested Japanese Assistance according to their activities, number of staff / patient, etc.

However, general furniture such as fan, refrigerator, bed, examination couch, etc. are overstocked in most of the facilities and shall not be examined. Incinerator shall not be examined either as it can cause environmental pollution by generating dioxin.

For the 3 clinics to be newly constructed, the existing equipment shall be transferred, as a rule, but for some old equipment, renewal plan shall be considered to make opening of the new facility smooth.

③ Mobile Clinic

Important part of the PHC in the Limpopo Province rely on mobile clinics. Their activities involve 1) medical examination and medication, 2) maternal examination, 3) vaccination, 4) child examination, 5) health promotion and 6) home based care. A vehicle with 3 to 6 health staffs visits 40 to 50 visiting points a month.

Examination for mobile clinic vehicle shall be based on the fact that most of the existing vehicles were procured before 1993, that they are not built for mobile clinic activity securing space for patient's privacy, that the requested vehicles are exclusively built for mobile clinic activity and can not be used for other purposes, and that mobile clinics are the most familiar way for the people of low income level to get access to

medical services. Examination shall also be done to help improve their activity without requiring any modification on number of staff and of administrative budget. No equipment for visiting point of mobile clinic shall be examined.

Based on the policies discussed above, equipment planning under the Requested Japanese Assistance shall be done by following the principles below.

Table 2-1 Principle of Equipment Selection

Included in the assistance	Excluded from the assistance
1. Equipment that renew the old equipment	1. Equipment that are already or will be procured by the recipient side
2. Equipment of which shortage is a serious problem	2. Equipment whose requested quantity is more than necessary for normal activity
3. Equipment that is indispensable to activities of the facility	3. Equipment designed for purely academic purpose
4. Equipment that are easily managed and maintained	4. Equipment that require large amount of maintenance cost and can be substituted by other simple alternatives
5. Equipment with large beneficiary effects	5. Equipment with little beneficiary effects
6. Equipment with low cost effectiveness	6. Equipment with cost ineffectiveness
7. Equipment with usefulness	7. Equipment with little usefulness
	8. Equipment requested for personal purposes
	9. Common furniture, general office apparatus, consumables which do not influence activity of the facility

b. Specifications of equipment

In renewing equipment, specifications of equipment shall be equivalent to and based on those commonly used in the existing facilities. As the project facilities are either secondary or primary health facilities, highly sophisticated equipment shall be excluded.

c. Quantity of equipment

Shortage of doctor is one of the most serious problems for the project hospitals. Most of the hospitals are obliged to employ foreign doctors and sometimes professional nurses have to do what should be done by doctors, for example, delivery. Therefore, quantity of equipment shall be examined by confirming who will use the equipment. It shall also be based on the existing number of patient and their present workload.

d. Maintenance skill

It is difficult to observe an established equipment maintenance system in the project facilities. Equipment maintenance is done by outside agents. Therefore, the equipment that are easily managed and maintained shall be examined and those equipment that require periodical checkups, repair, replacement of spare parts, etc. shall be procured from the manufacturers that have distributors in South Africa.

e. Procurement of equipment

The equipment that do not require consumables or spare parts shall be the products of either South Africa or Japan. For the equipment that require periodical replacement of spare parts or consumables and for the equipment that need to be taken care of by a professional maintenance staff, they shall be procured from the manufacturers with an agent in South Africa that can respond to those requirements. For those equipment, products from the third country shall be examined too.

f. Environment

With regard to installation of X-ray unit, suggestions shall be given concerning risk avoidance of radiation leak and its protection, for example.

Incinerator shall not be examined under the Requested Japanese Assistance as it can cause environmental pollution by generating dioxin.

(2) Building Design

1) Basic Policy on Building Design

Regarding clinics, they are the front line of primary healthcare and welfare services but the number of staff working there is limited. When planning them, which function well within the local healthcare service system, the relations between the clinics and higher level medical institutions should be taken into consideration. Idle and excessive space is to be eliminated for efficient facility with most suitable scale thereby minimizing the construction cost as well as running/maintenance cost. For example, a facility is to be planned by analyzing the user, staff and service flows in order to simplify the flow so that minimum

number of staff is required for running it.

Regarding V.P. shelter for mobile clinic, a waiting area for patients/residents and a parking space for a mobile clinic vehicle are to be included. Though the V.P. Shelter is of a simple structure, it should be made durable and not to be easily damaged.

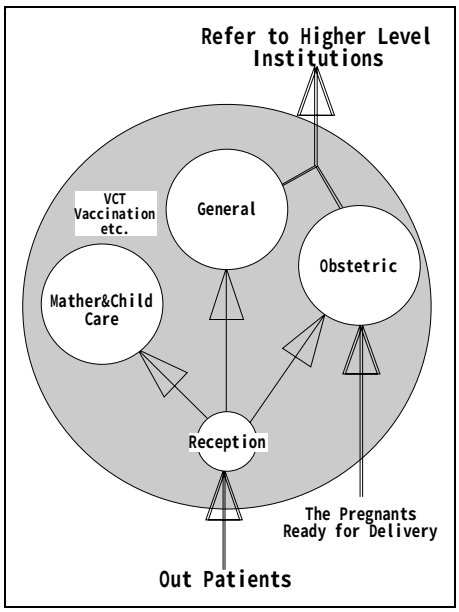

Fig. 2-1 Function of a Clinic

2) Policy for Functional Configuration

a. Clinic

According to the Terms of Reference (TOR) regarding Capital Works Planning Programme issued by the Limpopo DOHW, all clinics are to provide an obstetric function and 24-hour medical services as a goal. Each clinic building is therefore required to have the functions shown in Table 2-2. A clinic building is also required to be easily expandable in order to cope with future population growth within its catchment area.

As a policy, therefore, this project will provide clinic facilities with obstetric function as well as general medical care and expandability. As provision of 24-hour medical services, however, largely depends on management/administration system of the facility, e.g., assigning enough number of nurses for carrying out two shifts and availability of staff quarters, therefore, it shall be excluded from the Japanese Assistance

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Table 2-2 Rooms and Functions of a Clinic

Health and Management				
No.	**L**	**S**	**Room**	**Function**
1	●	●	Office (Social)	Inquire income level etc. of patients/residents before treatment
2	●	●	Office (Health)	Check health conditions of patients, carry out vaccination etc.
3	●		Health Inspector	Health Inspector's office
4	●		Com Dev. Officer	Com Dev. Officer's office
5	●	●	Waiting Area1	Waiting room for 60 persons, health/ hygiene education etc.
6	●		Staff WC(M/F)	
7	●	●	WC(M/F/Disabled)	
8	●	●	Cleaners	Cleaners' room
Maternity and Clinic				
9	●	●	N. Station/Reception	Reception after screening.
10	●	●	Records	Medical record room
11	●	●	Waiting2	Waiting room: for 14 persons (L), 7 persons (S)
12	●	●	Consultation 1	VCT services, collecting specimen
13	●	●	Consultation 2	Counseling for contraception, Maternal & child health (S)
14	●		Consultation 3	Maternal & Child Health: Maternal & child health services including medical examination services for infants and prenatal women are provided
15	●		Consultation 4	General consultation
16	●	●	Treatment	Treatment, injection, dressing
17	●	●	Pharmacy	This room is for dispensing drugs to patients. Medicine store and dispensary
18	●	●	Store	Store linen and medical equipment
19	●	●	First Stage	First stage room for pregnant women
20	●	●	Labour Rm	Normal case delivery services are provided by midwifes. Abnormal deliveries are not conducted in this facility. Prenatal women, who need Caesarean section, are referred to the hospital.
21	●	●	Post Natal	This room accommodates postnatal women at least 6 hours. Baby bath is also installed in this room.
22	●	●	Sluice	This room is to handle dirty items, e.g. linen, from the treatment room, delivery room, etc.
23	●	●	Laundry	Laundry for linen, etc.
24	●	●	Kitchen	
25	●		Nurse Restroom	
26	●	●	Staff WC	
L: Large size clinic, S: Small size clinic				

b. V.P. Shelter

According to the TOR issued by the DOHW, a V.P. Shelter is to have a designated parking for a mobile clinic vehicle and patients' waiting area. The Limpopo DOHW has already planned and/or constructed permanent V.P. Shelter structures, which can easily become a small size clinic building by remodeling and expanding, for the areas whose populations are predicted to be over 5,000 in the near future.

The requested Project sites are out of the area mentioned above and are not required to have the same kind of

structure that is expandable to become a small clinic building. In principle, a covered space for patients' waiting area and a mobile clinic vehicle is to be made.

3) Determination of Floor Area

a. Clinic

In South Africa, R158 Regulation prescribes medical/healthcare facilities and floor areas of required rooms need to follow this regulation. The TOR of the Limpopo DOHW, which is based on R158, stipulates the standard sizes of clinics based on their catchment area population. An area with population smaller than 5,000 is covered by mobile clinic service. An area with population between 5,000 and 20,000 is to have a small size clinic and an area with population greater than 20,000 a large size clinic. The standards for clinic facility are also stipulated that are to be followed when planning new clinics.

Since the facilities to be constructed under this project are to be used and managed by the Limpopo DOHW administration, the facilities need to adhere to the norms set by the Limpopo DOHW. Therefore, the size of the facilities shall be decided based on the TOR and to be the most appropriate by eliminating unnecessary area.

Medical room specifications and layouts issued by CSIR, which are commonly used for designing public health facilities, will also be used as a reference for planning (e.g. dimension of the rooms).

b. V.P. Shelter

As mentioned above, the V.P. Shelters of this project does not need to be the type that is expandable to a standard small size clinic. Therefore, a simple shelter with a wall on one side that will protect patients from rain and harsh sunlight while they wait and a parking space for a mobile clinic vehicle will be provided under this project.

4) Site Conditions

a. Clinic

All three proposed sites for clinics are inclined with a minimum level difference of two meters within the sites. Taking environmental impact into consideration, site layout and building plan should be made such that minimum land development is required. The volume of excess soil is to be minimized and used/disposed of within the site.

The site plans of the three clinics are shown below.

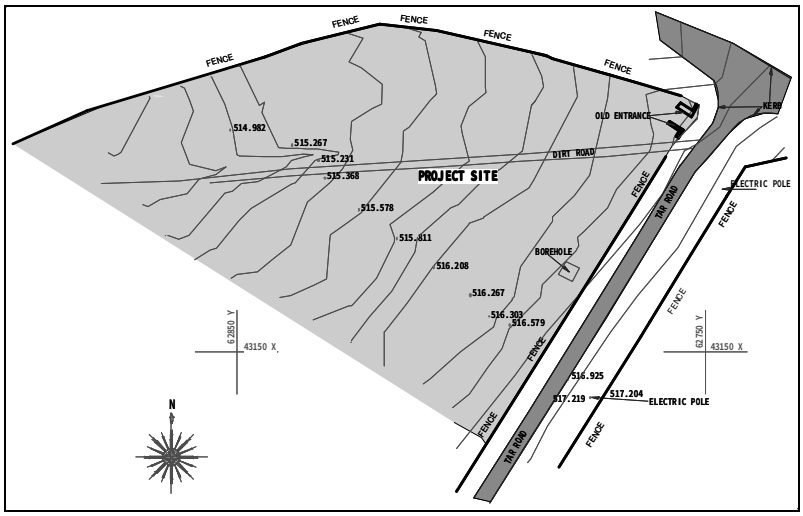


Fig. 2-2 Letsitele Clinic Site

The infrastructure such as electricity, water, telephone is available from the front street

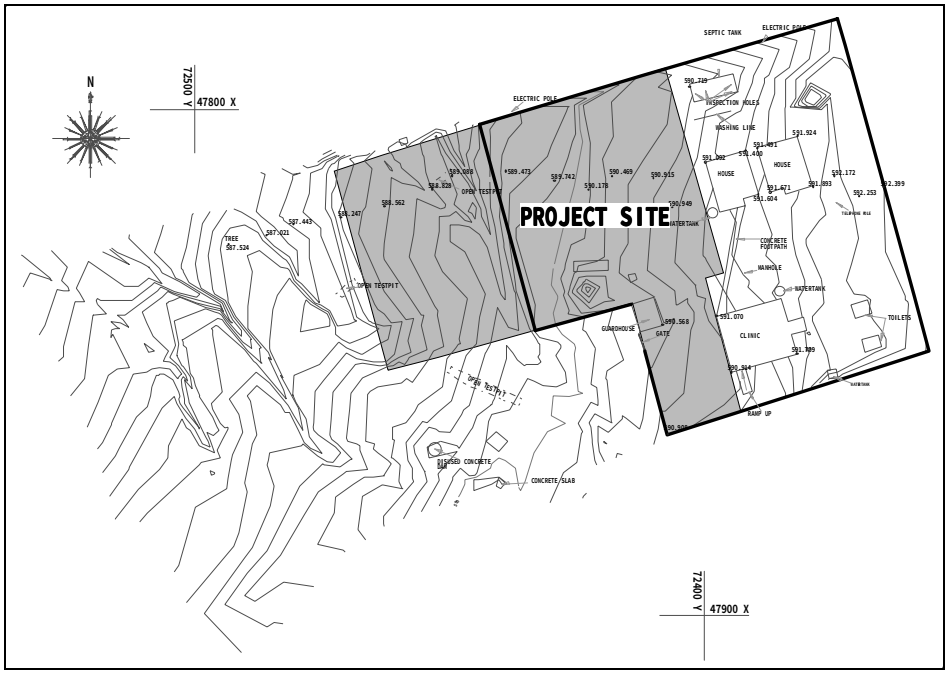


Fig. 2-3 Mohlaba Clinic Site

Electricity and telephone are available. Water shall be provided by boring a new well or laying a new supply pipe from the nearby reservoir tank by South African side.

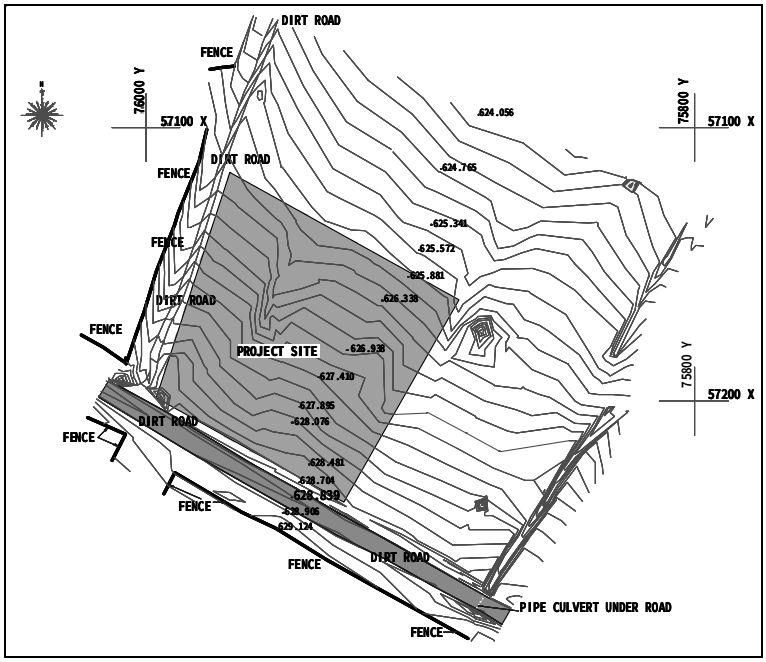


Fig. 2-4 Maake Clinic Site

Electricity and telephone are available. Water shall be provided by laying a new supply pipe from the water main approximately 500m away by South African side.

b. V.P. Shelter

It is mandatory that the set back distances from boundary lines required by law be kept when positioning V.P. Shelters in the Project sites. The user access and vehicle flow to the shelter shall also be taken into consideration and if the size of the Project site is large enough, layout should be made to allow future expansion.

5) Natural Conditions

The Project sites belong to a tropical zone. The highest monthly average maximum and minimum temperatures are 27.8℃ and 18.4℃ respectively in January and the lowest monthly average max. and min. temperatures are 21.2℃ and 11.4℃ respectively in July. In principle, no heating device will be installed and natural ventilation is to be fully utilized. Ceiling fans are to be installed and insulation on roofs and outer walls is to be enhanced in order to obtain a comfortable indoor environment. However, an air conditioning unit will be installed in the pharmacy because the sites are situated within the heat zone, which has an average max temperature of more than 25℃ for over 10 days per year, defined by the Limpopo DOHW requiring installation of air conditioner.

Insect screen on windows will not be installed since malaria case is not common in Greater Tzaneen SD.

6) Building Code and Building Permit

South Africa has a well-established building code. According to the building code, details of every architectural plan are subject to official approval prior to the commencement of construction work. In implementing the Project, it is essential to comply with the local building code and to follow the appropriate procedures for obtaining the building permit. The building laws and regulations that are applicable to the Project are as follows.

- National Building Regulations and Building Standard Act 1997
- R158 Regulations
- Limpopo Province Department of Health and Welfare Terms of Reference

Major design and specification standards prescribed by the South Africa Bureau of Standards (SABS) are as follows.

Table 2-3 List of SABS's Major Standards

SABS 0400	The Application of the National Building Regulations
SABS 0161-1980	The design of foundations for buildings
SABS 0160-1989	The general procedures and loadings to be adopted in the design of buildings
SABS 0100-1:1992	The structural use of concrete Part 1: Design
SABS 0139-1981	The prevention, automatic detection, and extinguishing of fire in buildings
SABS 0114-1:1996	Interior lighting Part 1: Artificial lighting of interiors
SABS 241-1984	Water for domestic supplies
SABS 543:1992	Fire hose reels (with hose)
SABS 1128:	Part I-1977 Fire fighting equipment Part I: Components of underground and above hydrant systems
SABS 1253:1994	Fire-door and fire-shutters

For the urban planning-related regulations, the Project shall comply with the following regulations which are enforced by the Greater Tzaneen Municipality.

Table 2-4 Regulations Applicable to the Project Site

Building type：	Institution restricted to medical use
Size restriction：	Floor coverage: 60%、Floor area rate: 50%
Height restriction：	Unrestricted
Building lines：	on street:7.5m, side and rear spaces: 4.5m+（1.5m× number of storey-1）
Parking requirements：	One per floor area 150 ㎡+one per two staff members

It is not necessary to obtain building permit from the local authority for this Project but the Limpopo DOHW shall notify the local authority regarding the Project prior to commencement of the construction work instead. Therefore, after obtaining approval for detail design of the Project from the Limpopo DOHW, it shall submit a notification of the Project to the local authority. The following table gives an outline of the procedures.

Table 2-5 Outline of Procedures for Building Permit

Authority：	Tzaneen Municipality
Submission timing：	After approval to the Detail Design by DOHW

7) Local Construction Condition

South Africa outperforms other African countries in terms of the level of building technology and experience of construction work. South Africa also has its own building standards, which are based on the British

Standard. All major building materials are manufactured in compliance with the local standard and available in local market. Therefore, the application of Japanese standards for construction work is not effective for local construction. For this reason, local construction methods, which are considered highly reliable in compliance with the local building standard, should be used for construction.

8) Local Consultants and Contractors

In South Africa, local consultants and contractors have experience in construction of public health facilities, of which qualities are very high and technology used are sophisticated. Thus, their experience and construction technology are judged reliable to be utilised for the Project.

However, because financial stabilities and technical skills of local contractors are different substantially, it will be necessary to screen their capabilities by examining their financial records, experience, etc. in selecting local sub-contractors for the Project.

9) Grade of Facilities

The grade of equipment and finishing materials should be determined on the basis of other existing clinics, and the standards of health facilities in South Africa. Centralised air-conditioning system, which requires high-level maintenance and management capabilities and high operation costs, are not considered to this Project. For selection of building materials, priority should be given to durable and locally common materials in terms of reducing the maintenance and management cost.

10) Maintenance and Management

As qualified engineers will not be assigned to the new clinics, attention should be given to selection of equipment and materials in terms of required technical skills for operation and maintenance. When selecting equipment, especially the ones which need regular maintenance, the specification of the item shall not be of high quality so that the running/maintenance cost will not be burden to the clinic. The degree of ease for obtaining consumables and spare parts should be of the priority of selection.

11) Construction Schedule

It must be considered in the construction scheduling that in South Africa the construction industry is under vacation from December 15 to January 10. Easter season in April also is a common vacation period. Thus, during these periods, no progress will be expected in any construction work in principle.

Since the climatic condition around the Project site is fairly mild, it is not necessary to consider seasonal variations in the progress of construction except for the rainy season between October and March. To avoid negative effect of heavy rainfall, neither earthwork nor roofing work should be carried out during this period.

2-2-2 Basic Plan

2-2-2-1 Equipment Plan

(1) Overall Plan

The Requested Japanese Assistance covers equipment provision for 1 regional hospital, 1 district hospital, 4 health centres, 27 clinics, 3 of which are to be newly constructed. It also includes vehicles for mobile clinic activity and construction of V.P. shelters.

Table 2-6 shows overall plan and outline of the equipment planning of the assistance by each sector.

Table 2-6 Overall Plan (Outline of equipment planning)

Project Facility	Sector	Outline of equipment planning
Letaba Regional Hospital	Emergency OPD	Most of equipment are already provided. Instrument set for treatment (4 sets) shall be replaced.
	OPD	1 Blood pressure monitor shall be provided to reduce the screening time. Instruments need to be replaced. 2 old Dental unit s shall be renewed to support the activity of 2 dentists and 3 assistants.
	Specialized OPD	1 ECG, 1 Ultrasonic nebulizer, and 2 Instrument set for treatment shall be replaced. As there is no ophthalmologis, only Traial lens set shall be provided.
	Gynecology /Obstetrics	1 Cardiotokograp, 4 Instrument set for delivery and 2 Instrument set for Obstetric/Gynecology examination shall be to renewed or replaced to promote safer delivery.
	Pediatrics	1 Infant warmer, 1 Neonatal monitor and 1 Phototherapy unit shall be replaced and renewed to support neonatal care.
	Theatre	Most of equipment are already provided. Instrument sets shall be replaced.
	CSSD	1 old High pressure steam sterilizer shall be replaced.
	ICU	4 Infusion pumps to be provided for 8 bed ICU
	Radiology	1 old X-ray unit shall be renewed. Fluoroscopic function shall be needed.
	Laboratory	No equipment shall be provided.
	Physiotherapy	No equipment shall be provided.
	Laundry	No equipment shall be provided for the possibility of outsourcing to a private company can not be eliminated.
Dr. C. N. Phatudi District Hospital	Emergency OPD	1 Emergency cart, 1 Defibrillator, 1 Pulsoxymetre, 1 Operation light, mobile, 2 Instrument set for treatment, 2 Laryngoscope sets shall be provided to strengthen the function of OPD.
	OPD	1 ECG, 1 Blood pressure monitor shall be provided to strengthen the screening function. 1 old Ultrasound unit shall be renewed to improve the antenatal check.
	Gynecology /Obstetrics	1 Cardiotokograph, 1 Instrument set for delivery shall be provided to ensure safe delivery.
	Pediatrics	1 Infant warmer, 1 Neonatal monitor, 1 Phototherapy unit shall be provided. Provision of ventilator would be excessive.
	Theatre	Instrument set for general surgery, appendectomy and caesarian section shall be provided. 1 Infusion set shall be provided in the recovery room.
	CSSD, Lab, Eye clinic, Physiotherapy, Laundry	Excluded from the project for such reasons as no more equipment necessary, it is an independent unit from the hospital, no specialists available, etc.
	Dental	1 Dental unit and 2 Instrument set for dental shall be renewed.
4 Health Centres		Equipment planning shall be based on size of the population, number of patient and staff, conditions of equipment and facilities, etc. The equipment that has never been used before (ECG, for example) or that has already been procured (Infant warmer, Oxygen generator) shall not be considered. Incinerator shall not be considered for it can emit harmful products into the environment.

24 Clinics		Equipment planning shall be based on size of the population, number of patient and staff, conditions of equipment and facilities, etc. The equipment that has never been used before (ECG, for example) or that has already been procured (Infant warmer, Oxygen generator) shall not be considered. 3 clinics that has no power supply shall no be provided with the equipment that require electricity.
3 Clinics to be constructed		1 Delivery bed, 2 Dressing trolley, 4 Examination lamp, 3 Medicine cabinet and 1 Suction unit shall be provided as well as other clinic equipment.
Mobile Clinic		5 Vehicle for mobile clinic shall be provided to strengthen the activity in the area where poverty prevails. 3 of the requested vehicles shall not be considered for they are used in a private farm.

(2) Examination of the Requested Equipment

Based on the policies mentioned so far, appropriateness and necessity for the requested equipment were examined as follows. Appendices 6 "Examination of the Requested Equipment" shows the results of the examination by equipment.

Classifications

The requested equipment are classified as follows.

Renewal : Equipment to be renewed

New equipment : Equipment new to the facility and to be newly procured

Replenishment : Equipment to be replenished in quantity for the existing equipment

Criteria

A. Purpose

○ : Basic equipment compatible with the activities of the facility

× : Equipment not compatible with the activities of the facility, can be replaced by another simple equipment

B. Necessity

○ : Equipment necessary for the basic activities of the facility as the existing equipment has become too old or out of order

× : Equipment not necessary because of its cost-ineffectiveness and limited beneficiary group, furniture not essential for the activities of the facility, office apparatus, inexpensive equipment procurable in South Africa and small articles

C. Technical Level

○ : Equipment compatible with the technical level of the facility

× : Equipment that require higher level of technique than expected from the facility

D. Administration Cost

○ : Equipment that can be maintained by the facility, that the manufactures can offer the after sale services and that the consumables / spare parts are procurable

× : Equipment difficult to be maintained by the facility, that the manufactures can not offer

the after sale services and that the consumables / spare parts are not procurable

E. Maintenance Cost

○ : Equipment whose maintenance cost is negligible or bearable by the facility

× : Equipment whose maintenance cost is not negligible or not bearable by the facility

F. Quantity

○ : Equipment whose requested quantity and allocation plan are judged appropriate by the contents of activities, number of patient and staff

△ : Equipment whose requested quantity and allocation plan are judged inappropriate or needed to be adjusted by the contents of activities, number of patient and staff

G. Overall Decision

○ : Equipment judged appropriate and included in The Project

× : Equipment judged inappropriate and excluded from The Project

(3) Equipment Planning

1) Letaba Hospital

a. Emergency OPD

Emergency OPD has just opened recently and major equipment are already provided. 6 beds are separated by curtain and the equipment can be shared by each section. Only **Instrument set for treatment** (4 sets) that are lacking shall be provided under the Requested Japanese Assistance.

b. OPD

① Specialised OPD

Specialised OPD (Internal medicine, Surgery, Orthopedics, Pediatrics, Obstetrics and Gynecology , Ophthalmology) has not opened yet. Basic equipment such as stethoscope, blood pressure machine, etc.) will be purchased by the hospital. The Requested Japanese Assistance shall cover such equipment as **ECG** (1), **Ultrasonic nebuliser** (1), **Instrument set for treatment** (2) in the Surgery and Orthopedics section. For Ophthalmology section where no specialists are available, **Trial lens set** (1) shall be provided.

② OPD (existing)

The existing OPD will be used as a screening section and consultation section for out patients even after the Specialised OPD opens. As basic equipment are already provided, the Requested Japanese Assistance shall provide **Blood pressure monitor** (2) to strengthen screening function and reduce the waiting time of patient.

Instrument set for treatment, **Dressing trolley** and **Instrument cabinet** shall be provided in each 4 Consultation room.

There are 3 dental units and 2 compressors in Dental section, which are all old. The Requested Japanese Assistance shall cover **Dental unit** (2) including compressors.

c. Obstetrics and Gynecology

Obstetrics and Gynecology Department has 4 delivery rooms and major equipment are already provided. 2,232 delivery are performed in 2002, of which 362 are caesarian section. The Requested Japanese Assistance focuses on obstetrics and shall provide **Cardiotocograph** (1) to promote safer delivery.

d. Pediatrics

Pediatrics Department covers from neonates to 14-year-old child. Neonates are treated in this department after treated in the Neonatal Ward. There are quite a few pregnant women with some complication in this secondary hospital and there were as many as 390 cases of premature birth (weight less than 2,500g) in 2002.

The department is divided between Neonatal Ward (6 incubators) and NICU (1 infant warmer). There are enough number of infant warmer so it is not included in the Requested Japanese Assistance. There are 1 infant warmer, 1 neonatal monitor, 1 pulse oxymetre in NICU but they are not enough in number.

Thus **1 Infant Warmer** and **1 Neonatal Monitor** shall be added in the NICU under the Requested Japanese Assistance. **2 Ultrasonic nebulisers** shall be provided to fight against infantile asthma.

e. Theatre

3 out of 4 operation theatres are not used due to breakdown of air conditioner. All the 4 rooms are basically equipped with operation table, operation light, patient monitor, anesthesia machine and ventilator, defibrillator, etc. Under the Requested Japanese Assistance, **Operation Instrument Set** that are lacking in number (Appendectomy, Finger Bone, Gastrectomy, Hand Surgery, Nephrectomy, Cholecystomy Prostatectomy, Caesarian Section and General Surgery) shall be renewed. **Instrument Set for Biopsy** shall also be provided based on the number of operation performed.

f. CSSD

In this newly built CSSD, there are 3 high pressure steam sterilisers that were transferred from an old facility, 2 of which are out of order. The hospital has requested the Limpopo DOHW for renewal because breakdown of the last one can stop all the hospital function. But renewal schedule is not yet fixed.

If all the 4 machines do work, the number of operation per year (1,298 in 2002) could double or triple (about 3,000). Therefore, on condition that the Limpopo DOHW shall renew one of them, the Japan side shall provide another one.

g. ICU

8 bed-ICU is equipped with 8 ICU beds, 8 ventilators, 8 patient monitors, 1 blood gas analyzer. **4 Infusion Pumps** against 8 beds shall be provided for medication to serious patients under the Requested Japanese Assistance.

h. Radiology Department

The department has 2 x-ray units, one of which is so old (1986) that it often malfunctions and maintenance cost is so high. Both units do not have fluoroscopic function to capture gastrointestinal images. Therefore, under the Requested Japanese Assistance, **1 X-ray Apparatus, basic screening unit** shall replace the old one and fluoroscopic examination shall become possible.

i. Physiotherapy Department

Physiotherapy (Rehabilitation) Department is well equipped with basic equipment for exercise and occupational therapy. Therefore, despite of its importance in rehabilitation of patients after orthopedic surgery, this department shall be excluded from the Requested Japanese Assistance.

j. Laboratory

Presently the Laboratory Department is administered by National Health Laboratory Service (NHLS). The hospital does not own or control any part of the department. Therefore, it shall be excluded from the Requested Japanese Assistance.

k. Laundry

Laundry equipment (washer, extractor, dryer) are very old. But the hospital plans to consign the laundry to outside supplier. Therefore, it shall be excluded from the Requested Japanese Assistance.

2) Dr. C. N. Phatudi

a. Emergency OPD

Emergency OPD has a treatment room and ICU but does not function properly due to shortage of equipment. Under the Requested Japanese Assistance, **1 Defibrillator**, **1 Pulse Oxymetre**, **1 Operation Light, mobile with battery back up** and **2 Instrument Sets for Treatment** shall be provided to help treat emergency patients.

b. OPD

OPD is always crowded with patients and it needs to strengthen its screening function. Under the Requested Japanese Assistance, **1 Blood Pressure Monitor** shall be provided to reduce the screening time of patients. **1 Ultrasound Scanner** and **1 ECG** shall also be provided to strengthen its examination function.

c. Obstetrics and Gynecology

2 Delivery rooms are almost equipped with basic equipment. But there are no equipment to see the condition of a fetus and judgement of emergency cases. Therefore, under the Requested Japanese Assistance, **2 Doppler Fetal Detector** and **1 Cardiotocograph** shall be provided to promote safer delivery.

d. Pediatrics

Enough number of infant incubators are already provided. **1 Infant Warmer**, **1 Neonatal Monitor** and **1 Phototherapy Unit** shall be provided under the Requested Japanese Assistance.

e. Theatre

2 operation theatres are well equipped with necessary equipment. **Operation Instrument Sets** that are lacking (Appendectomy, Caesarean Section and Genaral Surgery) shall be supplemented. As there is no ICU in a disctrict hospital, **1 Infusion Pump** shall be provided in the Recovery room.

f. CSSD

One of the 2 high pressure steam sterilizers is out of order but is still able to be used after repair. Therefore, CSSD shall be excluded from the Requested Japanese Assistance.

g. Radiology Department

There is 1 x-ray unit, 1 mobile x-ray machine and 1 automatic film developer, all of which are new. There is no need to renew them.

h. Dental Department

Both of 2 dental units are very old and one of them is beyond repair. Therefore, the worse one shall be replaced by the Requested Japanese Assistance to assist their activities.

i. Laboratory, Ophthalmology, Physiotherapy, Laundry

These departments shall be excluded from the Requested Japanese Assistance since, as in the case in Letaba Hospital, they are administered by a different body, there are no specialists, etc.

3) Health Centre/Clinic

The Requested Japanese Assistance shall assist their activities and improve the quality of services through renewal and provision of basic medical equipment used by nurses.

a. Blood Pressure Monitor

Each facility except 3 clinics which have no power supply shall be supplied with **1 Blood Pressure Monitor**. It is expected that this equipment will reduce the time and workload of staff for patient screening.

b. Autoclave (table top)

Health centres and some of the clinics have one or two autoclaves but many of them are out of order. They know the importance of sterilization but they use some disinfecting case filled with solution. Supply of sterilized instruments from higher health facilities has already stopped.

Therefore, all the health centre and clinics except 3 clinics that have no power supply shall be supplied with **1 Autoclave, table top** under the Requested Japanese Assistance.

c. Glucose Meter

Each facility shall be supplied with **1 Glucose Meter** to fight against one of the most prevailing diseases in the Greater Tzaneen SD, hypertension and diabetes.

d. Hemoglobin Meter

Each facility shall be supplied with **1 Hemoglobin Meter**. Antenatal examination is a main activity of health centres / clinics. Among them blood hemoglobin test is one of the most important tests for pregnant women.

e. Infant Warmer

Mgodeni Grace (476 delivery per year, 2002) and Nkowankowa (156) Health Centres which exceed by far the other 2 health centres in the number of delivery shall be supplied with **1 Infant Warmer**

f. Stethoscope

Most of their stethoscopes are too old or out of order. Each facility shall be supplied with this most basic examination tool as many as the number of the professional nurse.

g. Oxygen Generator

All of the facilities are supplied with oxygen cylinder so it shall be excluded from the Requested Japanese Assistance.

4) Mobile Clinic

a. Vehicle for Mobile Clinic

5 **Vehicles for Mobile Clinic** shall be renewed to assist the most effective medical services for the people living in a remote area. The vehicle shall be designed to secure the privacy of patients and shall be 4WD type to enable them to run under the bad weather in a bad road. Other 3 vehicles requested are considered to be used in private farms and therefore they are excluded from the Requested Japanese Assistance.

b. Audiomenter

Each vehicle for Mobile Clinic shall be equipped with **1 Audiometer** to screen the patient with hearing disorder.

2-2-2-2 Construction Plan

(1) General Scheme

The target facilities to be built under this Project are three clinics at Letsitele, Mohlaba and Maake and four V.P. Shelters at Burgersdorp, Khujwana, Mogoloboto-2 and Pharare, all of which are located within the Greater Tzaneen SD (NP333, Population: 380,000) of Mopani district (DC33) in Limpopo province.

The population within the catchment area, number of staff, activities being carried out at the three clinics are shown below.

Table 2-7 Catchment Area Population, Staff, Activities of the Clinics

HC	Clinic	Referring Hospital	Distance from the Hospital	Utility			Catchment Area Population	Number of Staff					Activiities (2002,01～12)		
				Electricity	Water supply	Drainage		PN	EN	ENA, Aux.A	Gen.Assit /Cleaner	Guards	Woking Hours	Patients	
														Annual	Under 5
Nkowankowa HC	Letsitele	Dr. CN Phatudi	25km	○	○	○	12,530	4	1	1	1	(2)	9	18,182	3,367
	Mohlaba		20km	○	×*	○	18,890	2	2	2	2	2	9	18,877	4,930
Shiluvana HC	Maake		7km	○	×*	×	10,285	3	4	0	2	2	9	13,114	3,606

Legend ○:Good、△:Difficulty、×:No service、*: well water
( )Guards at Letsitele to be provided after completion of the construction

The populations of catchment areas of all three clinics are between 5,000 to 20,000 as shown in the table above. Therefore, the appropriate size for all three clinics is the small size clinic according to the TOR set by the Limpopo DOHW. The building and site plans should be made such that future expansion is possible.

Water supply to the sites at Mohlaba and Maake must be secured by the Government of South Africa before the completion of the construction of the buildings.

A V.P. Shelter shall have a roof and a concrete floor for patients waiting area and a parking area for a mobile clinic vehicle as indicated in the policy.

(2) Site Plan

The site plans for the clinics and V.P. Shelters are as follows.

1) Letsitele Clinic (Fig. 2-5)

Of the two streets that the project site is on, the one that is already paved and water and electricity mains are available is the most suitable to provide entrance to the site. The main gate is to be located around the middle of the site slightly off the existing borehole, which provide water to the community. The site will be zoned for clinic area and staff quarters area placing clinic building with sufficient area for future expansion on the north side and staff quarters, which shall be built by the South African side, on the south side of the plot. Sewage shall be treated in a septic tank and sent to French drains whose location shall be the furthest from the two existing boreholes. The Project site is inclined towards the west and the drainage plan should be made accordingly, e.g. the elevated water tanks to be placed in the east and sewage drain towards the west.

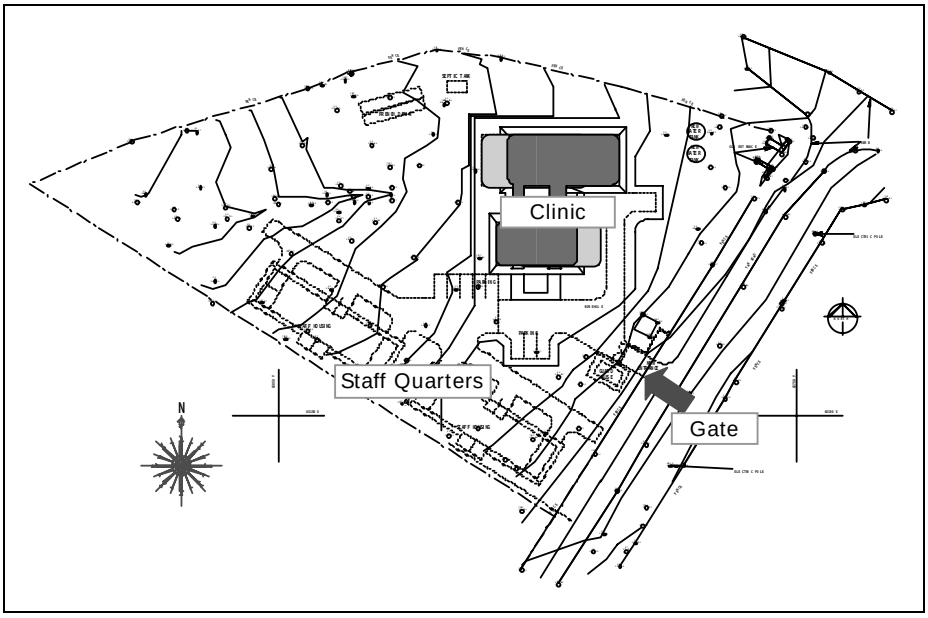


Fig. 2-5 Letsitele Clinic Site Plan

2) Mohlaba Clinic (Fig. 2-6)

The existing gate and the guardhouse will be utilized as they are. The new clinic building, for which the area needed for future expansion is secured, is to be placed towards the west side of the Project site. Enough

distance between the new clinic building and the existing large tree is kept so that the effect of the construction work on the tree will be minimized. Since there are already two staff quarters within the plot, no extra space for construction of future staff quarters is kept aside. Electricity is available from the nearby power line. Water needs to be supplied to the Project site by boring a new well or laying a new supply pipe from the nearby reservoir tank by South African side. The Project site is inclined towards the west. The design of water supply and drainage system will take advantage of this site condition, e.g. new elevated water tanks will be placed in the northeast side behind the existing staff quarters and sewage to be drained towards the west through a septic tank and to French drains.

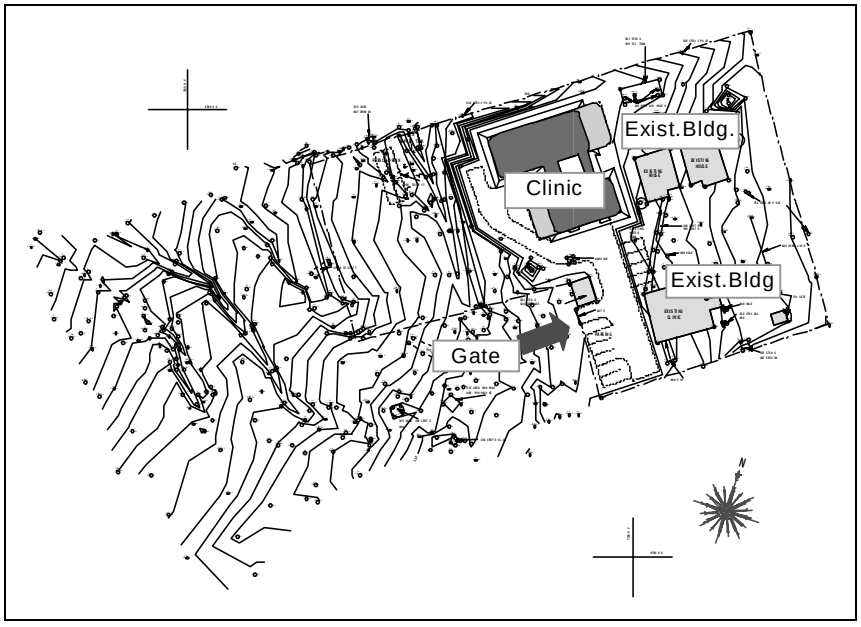


Fig. 2-6 Mohlaba Clinic Site Plan

3) Maake Clinic (Fig. 2-7)

The main approach is to be on the south side front street from which electricity, water and telephone lines will be connected. The clinic building is to be placed in the front and the area for staff quarters at the back, the northeast side, of the plot. Electricity is available from the power line on the front street. Water is not readily available and need to be brought to the site from the water main, which is approximately 500m away, by South African side. The Project site is inclined towards the northeast and the design of water supply and drainage system is to be made utilizing the site condition. New elevated water tanks are to be placed in the

south of the plot near the front street and sewage to be drained towards the north through a septic tank and to French drain.

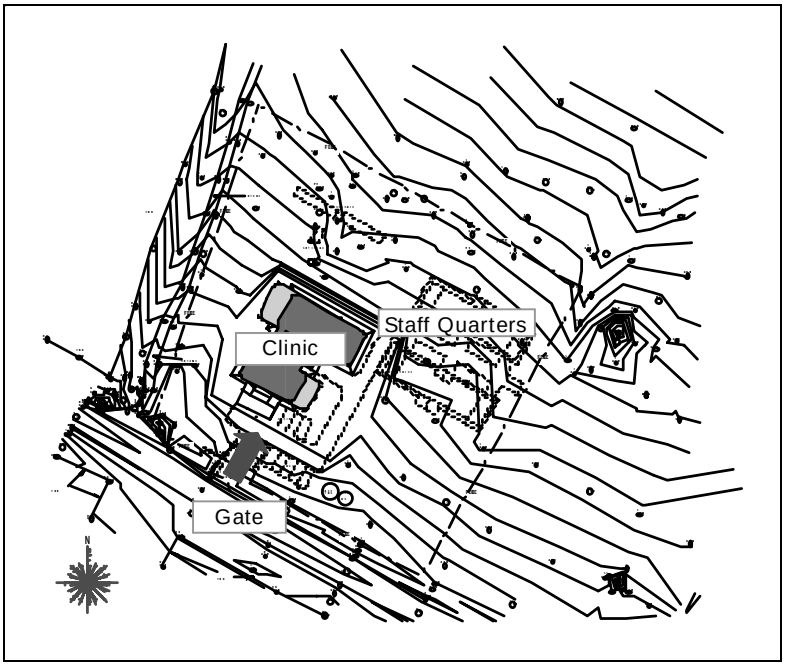


Fig. 2-7 Maake Clinic Site Plan

4) Burgersdorp V.P. Shelter (Fig. 2-8)

The Project site is sandwiched between a soccer ground and a street and another side is on a school and the other on a open land. There are an old filled in well and a tree in the middle of the plot. The plot has just enough area to build a 10m x 10m shelter after subtracting necessary set back distances from the front street, boundary lines and the tree.

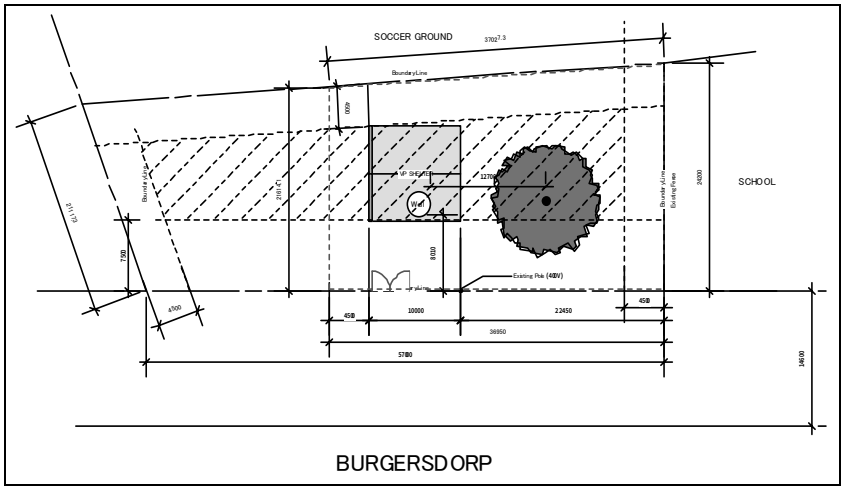


Fig. 2-8 Approximate Site Plan of Burgersdorp

5) Khujwana V.P. Shelter (Fig. 2-9)

This Project site is on 13.5m wide street, generally flat and a three cable power line (33kVA) runs above the site. The land area is large enough to build a 10m x 10m shelter, which accommodates patients' waiting area and a parking bay, after subtracting necessary set-back distances from the boundary lines, the front street and the power line.

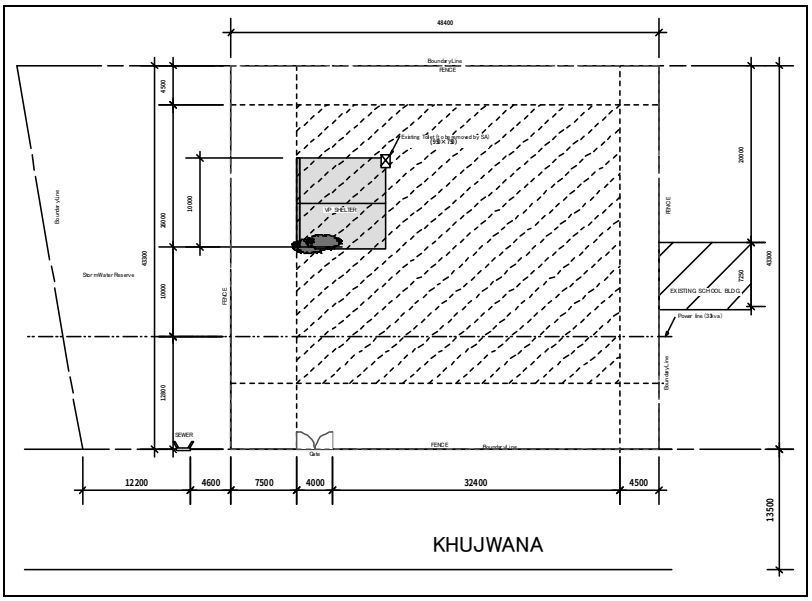


Fig. 2-9 Approximate Site Plan of Khujwana

6) Mogoloboto-2 V.P. Shelter (Fig. 2-10)

The Project site is on two streets and there is a level difference of about 1.5m between the back of the plot and the front street. There are two big trees within the site. The site is large enough to build a 10m x 10m shelter after subtracting necessary set-back distances from the boundary lines and avoiding the big trees.

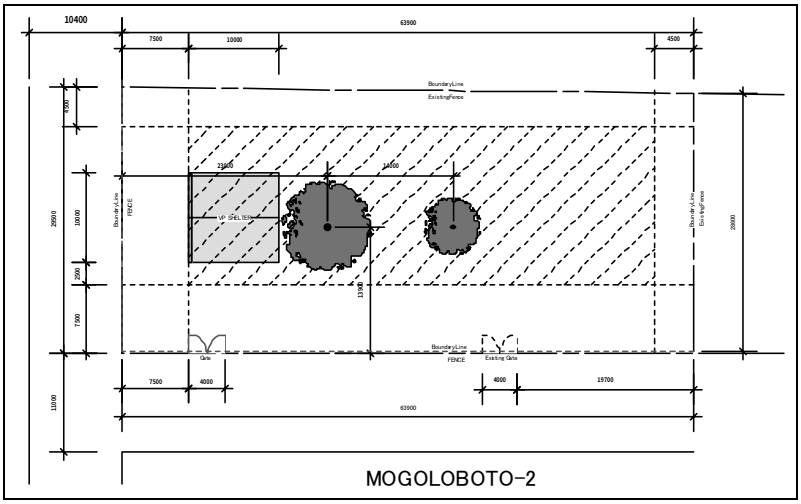


Fig. 2-10 Approximate Site Plan of Mogoloboto-2

7) Pharare V.P. Shelter (Fig. 2-11)

The Project site faces two streets and shares boundary with a school. There is a tree within the plot. The plot is large enough to build a 10m x 10m shelter after subtracting necessary set-back distances from the streets, the boundary lines and avoiding the tree.

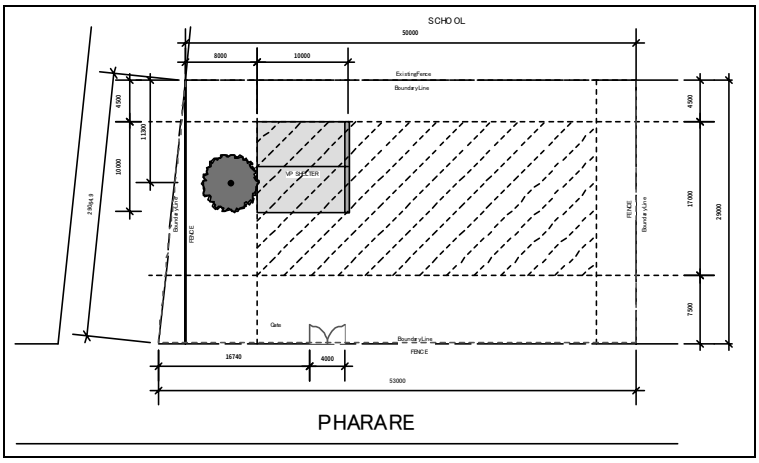


Fig. 2-11 Approximate Site Plan of Pharare

8) J.B. village V.P. Shelter (Fig. 2-12)

In depth examination of site conditions after returning to Japan revealed that the proposed site had a build-able area of only 0.5m x 2.0m after subtracting necessary set back distances from the boundary lines. It is, therefore, not possible to build a shelter on this site and hence the Project for this site is to be cancelled.

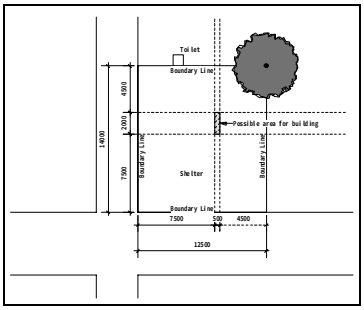


Fig.2-12 Approximate Site Plan of J.B. Village

(3) Architectural Plan

1) Function Layout

a. Clinic

Function layout of a clinic can be divided into two parts, a health & welfare, administration block and a maternity & medical services block. Two covered corridors connect the two blocks providing ventilation and natural light into the corresponding rooms. There will be an entrance for maternity area on one of the covered corridors so that the pregnant women do not have to go through the general entrance and waiting hall. The fig. 2-13 shows a function layout of a clinic.

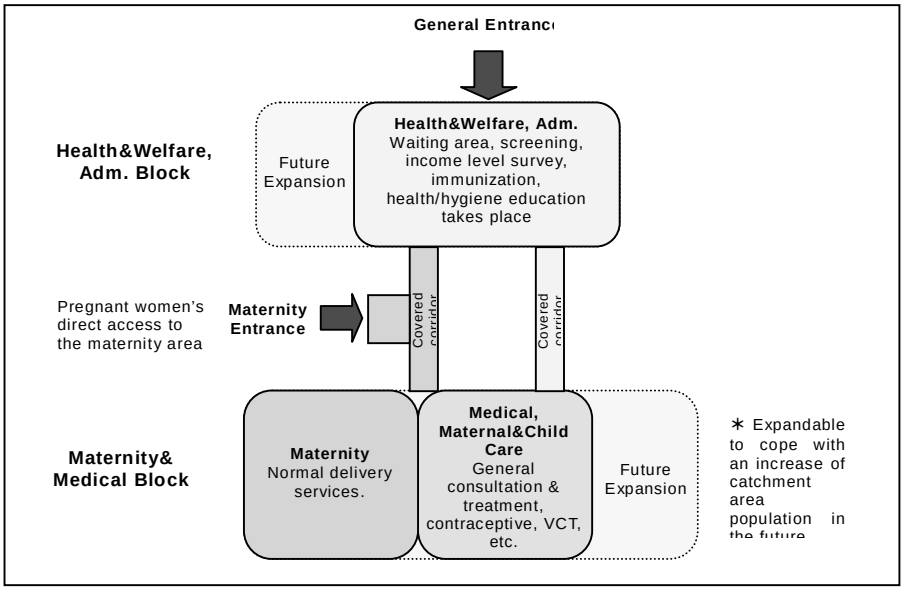


Fig. 2-13 Function Layout Diagram

b. V.P. Shelter

Function layout of a V.P. Shelter consists of a patients' waiting area and a parking bay for a mobile clinic vehicle. The shelter can also be used as a meeting hall when it is not used for mobile clinic.

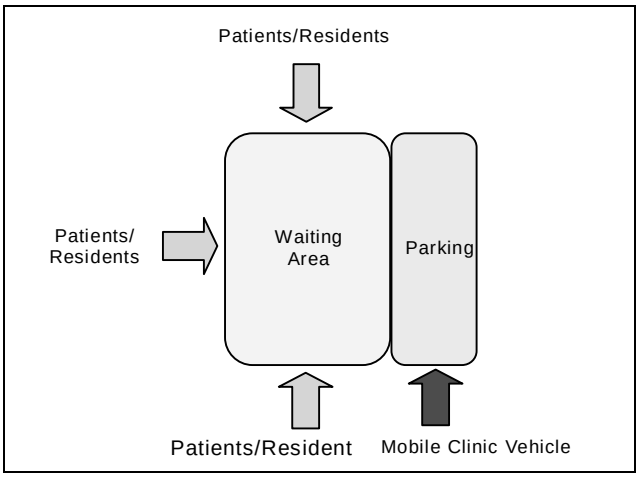


Fig.2-14 Function Layout Diagram of a V.P.Shelter

2) Floor Areas of Essential Rooms

Floor areas of the essential rooms mentioned in the Planning Principle are determined and shown in Table 2-8.

Table 2-8 Area Table for a Small Clinic

Dept.	Room	Planned Area (m^2)	Bases for Area Determination	
			SA Standard Area	Note
Health Welfare	Office (Social)	12.41	14.00	Work space for 2～3 staff with document shelves
	Office (Health)	12.41	14.00	Work space for 2～3 staff with document shelves
	Waiting Area-1	79.05	87.00	Waiting area for 60 persons
	Toilet (F)	8.23	9.20	Toilet: 2, Washbasin: 2
	Toilet (M)	6.68	6.85	Toilet: 1, Urinal: 1, Washbasin: 1
	Toilet(Disabled)	3.65	3.60	Toilet: 1, Washbasin: 1, Handrail
	Cleaners Rm	4.10	5.00	Storage for cleaning equipment、Slop hopper
OB & Clinic	Nurse sta. & reception	10.56	14.00	Nurses' working space and reception
	Records Rm	2.82	2.91	Medical record storage
	Waiting Area-2	10.11	10.15	Waiting area for 7 patients
	Consultaion-1	10.80	13.50	Exam. Table: 1, Desk:1, Chair:3, Washbasin:1, Shelf :1
	Consultation-2	10.49	13.50	Ditto
	Treatment	9.86	13.50	Exam Table:1, Trolley:1, Chair:3, Washbasin:1, Shelf:1
	Pharmacy	11.15	12.50	Medicine cabinet, Counter
	Storage	7.93	8.00	Linen & equipment store
	First Stage w/ Shower Rm	22.04	27.00	SA standards: 2 beds, Washbasin:1, Shower:1, Toilet:1, Washibasin:1
	Labour Ward	16.16	15.00	Labour table:1, Washbasin:1, Cabinets:1 etc.
	Post Natal Ward w/ Bath	32.43	32.50	SA standards: 3 beds, Washbasin:1 Baby bath:1, Bath tab:1, Washbasin:1,. Toilet:1
	Sluice	5.13	5.00	Bedpan & wash up sink :1, Bedpan & bottle racks
	Laundry	7.66	8.00	Wash sink: 1, Washing machine:1, Dryer:1, Worktable
	Kitchen	6.51	9.00	Sink:1, Range:1, Shelf, Refreglator:1
	Toilet (Staff)	2.60	2.50	Toilet:1, Washbasin:1
Common	Corridors	74.75	82.00	25% of the total of rooms above
Total		367.56	Based on S.A. standard: 408.71m^2	

3) V.P. Shelter

Standard waiting area for 60 persons mentioned in the above table and a parking space for a mobile clinic vehicle ((3m x 5.5m) are added. The required area for the Shelter is as follows.

Waiting area 87 m^2 + Parking area 16.5 m^2 = 103.5 m^2 100 m^2

4) Section Plan

In the cross-sectional plan, consideration should be given to natural ventilation, natural lighting, and protection against direct sunshine and rainwater into the building. The roof and outer walls are to be well insulated so that indoor environment of the building can be as comfortable as possible without air-conditioning, e.g. the roofs are to be pitched roof in order to provide ventilated attic and outer walls to be cavity walls. The windows are to have depth to let the natural light in while cutting off direct sunlight into the room and to eliminate water penetration. The ceiling height is to be decided to provide sufficient air volume for providing comfortable indoor environment and other factors such as economical and ease of maintenance.

(4) Structural Plan

1) Foundation

According to the soil survey and plate loading test conducted in April 2003, the soil conditions of three project sites for clinics are as follows.

a. Letsitele Clinic

The upper soil layer (0.2～0.5m) consists of a dark red to brown stiff to very stiff sandy clay. This overlies a very stiff slickensided sandy clay down to a depth of approximately 1.6m. All materials are considered potentially medium in expansiveness with an allowable bearing pressure of 200kPa. The clinic building to be built under this project is a single story structure. Therefore, it is appropriate to adopt reinforced concrete

strip foundations with reinforced concrete foundation beams at the average depth of about 1.35m. Considering the potential medium expansiveness of the soil, concrete aprons of 1.5m width is to be provided all around the building in order to reduce effects of the surface water seepage to the foundation level.

b. Mohlaba Clinic

The top 0.3 to 0.6 m consists of a dark brown stiff sandy clay overlying stiff to very stiff highly decomposed granite up to a depth of approximately 2.0m. Both these soils exhibit potential medium heave characteristics and allowable ground bearing pressure at this level is 275kPa. Considering the structure being a single story it is appropriate to adopt reinforced concrete strip foundations with reinforced concrete foundation beams at the average depth of about 1.65m. 1.5m wide concrete aprons are to be provided all around the building in order to reduce effects of surface water seepage to the foundation level.

c. Maake Clinic

The material on this site up to a depth of 2.5m is consistently a sandy clay to a clayey sand with medium to high potential expansiveness with an allowable bearing capacity of 200kPa. The clinic building to be built under this project is a single story structure. Therefore, it is appropriate to adopt reinforced concrete strip foundations with reinforced concrete foundation beams at the average depth of about 1.3m. Considering the potential medium expansiveness of the soil, concrete aprons of 1.5m width is to be provided all around the building in order to reduce effects of the surface water seepage to the foundation level.

d. V.P. Shelter

The V.P. Shelter consists of a light structure, e.g.; a concrete floor and columns, and a wooden truss roof. Therefore, it is appropriate to adopt individual footings.

2) Super Structure

a. Clinic

In South Africa, a typical superstructure of low-rise building is brick masonry wall. In the area around the Project sites, the most common superstructure with heat insulation and effective waterproofing is cavity brick masonry wall. The roof trusses are usually fixed to concrete lintels above the brick walls, or fixed directly onto the tops of brick walls. As for this Project, concrete posts and girders are to be constructed prior to the brick masonry works. The roof trusses can then be installed onto the concrete girders prior to brick masonry work. This method enables to start the roofing work without waiting for completion of the brick masonry works, and to continue the brick works and the interior finishing work without much influence of rain, which ensures control of the construction schedule. Furthermore, it will be possible to prevent the damaging or staining of the face brick walls caused by concrete casting. The same super structure system is to be applied to all three clinics.

b. V.P. Shelter

The structure of V.P. Shelters will be a combination of RC foundation/columns and wooden truss roof.

3) Roof Structure

In consideration of construction cost, the structure of the roof frame that supports the roofing materials should be wooden truss, which is widely used in the construction of public medical facilities in South Africa. The same super structure system is to be applied to all three clinics.

4) Structural Design Load

The structural live load for this project is shown in Table 2-9 in accordance with "SABS 0160-1989 The general procedures and loadings to be adopted in the design of buildings".

Table 2-9 Structural Live Loads

Rooms	Live Load (kN/m^2)	Intensive Load
Consultation, Treatment, Office	2.5	9.0kN per 0.75m x 0.75m
First Stage, Post Natal Ward	1.5	1.5kN per 0.1m x 0.1m
Store	5.0	5.0kN per 0.1m x 0.1m
Toilet, Kitchen	3.0	3.0kN per 0.1m x 0.1m
Entrance/waiting hall, Corridor	3.0	3.0kN per 0.1m x 0.1m

5) Reinforced Concrete

The value of strength of concrete is to be determined in accordance with "SABS 0100-1:1992 The structural use of concrete Part 1: Design." The details of the standard are identical with those of "BS 8110: Structural use of concrete Part 1: Code of practice for design and construction." Thus this standard is sufficient to be applied to this Project.

With respect to reinforcing bars, in South Africa, high-tension steel with a tensile strength of 450Mpa is used widely for main reinforcement and soft steel with a tensile strength of 250Mpa is used widely for other reinforcing bars. Thus the strength and quality of the locally manufactured steel is sufficient to be used as construction material.

(5) Electrical Facility Plan

1) Power Reception Plan

Low voltage power supply (3Φ4W－400/230V) will be the intake power at all three (Letsitele, Mohlaba, and Maake) clinics. A main distribution board will be installed near the connection point at each clinic. Installation of the first stage power line up to the main distribution board is to be carried out by the South African side.

2) Main Feeder

Distribution panel boards and power control panels are to be installed where necessary. In principle, the main line feeder system should consist of cable trays and cables installed above ceiling.

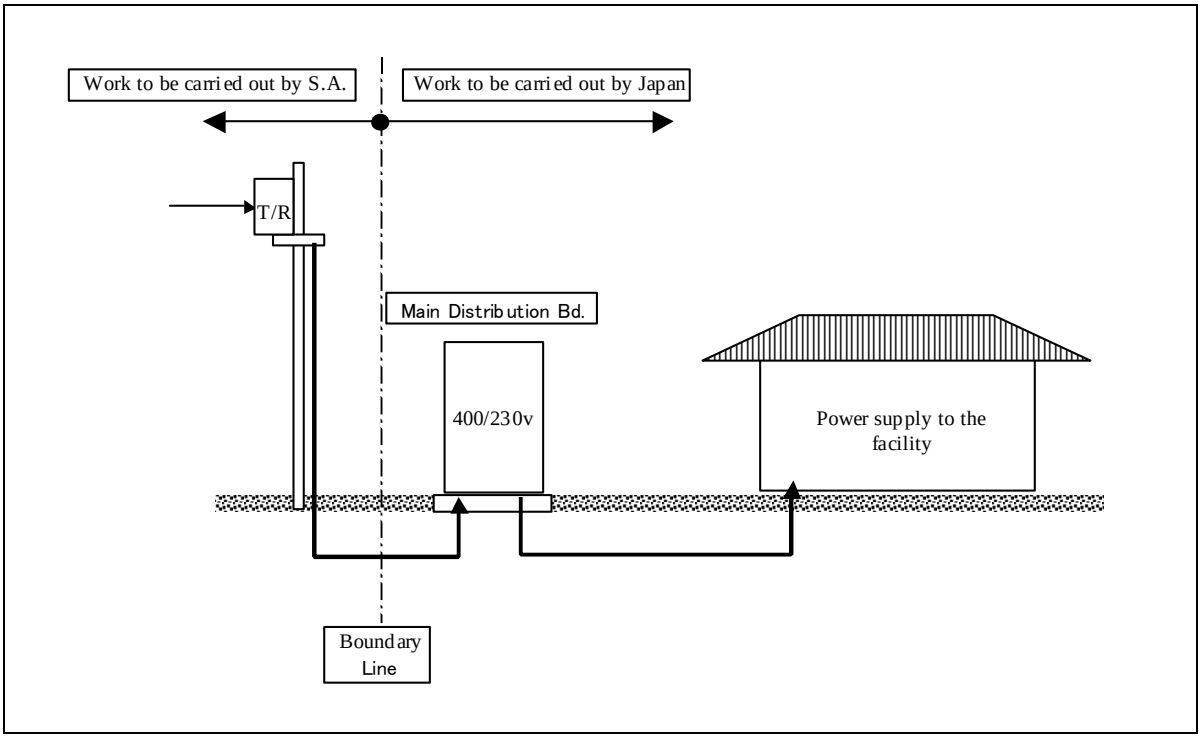


Fig. 2-15 Electrical System Diagram

3) Lighting Fixtures / Socket outlets

Fluorescent lamps will mainly be used for their long lives and operation costs. In the consultation room and other medical rooms, suspended ceiling lamps for medical use are also to be installed. The target intensity of illumination for each of the main rooms is as shown below.

Table 2-10 Target Illumination

Rooms	Illumination (lx)
Consultation, Treatment, Delivery, First Stage, Pharmacy	500～300
Nurse Station, Post Natal Ward, Office	350～250
Reception, Waiting, Pharmacy, Sluice, Laundry, Medical Record	250～100
Corridor, General Store	150～100

Receptacles shall comply with SABS and of standard type. Outdoor lights will be installed for crime prevention.

4） Telephone System

One telephone will be installed.

(6) Air Conditioning / Ventilation System

1) Air Conditioning System

According to the standards set by the Limpopo DOHW, all three Project sites for clinics are within the area requiring air conditioning. However, in order to minimize the running cost only the pharmacy will be air conditioned. In consideration of operation and ease of maintenance a split-type air conditioning unit, of which both the indoor and outdoor units will be wall-mounted, is to be installed.

Air-conditioned Room

Rooms with Air-conditioning unit
Pharmacy

2) Ventilation System

Natural airflow will be the basis for ventilation system of the building. Natural ventilation fans should be installed in the rooms which require exhaust odor / heat.

Ceiling fans shall be installed in the rooms listed below.

Rooms with Ceiling Fan

Rooms with Ceiling Fan
Consultation room, Treatment room, Labour ward, First stage, Post natal ward, Office, Waiting

(7) Plumbing and Sanitary System Plan

1) Water Supply System

A service pipe of size about 40A will be connected to the water main/source provided by South African side at all three clinics.

Number of people Staff members:6 （120 L/day･person） Visitors: approx.120（10 L/ day･person） Daily water requirement = 1,920 L/day（ 2m^3/day） 5days equivalent: 2m^3/day x 5days = 10m^3 = 5m^3 tank x 2 Nos.

Daily water requirement is calculated above and it is required to provide five day supply in the elevated water tank according to the standards of the Limpopo DOHW. Therefore, two $5m^3$ elevated water tanks will be installed.

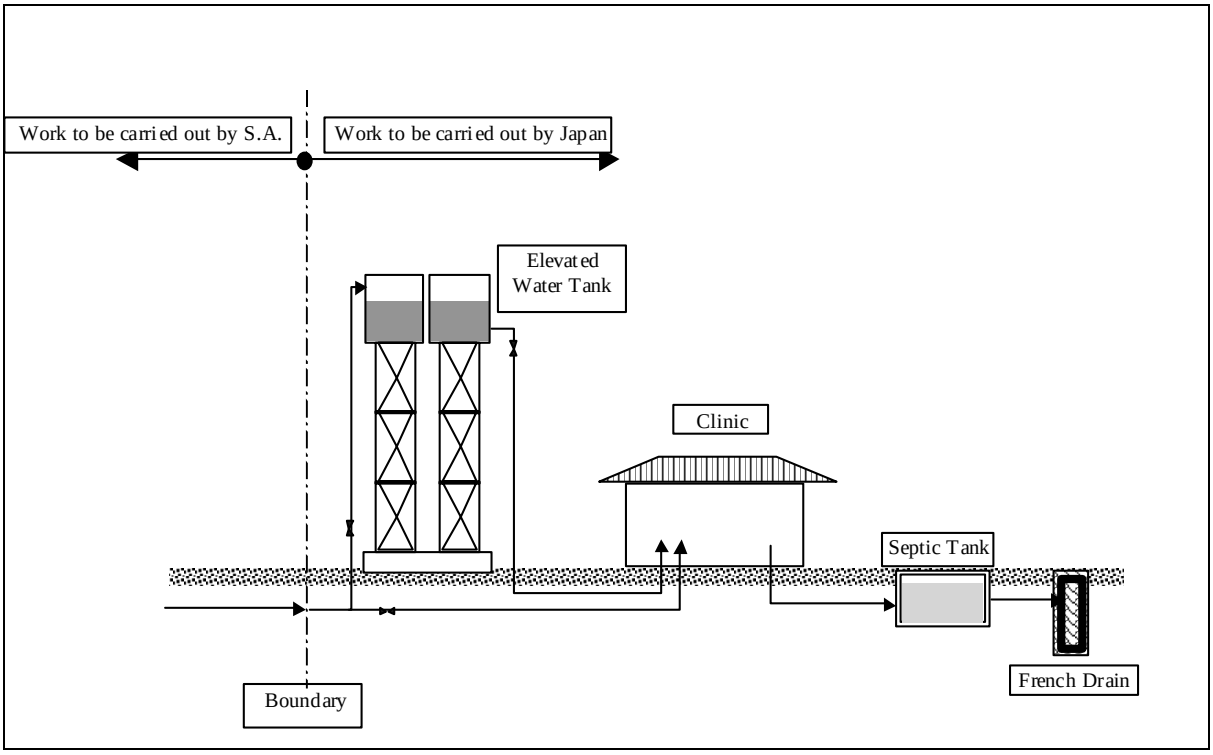


Fig. 2-16 Water Supply & Sewage System

2) Hot Water Supply System

Hot water will be supplied centrally by installing an electric geyser in accordance with the standards of the Limpopo DOHW.

3) Drainage and Vent System

Soil water from the toilets and other waste water will be disposed separately within the site. The soil water will first be sent to a septic tank for treatment and then be sent to French drain. General waste water will directly be sent to the other French drain within the site.

Storm water will be lead so that it can naturally be absorbed within the site and excessive water will be drained away.

4) Medical Gas

Medical gas in the clinics are handled individually by providing a gas cylinder to where necessary. Therefore, no medical gas piping will be installed within the building.

5) Sanitary Fixtures

Western-style stools, urinals, washbowls, bathtub and sinks will be installed. Faucets for both cold and hot water will be long lever type except for the toilets. A special double sink, combination of a slop sink for washing urine glass and a regular sink, will be installed in the sluice.

6) Fire Fighting System

Fire fighting utilities in compliance with the National Building Regulations should be installed. Hose reels and fire extinguishers are required for the clinics according to the regulations. The hose reels will directly be connected to the water supply pipe from the elevated water tank. No special water pump will be provided for hose reel.

(8) Materials and Construction Methods

Methods of construction and building materials will be decided by examining the surrounding climatic conditions, functional requirements, available construction period, construction cost, quantity of supply, and the maintenance and management cost.

1) Exterior Finishing Materials

The following table shows the main exterior finishing materials and rationale for their selection.

Table 2-11 Exterior Finishes

Part	Finish	Remarks
Roof	Corrugated galvanized steel sheet	The most reliable water proofing material available locally with cost effectiveness in the area where no chloride erosion need to be considered. Also, compared to the roof tiles, the lightness of the material will result less structural cost.
Exterior Wall	Face Brick	Highly durable and free of maintenance. Since re-painting or repair work for cracks are not necessary, maintenance cost can be reduced.
Windows	Aluminum Sash	Reliable compared to steel sash, in terms of corrosion and water resistance.

* The finish for V.P. Shelter will basically be the same as the clinics except for not having windows

2) Interior Finishing Materials

The following table shows main interior finishing materials and rationale for their selection.

Table 2-12 Interior Finishes of Clinics

Room	Floor	Wall	Ceiling	Remarks
Consultation, Treatment, First stage, Labour ward	Seamless vinyl sheet flooring	Paint on plaster screed	Paint on water resistant fiber cement board	Hygienic and durable
Waiting area, Covered corridor	Colour Hardener	Paint of plaster screed/fair face brick	Paint on water resistant fiber cement board	Durable and economical
Toilet, Shower Rm., Sluice	Ceramic floor tiles	Ceramic wall tiles	Paint on water resistant fiber cement board	Water resistant and easily cleanable

Table 2-13 Interior Finishes of V.P. Shelters

Room	Floor	Wall	Ceiling	Remarks
Waiting area, car parking	Steel troweled concrete	Face brick/ partially plastered	Exposed insulation board	Durable and economical

2-2-3 Basic Design Drawings

(1) Equipment Plan

- X-ray apparatus (Letaba)
- High pressure steam sterilizer (Letaba)
- Dental unit (Letaba)
- Dental unit (Dr.CN Phatudi)

(2) Building Plan

The following drawings are attached.

1) Letsitele Clinic and Maake Clinic

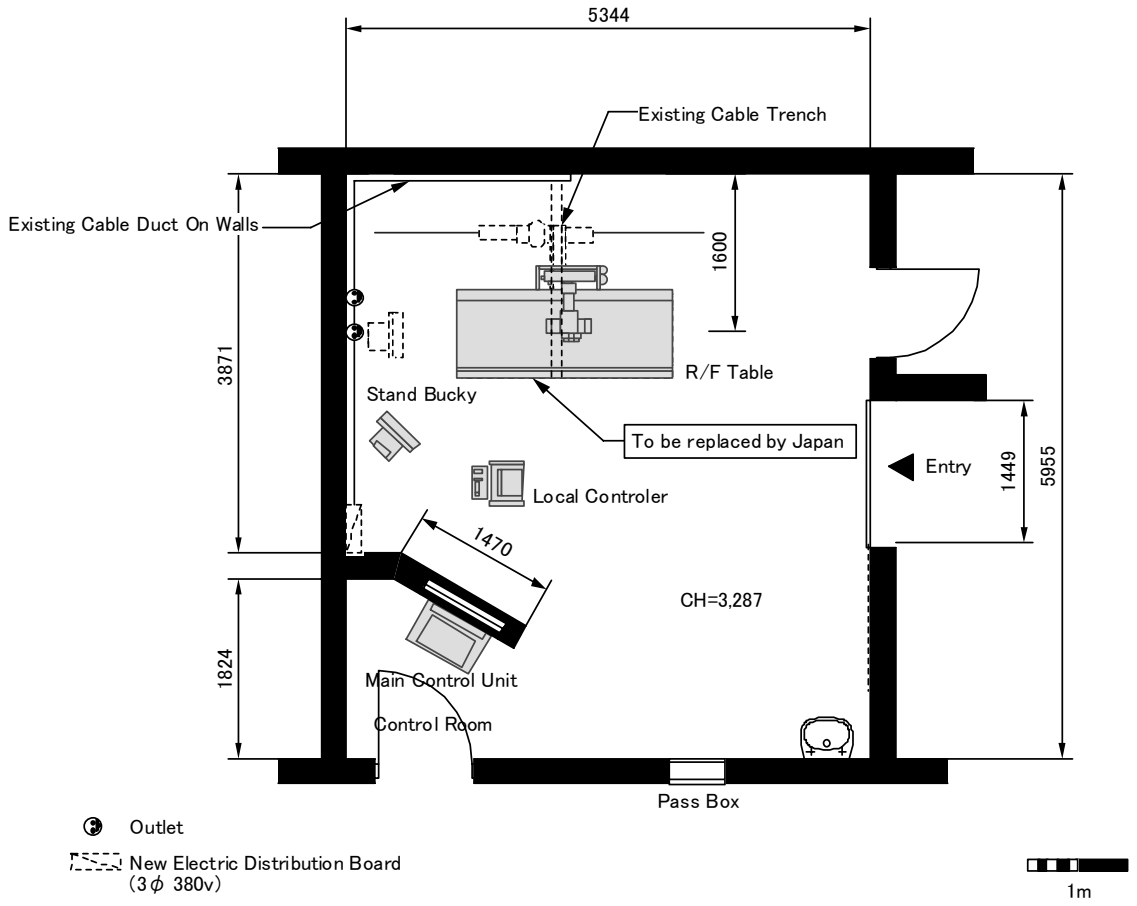
- Site Plan (Letsitele Clinic)
- Site Plan (Maake Clinic)
- Plan (Common)
- Elevation (Common)
- Section (Common)

2) Mohlaba Clinic

- Site Plan
- Plan
- Elevation
- Section

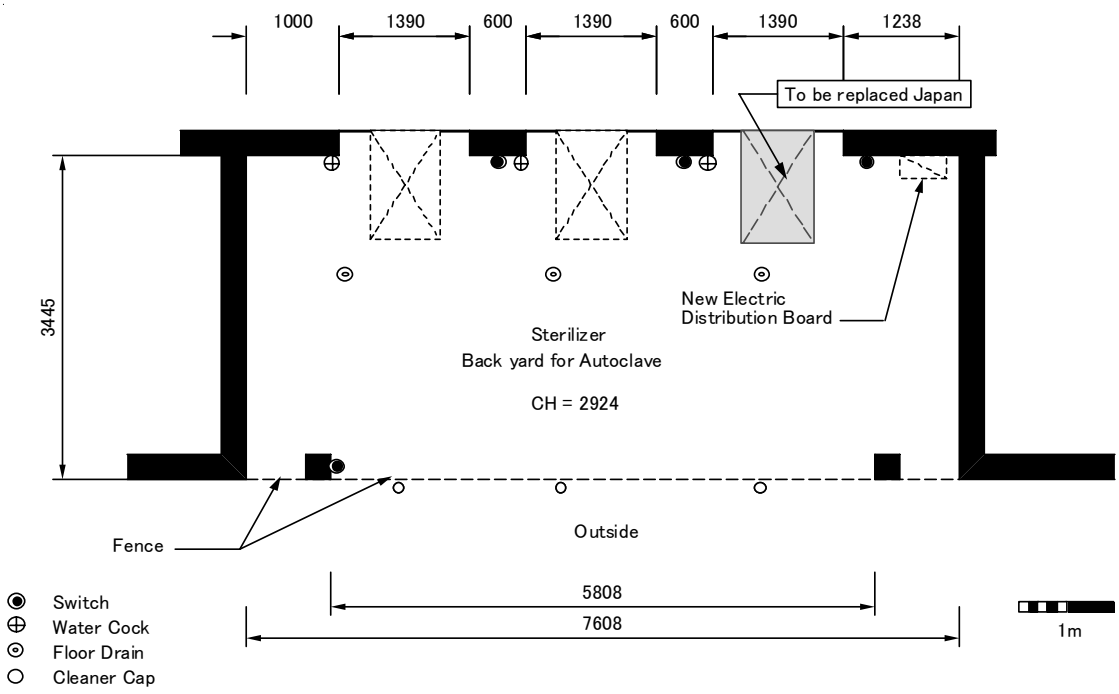
3) V.P. Shelters

- Site Plan (Burgersdorp, Khujwana, Mogoloboto-2, Pharare)
- Plan, Section
- Elevation



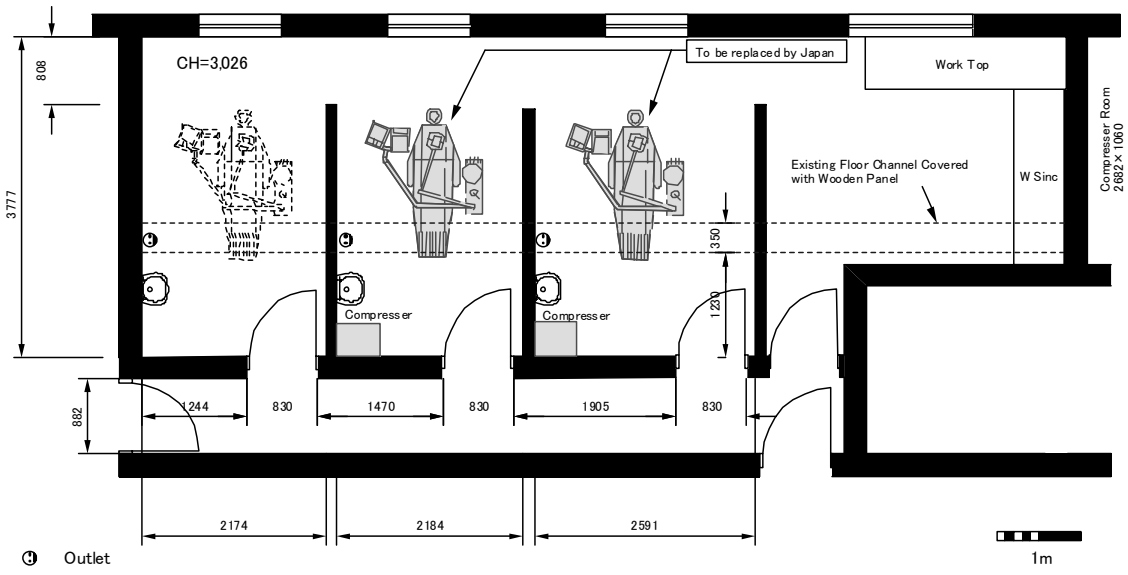
Letaba Regional Hospital

X-ray apparatus, basic screening unit (H-L-F-02)



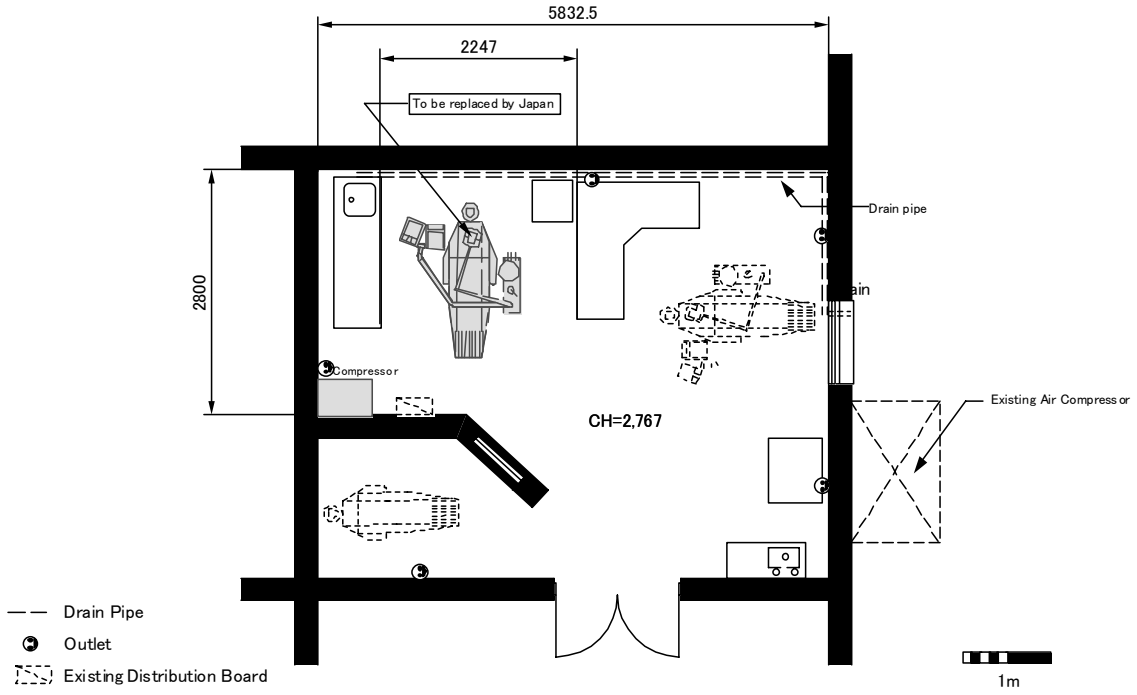
Letaba Regional Hospital

High pressure steam sterilizer (H-L-H-01)



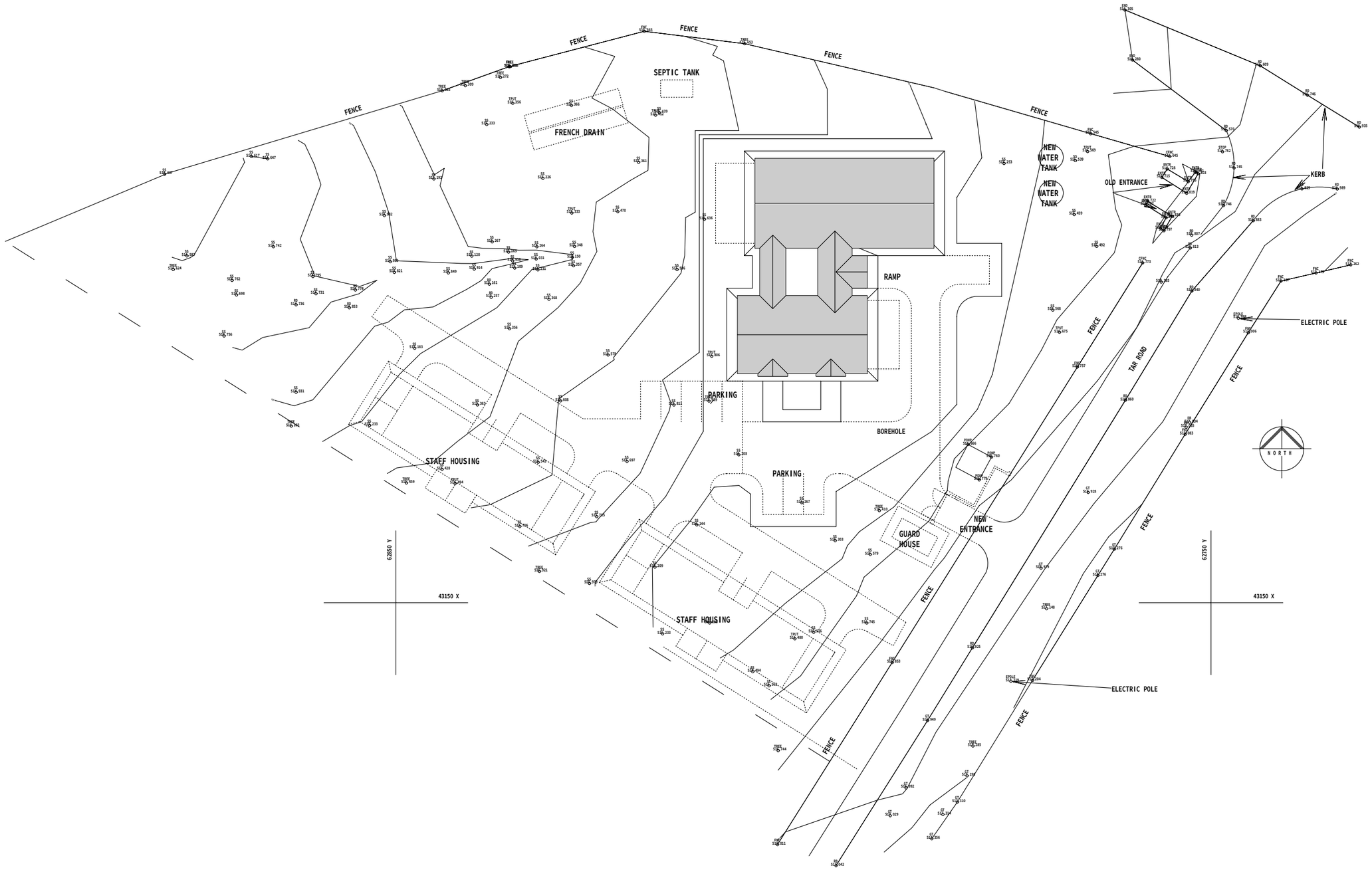
Letaba Regional Hospital

Dental unit (H-L-C-06)



Dr.CN　Phatudi District Hospital

Dental unit（H-P-C-01）

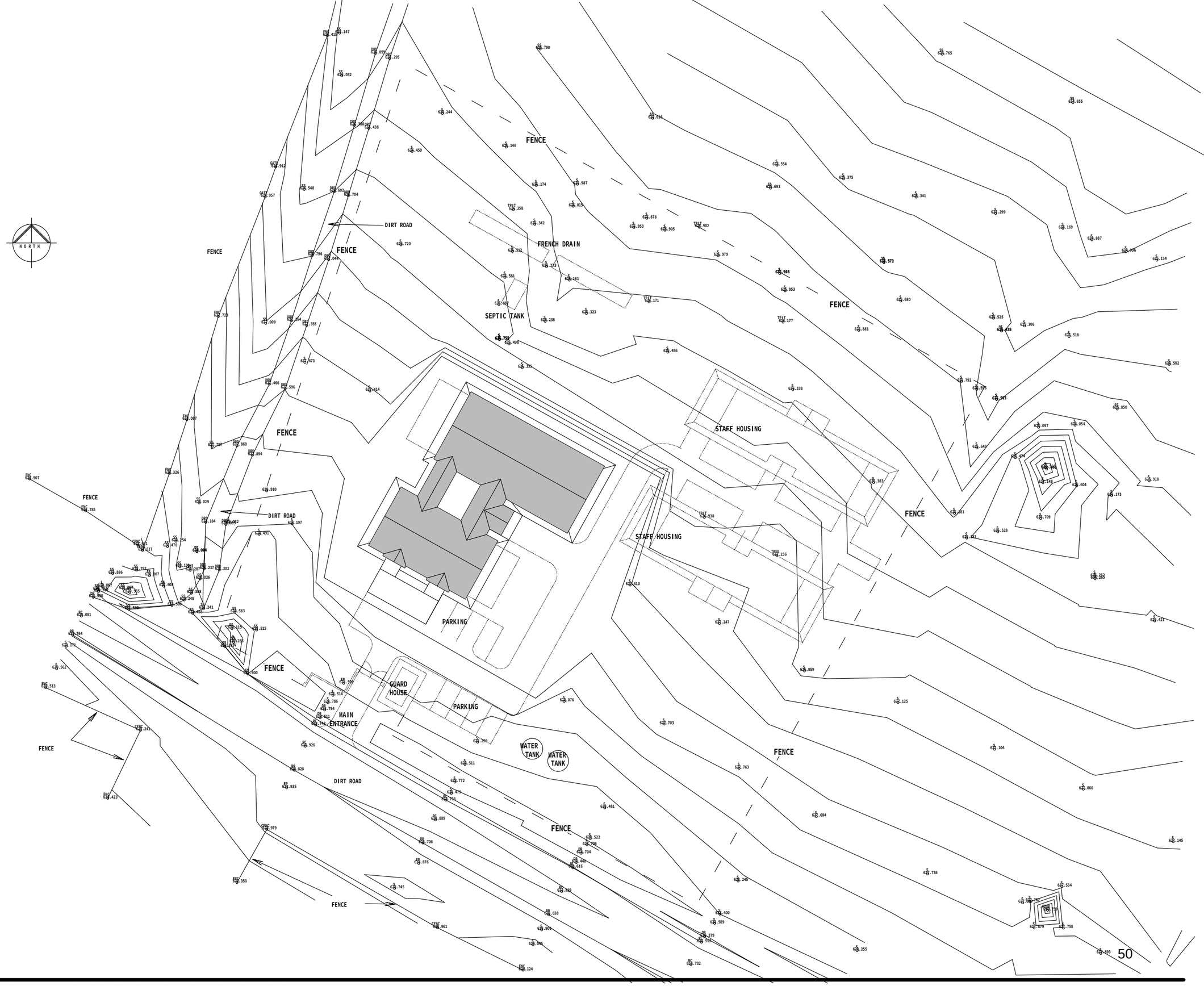


THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

LETSITELE CLINIC

SCALE = 1:500

SITE PLAN



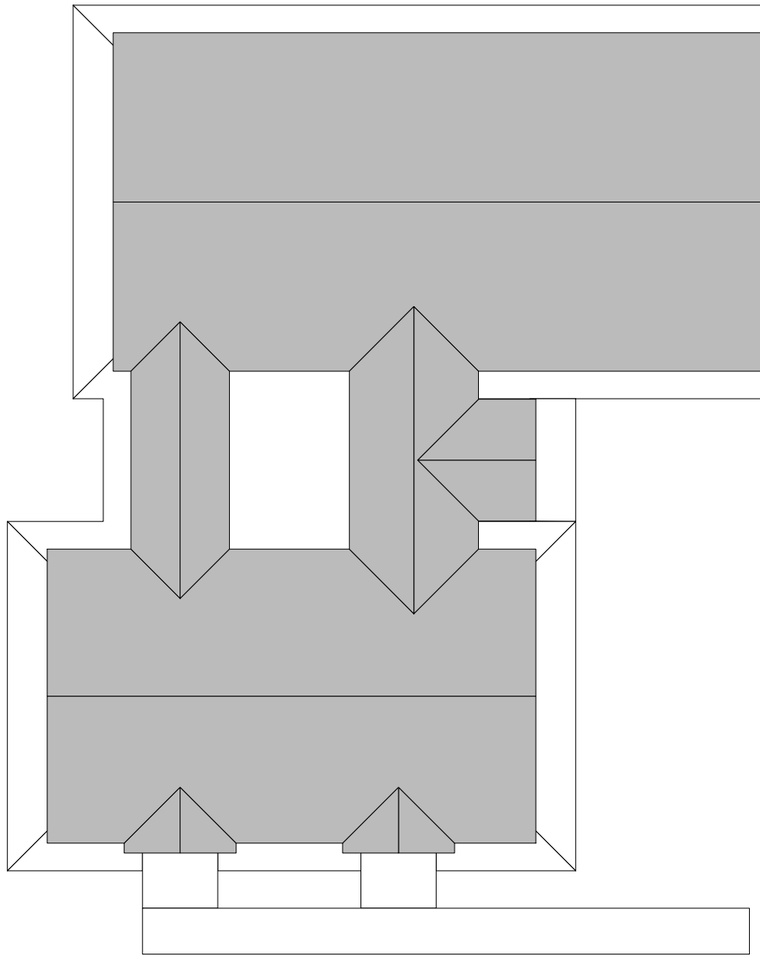
THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

MAAKE CLINIC

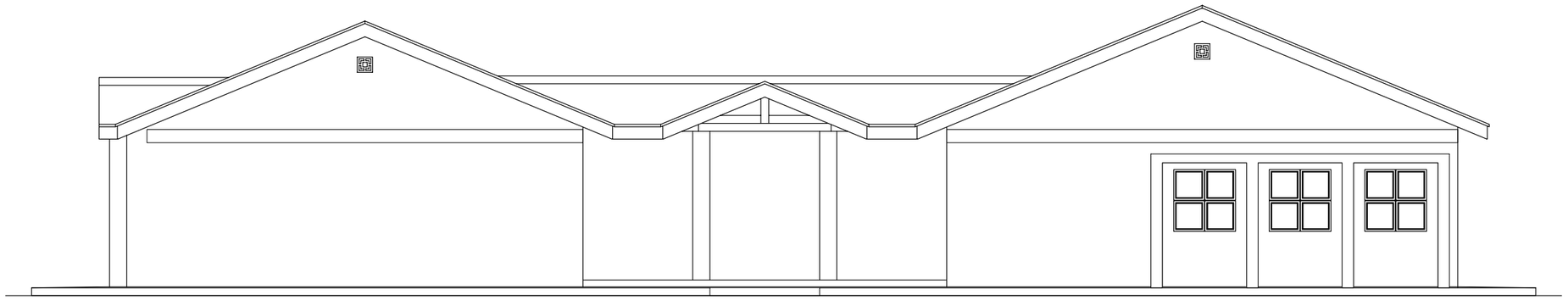
SCALE = 1:500

SITE PLAN

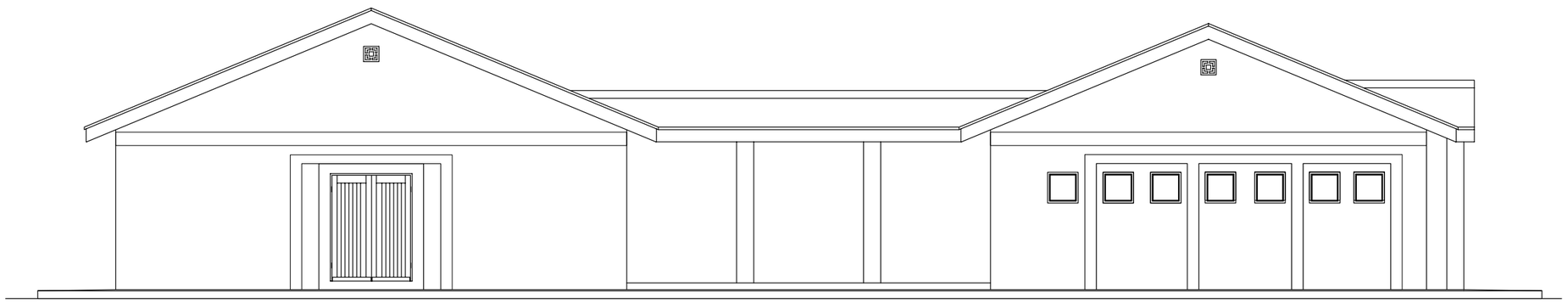
FLOOR PLAN



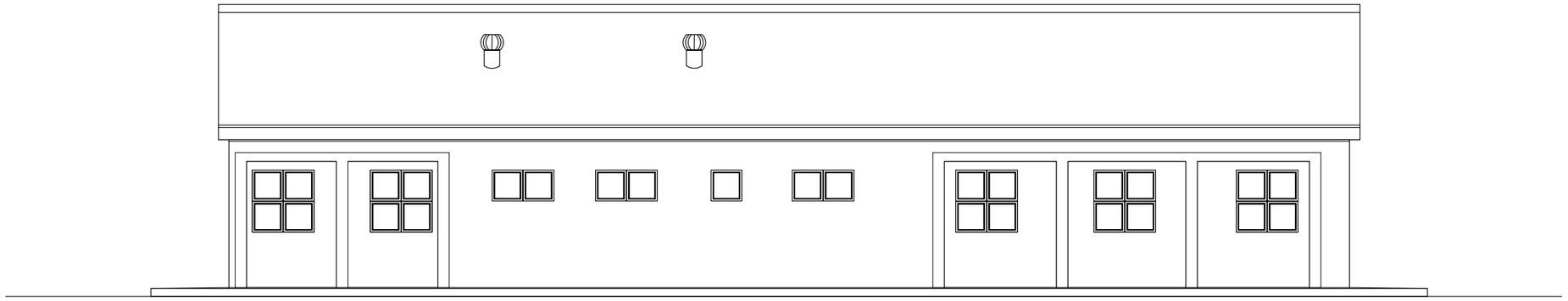
ROOF PLAN



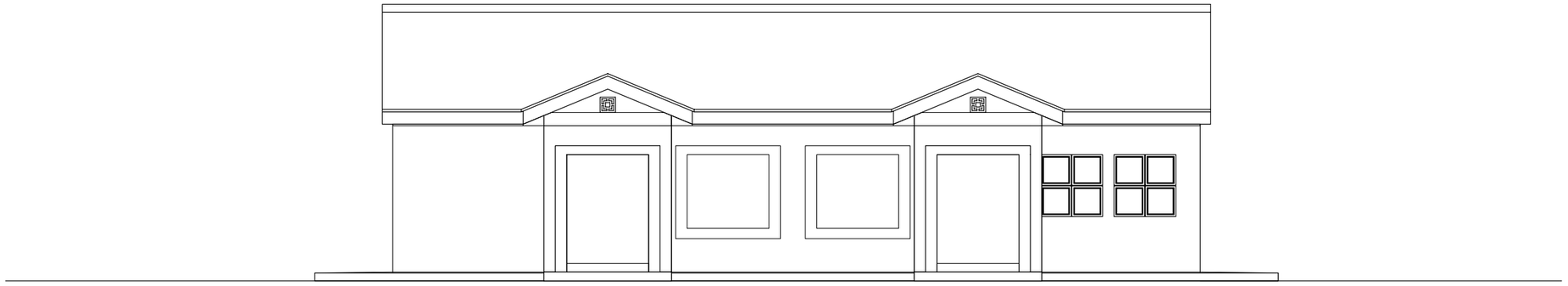
EAST ELEVATION



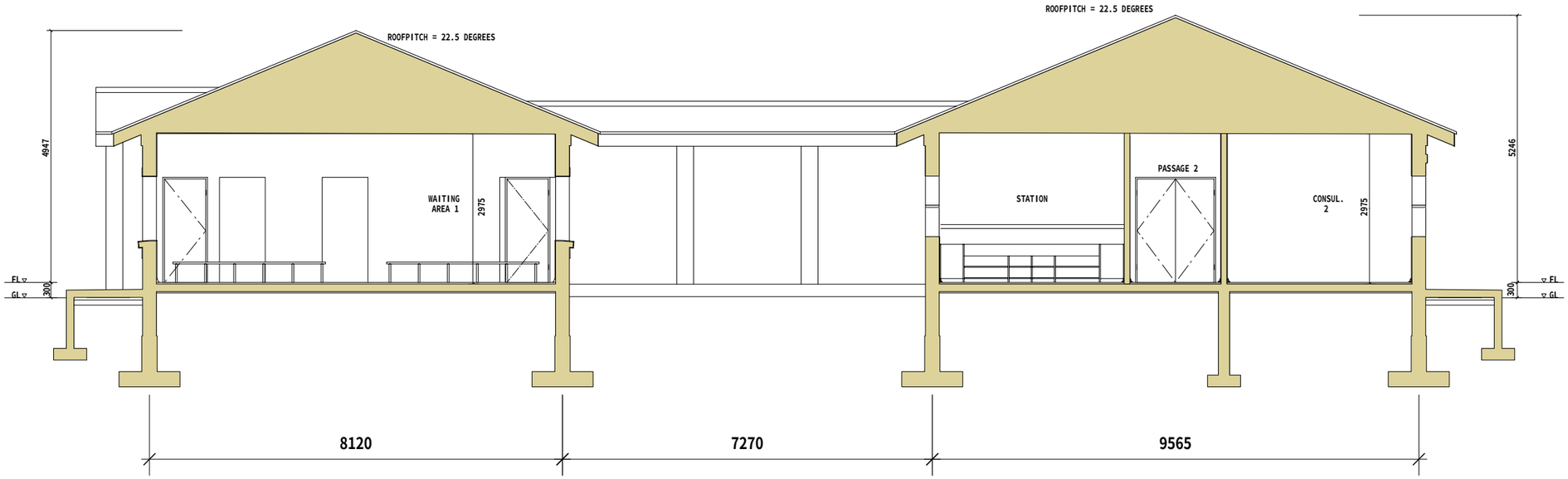
WEST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

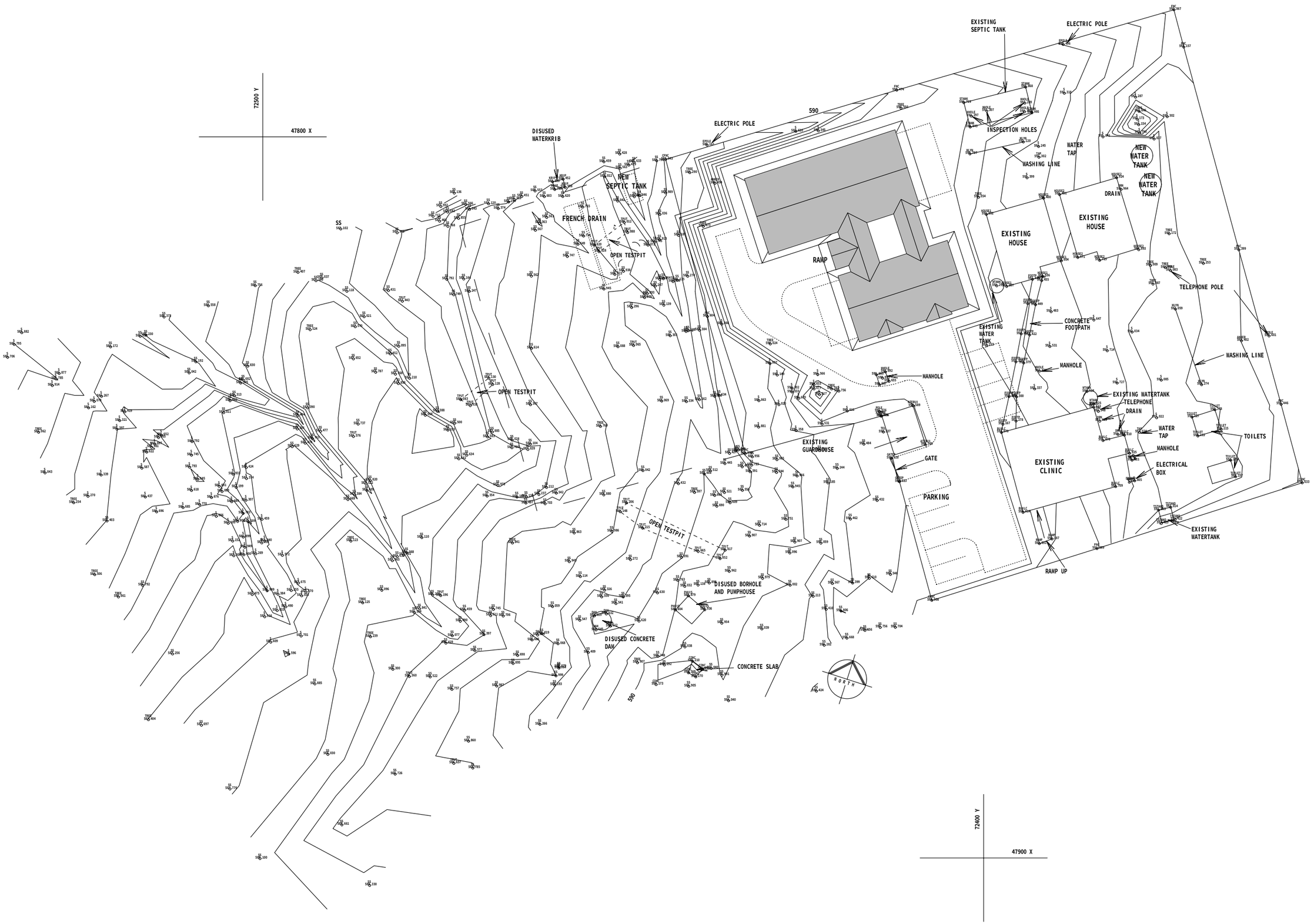


THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

LETSITELE CLINIC / MAAKE CLINIC

SCALE = 1:100

SECTION



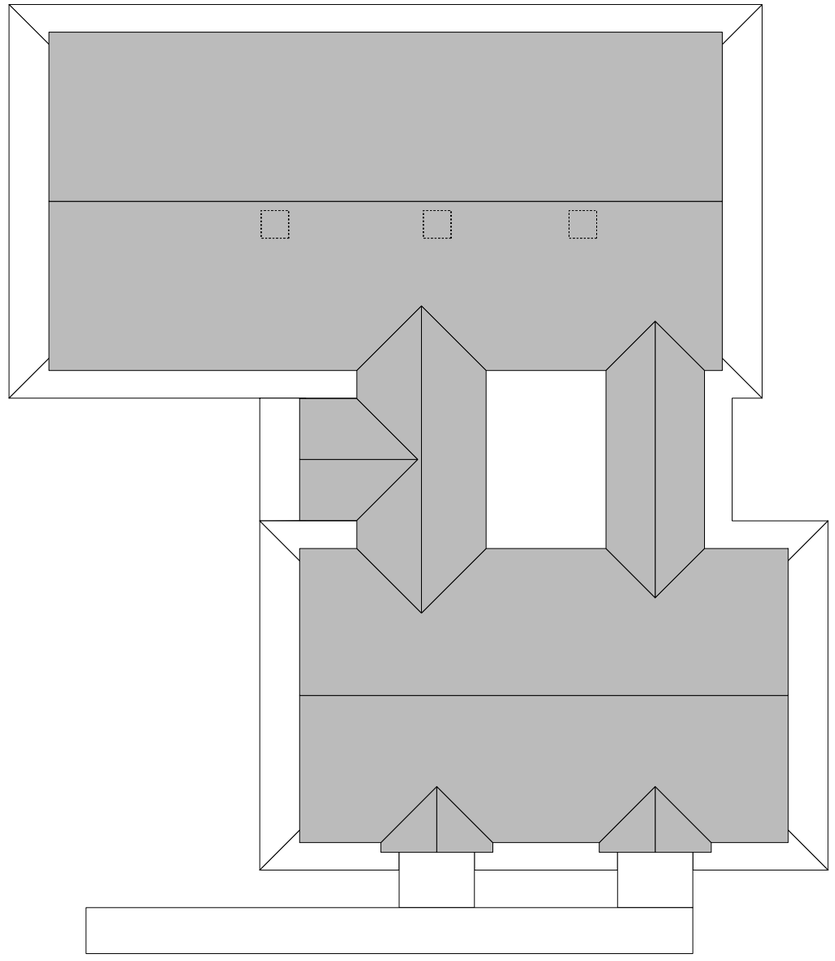
THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

MOHLABA CLINIC

SCALE = 1:500

SITE PLAN

FLOOR PLAN



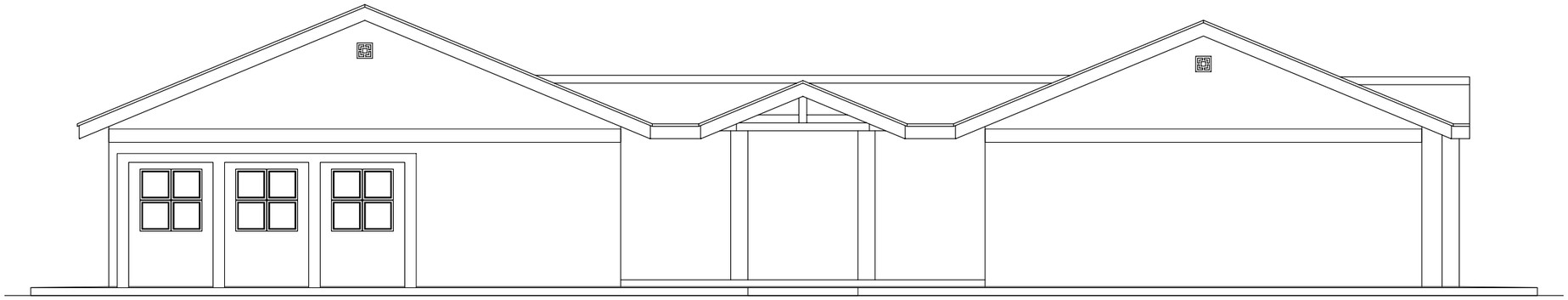
ROOF PLAN

THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

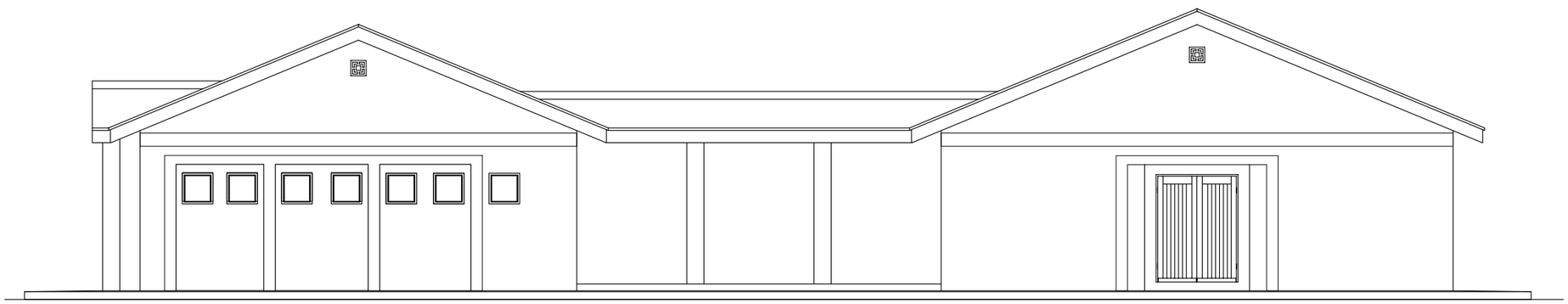
MOHLABA CLINIC

SCALE = 1:200

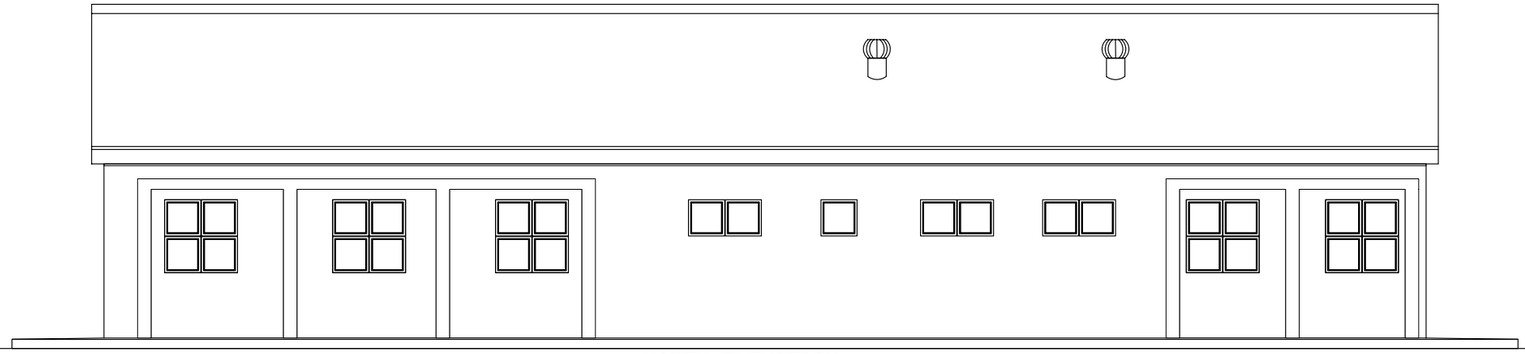
FLOOR PLAN / ROOF PLAN



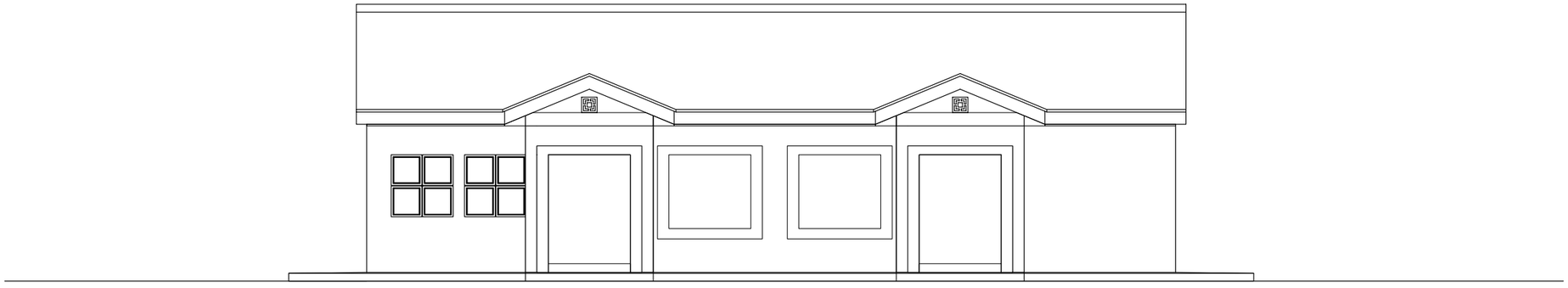
WEST ELEVATION



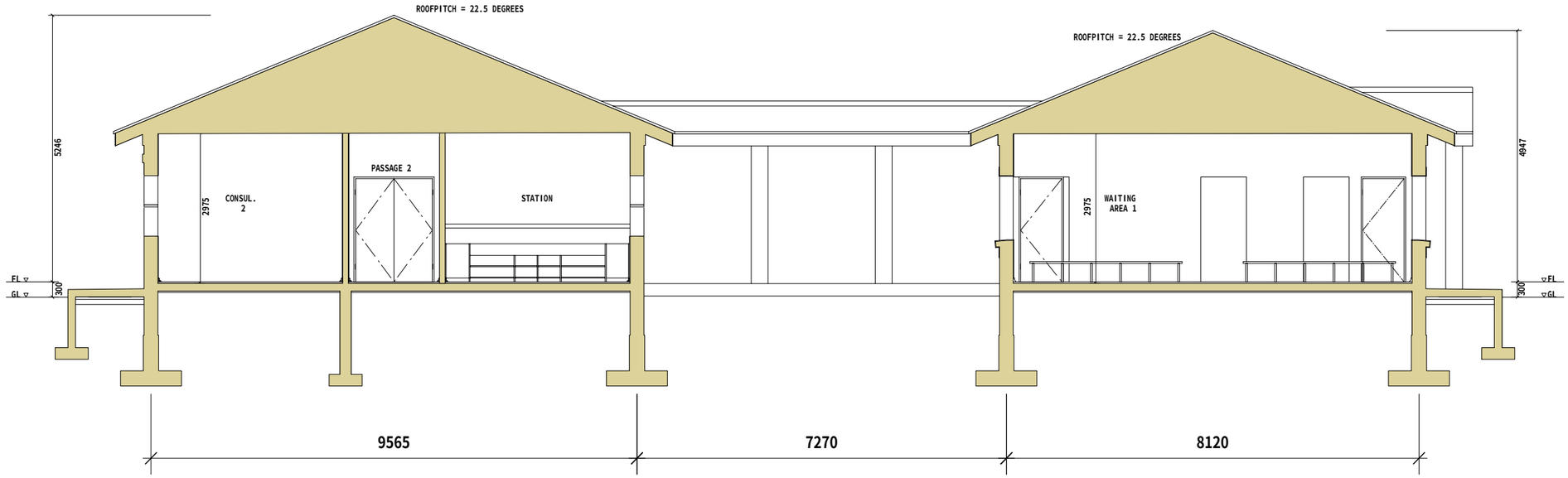
EAST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION



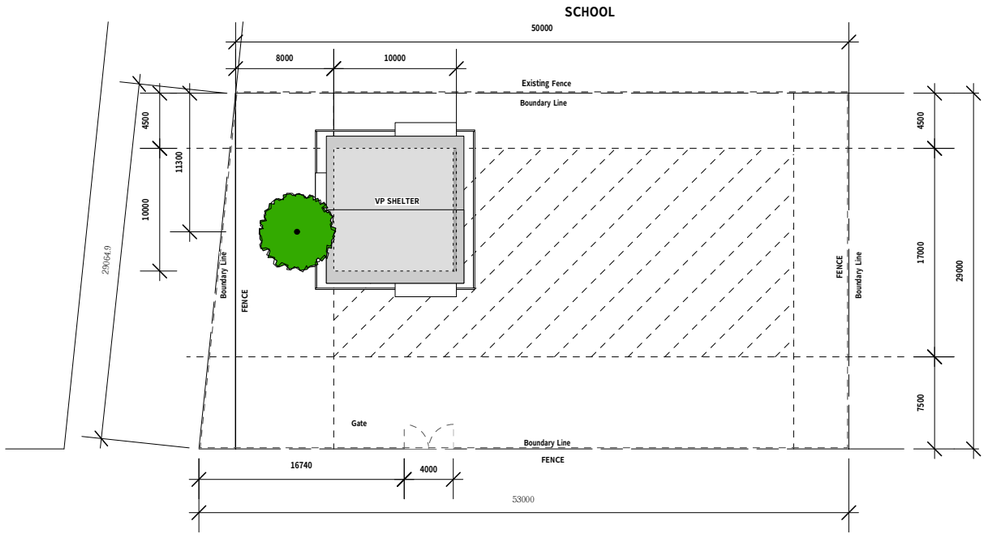
THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

MOHLABA CLINIC

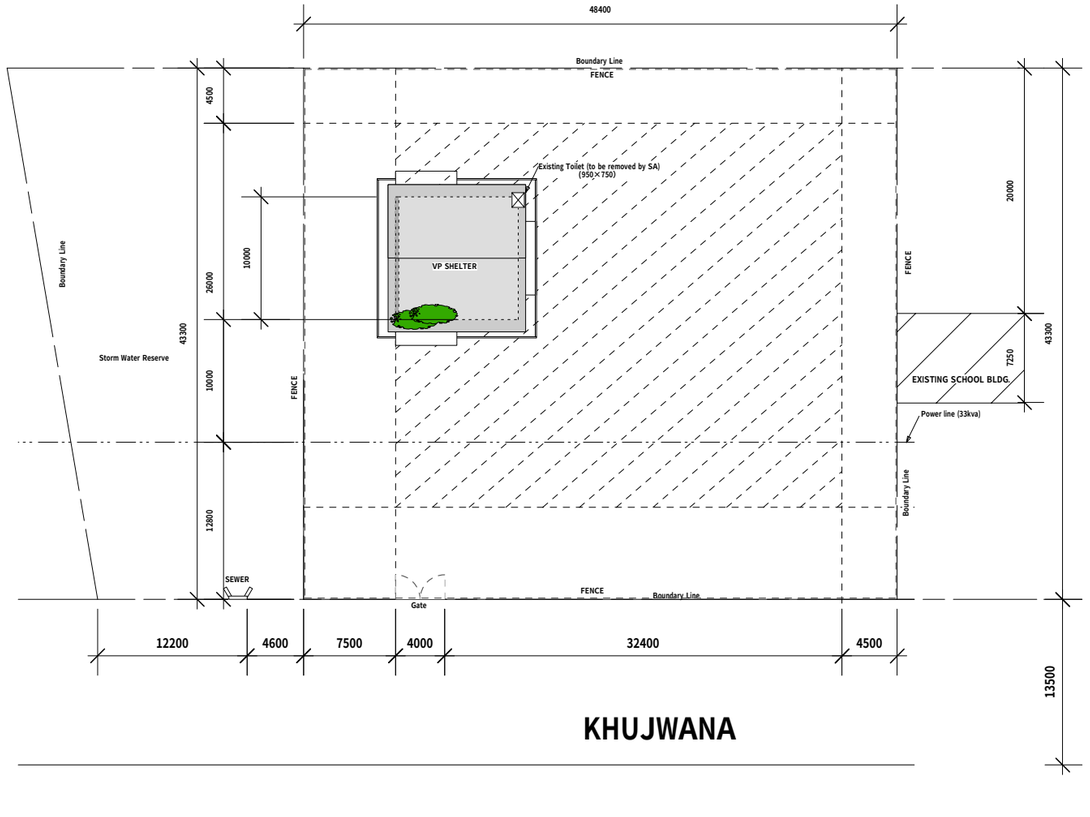
SCALE = 1:100

SECTION

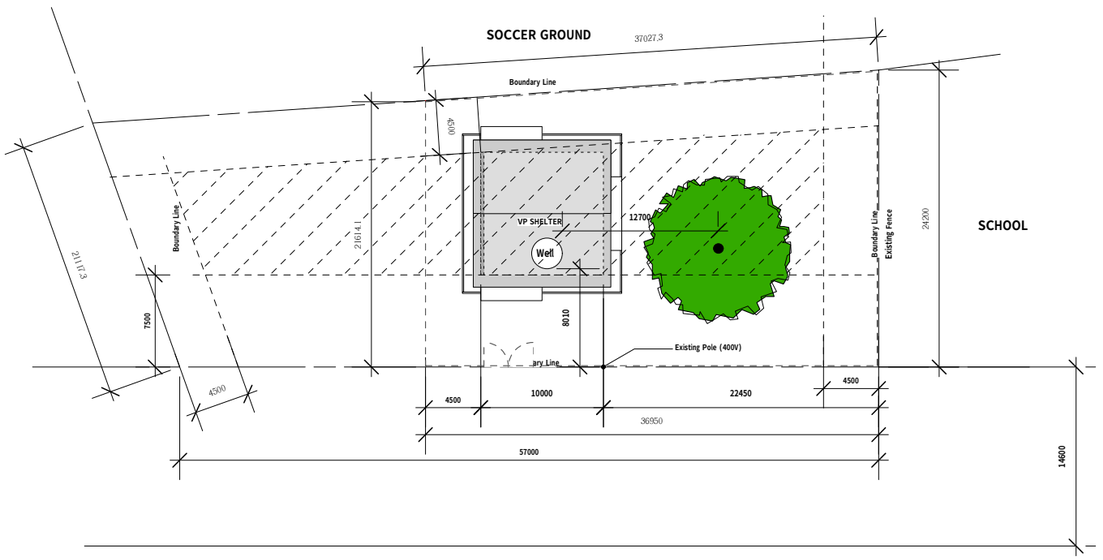
POSSIBLE AREA FOR BUILDING



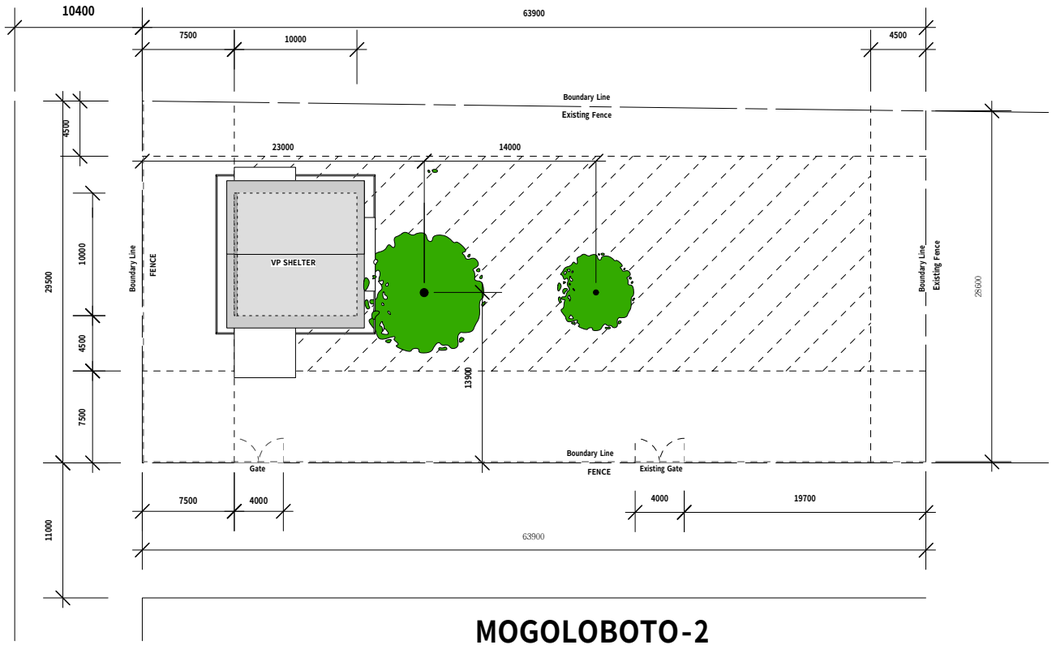
PHARARE



KHUJWANA



BURGERSDORP



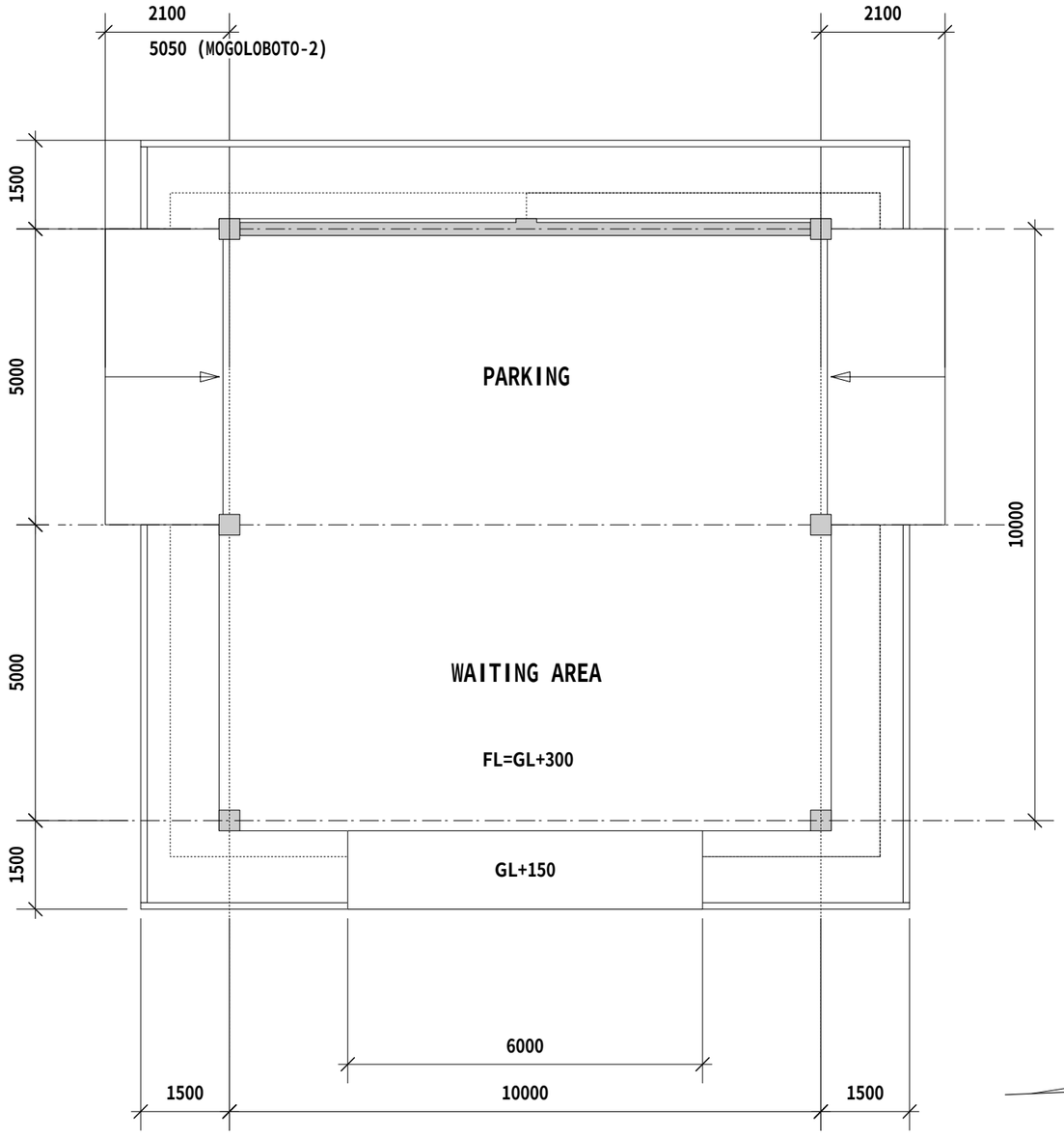
MOGOLOBOTO-2

THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

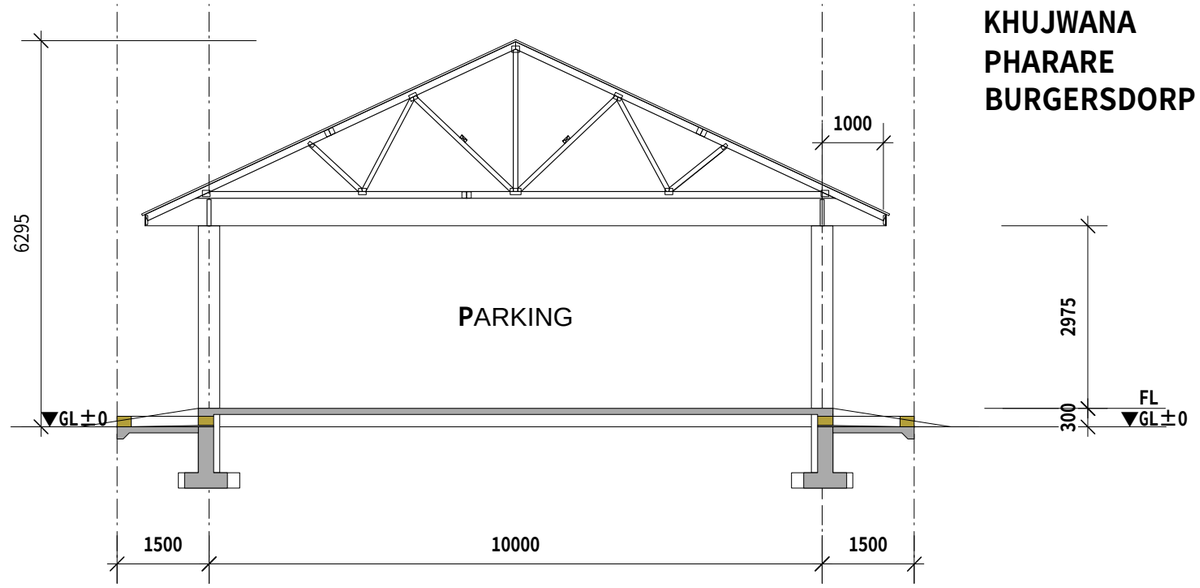
VISITING POINT SHELTER

SCALE = 1:500

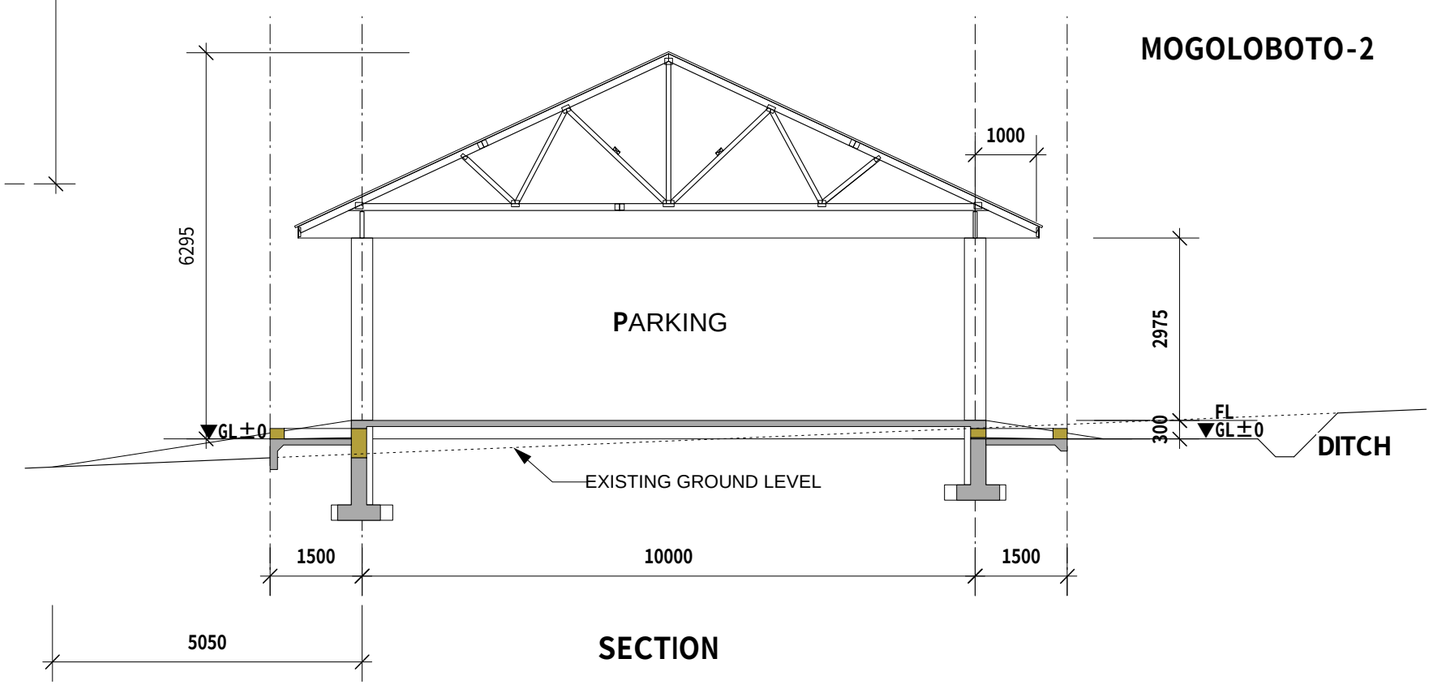
SITE PLAN



FLOOR PLAN



SECTION



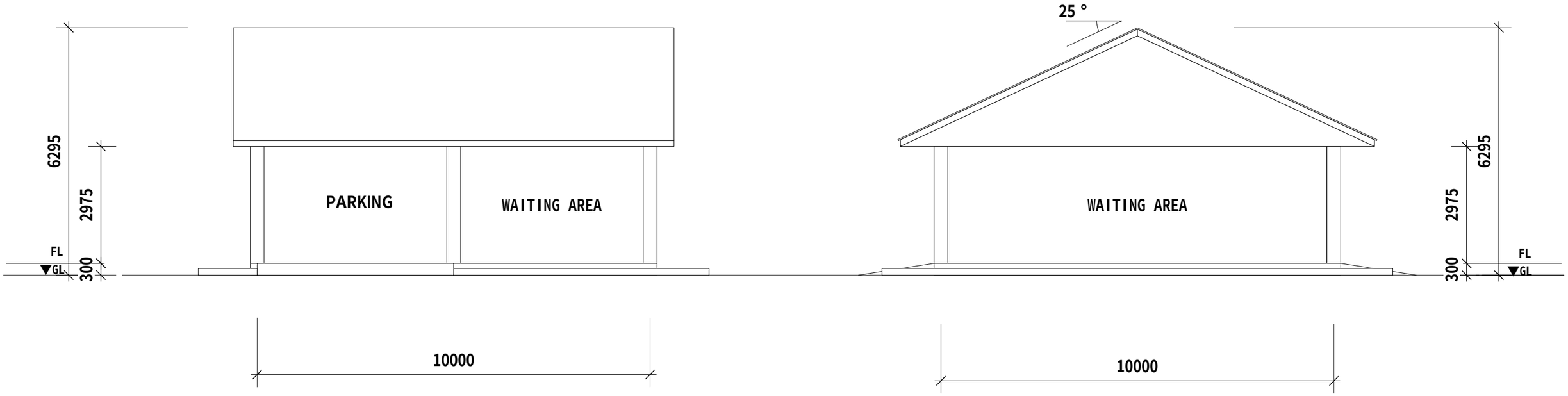
SECTION

THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

VISITING POINT SHELTER

SCALE = 1:100

FLOOR PLAN / SECTION



THE PROJECT FOR IMPROVEMENT OF THE HEALTH FACILITIES IN THE LIMPOPO PROVINCE IN THE REPUBLIC OF SOUTH AFRICA

VISITING POINT SHELTER

SCALE = 1:100

ELEVATION

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The Requested Japanese Assistance shall be executed in accordance with the framework of Japan's grant aid scheme. After conclusion of the exchange of notes regarding the Project between the two governments, the Project will officially be commenced.

This procedure will be followed by conclusion of a consultant agreement and preparation of detail design / tender documents. Tendering of construction contractor (hereinafter referred to as "the Contractor") and equipment supply contractor (hereinafter referred to as "the Supplier) will be held thereafter. The Contractor and the Supplier selected through the tenders shall then execute both construction work and equipment supply and installation work.

During the detail design stage the Consultant and the persons concerned in South Africa will study construction schedule of the Project and have discussions to ensure smooth implementation of works undertaken by the both Governments. The scope of works undertaken by South Africa shall be completed prior to procurement of equipment and construction of the new buildings.

(1) Implementing Organisation

1) South African side

The implementing agency of this Project is the Limpopo DOHW. The Limpopo DOHW formed a committee for implementation of the Project. The members of the committee are as follows.

- *Dr. M. Nkadimeng* (*Senior General Manager, Health Care Services Branch*)
- *Mr. Mpho Mofokeng* (*Chief Financial Officer, Financial Management Branch*)
- *Dr. P.N.Kgaphaola* (*General Manager, District Health Services*)
- *Mr. Anton van Geffen* (*General Manager, Financial Management Chief Directorate*)
- *Mr. Jimmy Ledwaba* (*Senior Manager, Devolution Support Directorate*) *PIC*
- *Ms. Mantji Mahlo* (*Senior Manager, Integrated Primary Health Care*)
- *Dr. ETC Moloko* (*Senior Manager, District Hospital Services*)

- *Mr. Frans Faul (Manager, Physical Resource Management Sub-directorate, Strategic Management and Planning)*
- *Mr. Manasseh Khosa (Deputy Manager, Physical Resource Management Sub-directorate)*

2) Consultant

Immediately after the Notes regarding the Project are exchanged between the two governments, the Government of South Africa will conclude a consultant agreement with a selected Japanese consultant in accordance with the Grant Aid scheme of the Government of Japan. The agreement will become effective upon verification by the Government of Japan. The consultant will carry out the following services in compliance with the provisions of the consultant agreement.

- Detail Design: Preparation of the detail design documents including specifications and other technical documents
- Assistance of Tendering: Assistance of tendering to select the Contractor and the Supplier, and concluding the contract.
- Supervision: Supervision of construction work and equipment work including installation and instruction for operation and maintenance

In Detail Design stage, the Consultant will prepare tender documents including detailed specifications and drawings of construction work and equipment work based on the Basic Design, and tender instructions and condition of the contract.

In Tendering stage, the Consultant will provide the tendering services, e.g. public notice of tender, receipt of applications, pre-qualification, distribution of tender documents, tender opening, evaluation of the tender results. Furthermore, the Consultant will assist on concluding the contract between the Government of Republic of South Africa and the Contractor and the Supplier, and report to the Government of Japan.

In Supervision stage, the Consultant will ensure that construction work and equipment work will be carried out fairly in accordance with the contract documents as well as instructions, advice and coordination, for implementation of the Project. The supervision service includes the followings:

a. Coordination, instructions and advice to the Contractor and the Supplier

The Consultant will examine the construction schedule, construction plan, the building materials procurement plan and the equipment procurement / installation plan, and shall coordinate, give instructions and advices to the Contractor and the Supplier.

b. Examination and approval of working drawings of the construction work

The Consultant will examine, instruct and approve the shop drawings and other relevant documents submitted by the Contractor.

c. Confirmation and approval of building materials and equipment

The Consultant will confirm and approve the building materials and equipment proposed by the Contractor and the Supplier in compliance with the contract documents.

d. Factory inspection

The Consultant shall inspect, if necessary, the building materials and equipment at the manufacturers' factories to ensure the quality and performance.

e. Reporting progress of work

The Consultant shall grasp the actual conditions of the construction sites and progress, and report them to both the governments of South Africa and Japan.

f. Completion inspection and commissioning test

Upon completion of the construction work and the equipment work, the consultant will conduct a final inspection and commissioning tests of the completed facilities and installed equipment to ensure that all the works are completed in compliance with the contract documents, and will submit the completion certificates to the Government of South Africa.

g. Training for operation of the equipment

Some equipment included in the Project will require expertise on operation and maintenance. Therefore, the persons in charge of operation of the equipment will be required to receive on-site training by the Supplier during the installation / adjustment / test-run period. The Consultant shall give instructions and advice regarding the training programme.

3) The Contractor and the Supplier

The Contractor will carry out construction work and the Supplier will procure, supply and install medical equipment in accordance with the contract documents and give instruction for operation and maintenance of the equipment. The Supplier will also ensure after-sale services for getting technical assistance and procuring spare parts and consumables for the major equipment within the guarantee period from local suppliers.

4) JICA

In order for the Project to be implemented in accordance with Japan's Grant Aid scheme, the Grant Aid department of JICA will guide the Consultant as well as the Supplier. JICA will hold meetings with concerned parties for advancement of the Project when necessary.

2-2-4-2 Implementation Conditions

(1) Construction Work

1) Condition of the Local Construction Industry

There are in principle no major differences in terms of construction practices between South Africa and Japan. However, since the scope of local contractors' operations and responsibilities differ widely from those of Japanese contractors', careful attention should be paid to the local method of determining the construction period and so on. In South Africa, the range of consultants' services in construction project is broad, including preparation of working drawings and reinforcement-bar schedule, as well as a heavy responsibility for

warranty against defects. If a building is not constructed strictly with the design drawings, the architect in charge must rectify such defect at their own expense, and the contractor will not be held responsible for such defect. Therefore, in South Africa, architects are insured for architectural design insurance according to the size of the project.

It should be noted that in South Africa the amount of gross profit included in the unit cost of construction is by far lower in Japan due to the difference in terms of scope of work and responsibility.

2) Building Regulations and Permit Procedure

In South Africa, there are regulations on facility planning and construction. Furthermore, Building materials and machinery equipment should also comply with the relevant industrial standards and regulations in South Africa.

Prior to commencement of the construction work of this Project, it is not necessary to obtain building permit from the local authority but the Limpopo DOHW shall submit a notification of the Project to the local authority instead. Upon the completion of detail design, all the relevant documents for construction of the Project shall be submitted to the Limpopo DOHW for its approval. The Limpopo DOHW shall submit the notification to the local authority thereafter.

(2) Equipment Procurement

1) Supervision of Equipment Installation

Installation work and training of the procured equipment will be done during the operation period of the existing facilities. Therefore, schedule of installation work and training must be controlled through close communication between South African side and the consultant not to hinder the activities of facilities.

2) Dispatch of Engineer

Engineers shall be dispatched from the manufacturers or distributors of equipment under the Requested Japanese Assistance. They shall give instruction to facility staff as to handling, operation, daily maintenance,

etc. so that the equipment may be used properly and effectively.

2-2-4-3 Scope of Works

(1) Scope of Works (Equipment Procurement & Installation)

1) Work under Japan's Grant Aid

- Procurement, transportation, loading and unloading of the equipment to the Project site
- Installation and test operation of the equipment
- Explanation, operation and maintenance training for the equipment

2) Work under the Government of South Africa

- Relocation, removal of existing equipment where new equipment will be installed
- Provision of space for temporary storage within the Project site
- Provision of access way for transportation of the equipment
- Provision of water supply (with bulbs), drainage (with end caps), power supply (with receptacles, breakers), medical gas supply, reinforcement of foundations, and so on, which is necessary prior to the equipment installation

(2) Scope of Works (Construction Work)

1) Work under Japan's Grant Aid

a. Facility construction

- Construction of the buildings described in the Basic Design Study report
- Electrical, mechanical, plumbing and sanitary ware installation works
- Water service piping, electric cabling and drainage work within the Project sites
- Installation, removal of temporary fence and temporary buildings such as warehouse for construction
- Payments for electricity, water and telephone used for construction

b. Other relevant work

- Inland transportation of materials and equipment to the Project site

2) Work under the Government of South Africa

a. Site and exterior works

- Securing the sites for the Project
- Removing existing structures, trees and any other obstacles work from the Project sites and levelling
- Landscaping work such as planting, gardening and pavement
- Construction of other necessary structures such as a guardhouse and generator room at each Project site
- Construction of boundary fences and gates

b. Infrastructure

- Low voltage electricity supply to the sites
- Installation of telephone lines with enough capacity up to the Main Distribution Frame in the buildings
- Provision of water supply, which includes construction of a new bore well, up to the boundary line of the Project sites

c. Preparatory work

- Provision of sites for temporary construction site office, workshops and material storage
- Connection of temporary supply line of electricity, telephone, and water

2-2-4-4 Consultant Supervision

(1) Supervision Policy on Procurement and Construction

In accordance with the scheme of Japan's Grand Aid, the consultant will organize the Project working team to ensure smooth implementation of the Project based on the policy of the basic design. The supervision policy on procurement and construction are as stated below.

- To keep close communication with the persons in charge of the Project of both the governments to ensure completion of construction of the buildings and procurement of equipment without delay
- To promptly give proper advices and instructions with justice to the Supplier and the Contractor
- To give proper advices and instructions concerning installation and operation of equipment after handover
- To confirm completion of equipment installation and construction of the buildings in compliance with conditions of the contract, to attend handover of equipment and the buildings, and to conclude the consulting services with approval of South African side

(2) Supervision Plan on Procurement and Construction

Judging from the scale of the Project, it is advisable that, in carrying out the aforementioned tasks, the consultant should dispatch one engineer to South Africa throughout the term of works. The Consultant shall also dispatch necessary consultants/engineers to the site at relevant occasions for inspection, instruction and coordination, and at the same time assign necessary engineers in Japan to establish a communication and support system. The consultant shall report the progress of the works, payment procedures, completion of construction of the facilities and installation of the equipment, and any other relevant matters to the concerned officers of the Japanese Government.

2-2-4-5 Quality Control Plan

Construction supervision under this Project is to be conducted in compliance with the following criteria in order to achieve the designated quality of construction work. These criteria are based on relevant standards of South Africa or Japan.

Table 2-14 Criteria for Quality Control

	Typical criteria for quality control			Remarks
	Items	Target value	Testing method	
Earth work	Inclination Accuracy of floor level Height of foundation Height of levelling concrete	Within accepted range +0～-5cm +0～-3cm ±1cm	Slant gauge, observation Levelling, observation As above As above	The consultant will instruct the Contractor to submit the Summary of construction techniques which include types of inspection, target value, contents of inspection, method of testing, curing, construction, and check prior to construction.
Re-bar work	Minimum concrete covering thickness	Sides not in contact with the earth 30m/m Sides in contact with the earth: Foundation 60m/m Others 40m/m	Observation, measurement	As above
	Processing precision	Tolerable size: Stirrup / hoop ±5m/m Others ±10m/m		
	Tensile strength	3 pieces taken from 1 lot at site (1lot= 20 tons for each diameter)	Tested at factory at the presence of consultant	
Concrete work (Freshly mixed concrete)	Compressive strength	Planned strength over 210kg/cm^2	3 samples x 3 types for every batch as well as every 150 m^3 (tested at site at the presence of consultant)	As above
	Slump level	15cm±2.5cm	Once for every batch as well as every 150 m^3 (tested at site at the presence of consultant)	
	Chloride level	Under 0.3kg/m^3	As above	
Masonry work	Compressive strength Other materials (cement, re-bars)	40～70kg/cm^2	Tested at manufacture at the presence of consultant Observation	As above
Plaster work Paint work Roof waterproofing work Doors / windows	Material, storage construction, compound, finishing thickness, curing, precision			As above
Plumbing work	Water supply pipe Sewage pipe	Air pressure test Water filling test	Tested at the presence of consultant	As above
Electrical work	Electrical cabling	Insulation resistance test Performance test	As above	As above

2-2-4-6 Procurement Plan

(1) Procurement of Equipment

1) Procurement of Equipment

Equipment procured shall be the product of either Japan or South Africa. The both governments may however allow procurement of the third country products considering competitiveness of price, ease of maintenance and other criteria below.

- The manufacturer has (a) local distributor(s) for maintenance in South Africa
- Spare parts and consumables are available locally

- The equipment that are widely used in South Africa
- The equipment that are procured within the E/N period

The equipment that contain the possibility of third country origin are as follows.

Table 2-15 Equipment that contain the possibility of third country origin

Equipment	Country
Infant Warmer	EU
X-ray Apparatus, basic screening unit	EU
Audiometer	US
Glucose Meter	US
High Pressure Steam Sterilizer	EU
Defibrillator	EU
Neonatal Monitor	EU
Diagnostic Set	US
ECG（6ch）	Switzerland
Pulse Oxymeter	EU
Peak Flow Meter	US
Bilirubin Meter	US
Cardiotocograph	EU
Hemoglobin Meter	EU
Autoclave	EU

2) Transportation Plan

a. Packing

Japan and the third country procured equipment shall be packed in wooden case and carried in a 20ft. container to avoid robbery during marine transportation.

b. Route

① Japanese Products and Third Country Products (for existing facilities)

Shipped from Japanese and third country port to Durban port by sea, sorted out at a warehouse near Durban port, then transported to each facility by truck.

② South African Products (for existing facilities)

Sorted out at a warehouse near Durban port, then transported to each facility by truck.

The equipment for the 3 new clinics shall be transported to a warehouse at Van Velden Hospital to be kept until construction work is finished. Installation of those equipment shall be controlled according to the progress of the construction work.

c. Vehicle

Vehicle for Mobile Clinic shall be handed over at each site.

(2) Procurement of Building Materials

All of the major building materials are produced and available in South Africa. Some of the primary parts of industrial products, such as generators, are imported, but it is possible to procure those products in local market through local distributors. Most of the major building materials are locally available or available in Polokwane, which is about 2 hours drive from the sites. Therefore, no problem will be expected regarding the procurement of repair parts and maintenance of equipment after completion of the Project.

Table 2-16 indicates origins of materials/equipment for building, electrical, plumbing and mechanical work and locations from where they can be procured.

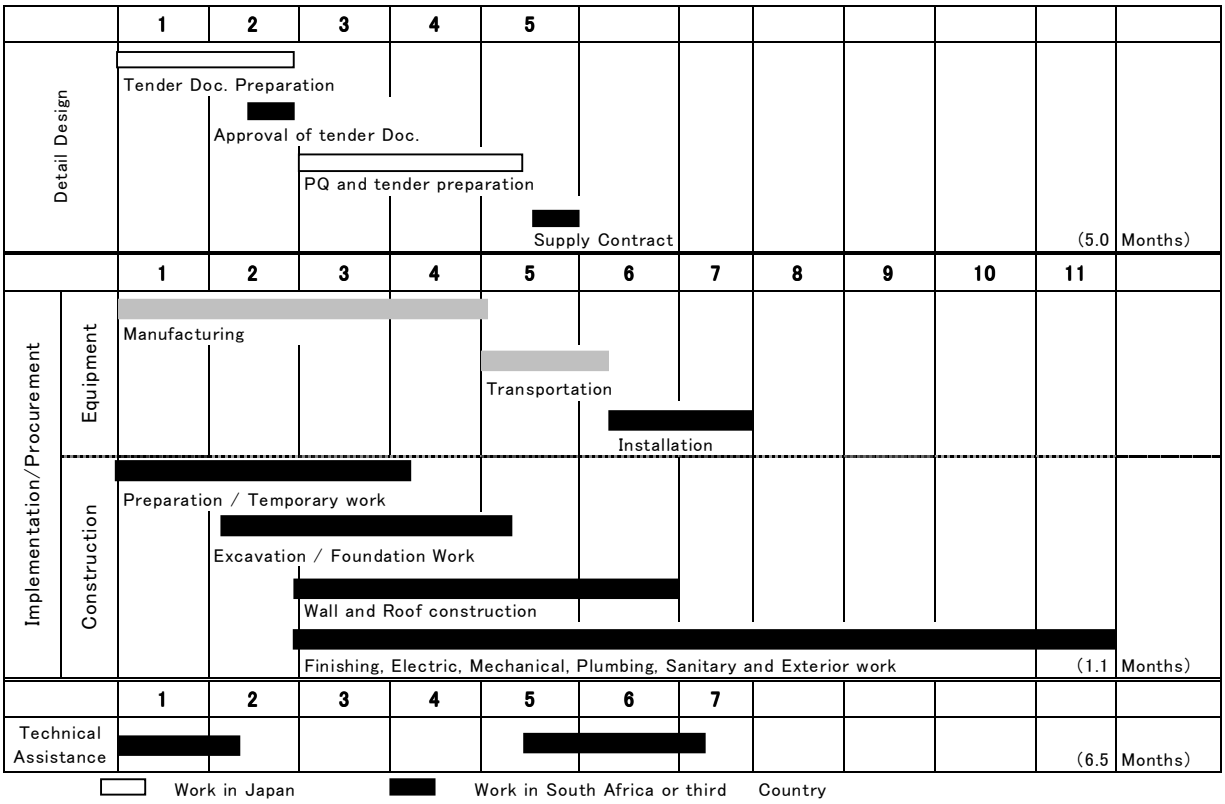
Table 2-16 Procurement Plan of Building Materials/Equipment

Material / Equipment		Country	Area	Remarks
Building	Cement	South Africa	All areas	Local products
	Sand / Gravel	South Africa	All areas	Local products
	Re-bar	South Africa	All areas	Local products
	Form	South Africa	All areas	Local products
	Aluminium windows	South Africa	Polokwane, Johannesberg	Local products
	Steel doors	South Africa	Polokwane, Johannesberg	Local products
	Hardware	South Africa	Polokwane, Johannesberg	Local products, Imported (Locally procured)
	Face brick	South Africa	Tzaneen, Polokwane, Johannesberg	Local products
	Floor tiles	South Africa	Tzaneen, Polokwane	Local products
	Paint	South Africa	Tzaneen, Polokwane, Johannesberg	Local products
Electrical	Distribution panel	South Africa	Johannesberg	Local products, Locally assembled with imported parts
	Lighting fixture	South Africa	Polokwane, Johannesberg	Local products, Locally assembled with imported parts
	Electric cable cover (PVC pipe)	South Africa	Polokwane, Johannesberg	Local products
	Electric wire, cable	South Africa	Polokwane, Johannesberg	Local products
Mechanical	Air-conditioning unit	South Africa	Polokwane, Johannesberg	Local products, Locally assembled with imported parts
	Ventilation fan	South Africa	Polokwane, Johannesberg	Local products
Sanitary	Sanitary fittings	South Africa	Tzaneen, Polokwane, Johannesberg	Local products, Imported (Locally procured)
	PVC pipe	South Africa	Tzaneen, Polokwane, Johannesberg	Local products

2-2-4-7 Implementation Schedule

When the Notes regarding implementation of the Project are exchanged between the Government of South Africa and the Government of Japan the work shown in Table 2-17 shall be executed accordingly.

Table 2-17 Implementation Schedule



(1) Detail Design

After conclusion of consultant agreement with the Limpopo DOHW, the consultant shall start preparing detail design drawings for construction work, equipment specifications and tender documents in accordance with the Basic Design Study Report. In the meantime the consultant shall also obtain approval for those documents from the South African side.

(2) Tender

The Supplier and the Contractor for implementation of the Project shall be selected through open tender. Tendering procedure shall start from a public announcement, pre-qualification, explanation and distribution of tender documents, questions and answers, submission of tender, tender evaluation and conclusion of supply

contract and construction contract. The South African side shall take the necessary measures to obtain land permission, building permit, working visa, etc. prior to the commencement of the works. The consultant shall assist these procedures.

(3) Construction Work and Equipment Work

Judging from the functions of the facility, scale of the project, technique required and the local conditions of construction industry, the overall project implementation period for both the construction work and equipment work will be 11 months if construction materials are procured without delay.

2-3 Obligations of the Recipient Country

The following tasks for the Project shall be carried out by the South African side within the stipulated period.

(1) Equipment Work

- To relocate and/or remove existing equipment and prepare the place where new equipment will be installed
- To provide space for temporary storage within the Project site
- To provide access way for transportation of the equipment
- To provide water supply (with bulbs), drainage (with end caps), power supply (with receptacles, breakers), medical gas supply, reinforcement of foundations, and so on, which is necessary prior to equipment installation

(2) Construction Work

1) Site and Exterior Work

- To secure land necessary for the Project
- To remove existing structures, trees and any other obstacles from the Project sites and to level the land
- To undertake incidental outdoor works, such as gardening and paving
- To construct a guardhouse and a generator room
- To construct fence around the site and a gate

2) Infrastructure

- To bring electricity up to the boundaries of the three clinic sites
- To bring telephone line up to the boundaries of the three clinic sites
- To provide water supply, including provision of a new bore well, up to the boundaries of the 3 clinic sites

3) Preparation for Construction

- To provide sites for temporary office, workshop and warehouse
- To provide temporary connection line of electricity, telephone, water supply

(3) Others

- To obtain the building permits for all the clinics and shelters
- To bear commissions, namely advising commissions of an Authorisation to Pay (A/P) and payment commissions, to a Japanese bank for the banking services based upon the Banking Arrangement (B/A)
- To ensure prompt unloading and customs clearance of the products purchased under the Japan's Grant Aid at ports of disembarkation
- To exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in South Africa with respect to the supply of the products and services under the verified contracts
- To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into South Africa and stay therein for the performance of their work
- To provide necessary permissions, licenses, and other authorisation for implementing the Project, if necessary
- To bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project

2-4 Project Operation Plan

2-4-1 Project Team in Limpopo DOHW and Maintenance System

As described in 2-2-4, the implementing organization is the Limpopo DOHW, in which a project team consisting of nine members headed by Mr. J. Ledwaba, Senior Manager, Devolution Support Directorate, DHS Chief Directorate, has been formed. In Limpopo DOHW, Physical Resource Management Sub-directorate, Strategic Management and Planning Directorate, Strategic Management Services Branch is in charge of construction, facility and installed equipment. In DHS Chief directorate, Regional Hospital Division, District Hospital Division and District Health Division are in charge of other medical equipment at each level. As of the organizational change in 2003, actual management of maintenance is done by each hospital and district health office (for Health Centres and Clinics). Therefore, the Limpopo DOHW only gives advice to each facility on budget allocation, administration of maintenance, etc.

2-4-2 Project Implementation Structure of the Medical Facilities

The facilities to be constructed under this Project will be operated by the existing operation and management structure. The equipment to be supplied under this Project is basically replacement of the existing ones and the specifications and quantities of the equipment plan are made based on the existing manpower of each facility. Therefore no problem is foreseen for operation and management of the new facilities and equipment.

Letsitele clinic, which is being operated within several rented rooms and does not have any guards at present, will need to hire two guards upon completion of the Project. Though this will be an increase in staff number, it will not be a problem because this is the usual number of guards for a clinic.

2-5 Estimated Project Cost

2-5-1 Estimated Project Cost

Estimated project cost required for realization of the Project under the conditions described in (3) Conditions of Estimation is Japanese Yen 521 million. (Japan's Grant Aid:476 million, South African side:45 million).

(1) Project Cost borne by Japan

The Project cost borne by Japan is shown in Table 2-18.

Table 2-18 Project Cost borne by Japan

Item	Amount (JY1,000)
1 Equipment Procurement	191,400
a. Letaba Regional Hospital	78,800
b. Dr. CN Phatudi Hospital	32,000
c. Health Centres	11,500
d. Clinics	42,400
e. Vehicles for Mobile Clinic	26,700
2 Construction Work	179,600
a. Clinic (3 sites)	162,800
①Letuitele Clinic	54,600
②Mohlaba Clinic	54,400
③Maake Clinic	53,800
b. Visiting Point Shelter (4 sites) Burgersdop, Khujwana, Mogoloboto, Pharare	16,800
3 Design and Supervision	105,400
Grand Total	476,400

This cost estimation is provisional and would further be examined by the Government of Japan for the approval of the Grant

(2) Project Cost borne by South Africa

The Project cost borne by Japan is shown in Table 2-19

Table 2-19 Project Cost borne by South Africa

Category	Total (ZAR 1000)
1 Removal of existing equipment	8
2 Preparation work	7
3 Electricity and water supply and telephone connection cost	673
4 Guardhouse for clinics	266
5 Fences and gates for clinics	99
6 VAT (14%)	1,719
7 Commission on Authorization to Pay (A/P)	35
Grand Total	2,807

1) Breakdown of Removal of existing equipment

Equipment removed	Hospital	Total (ZAR)
X-ray apparatus	Letaba	4,941
High pressure steam sterilizer	Letaba	1,005
Dental unit	Letaba	1,005
	DR.CN Phatudi	924
Total (ZAR)		7,875

2) Breakdown of Preparation work

Equipment installed	Hospital	Construction	Total (ZAR)
X-ray apparatus, basic screening unit	Letaba	Distribution boad	1,161
High pressure steam sterilizer	Letaba	Water supply	1,224
Dental unit	Letaba	Plumbing	924
	DR.CN Phatudi	Plumbing, water supply, drainage	3,210
Total			6,519

3) VAT = ZAR 1,719,000

1. VAT on consultant fee

Approximately 25 % of consultant fee including hotel, car, etc.

￥117,000,000. X0.25X0.14＝￥4,095,000.（ZAR253,000）

2. VAT on procurement of equipment

Approximately 20% of equipment cost procured in South Africa

¥192,000,000.X0.2X0.14=¥5,376,000. (ZAR332,000)

3. VAT on construction cost

Approximately 100 % of Direct Expenses of construction work

¥131,000,000.X0.14＝¥18,340,000.（ZAR1,134,000）

4) Commission on authorization to pay (A/P) = ZAR 35,000

Fund from the Japanese Government will be transferred to an account of National Department of Health after Banking Arrangement (B/A). The 0.1 % commission will be charged on consultant fee, equipment procurement and construction.

1. Commission on consultant fee

¥5,000＋¥117,000,000X0.001=¥122,000.（ZAR7,000）

2. Commission on equipment procurement

¥5,000＋¥192,000,000X0.001=¥197,000.（ZAR12,000）

3. Commission on construction

¥5,000＋¥247,000,000X0.001=¥252,000.（ZAR16,000R）

(3) Conditions of Estimation

- Estimation date ： June, 2003
- Exchange rate ：US$1＝JY120.35

  1Rand＝JY16.17（Based on TTS for the last 6 months）
- Construction period ：1 phase in the 1 fiscal year. The period of detail design, equipment procurement and construction work are as shown in Table 2-16.

2-5-2 Operation and Maintenance Costs

(1) Equipment

The budget for equipment operation and maintenance are allocated from “Programme 8, Health Facilities Management” drafted by the Limpopo DOHW, as follow.

Table 2-20Maintenance Budget (ZAR)

Facility \ Fiscal Year		2002	2003
Letaba	Facility	551,046	360,000
	Equipment	322,363	500,000
Dr. C. N. Phatudi	Facility	406,676	260,000
	Equipment	237,906	242,754
Health Centre/Clinics	Facility	n.a.	1,095,000
in Mopani District	Equipment	n.a.	339,856
Maintenance budget	Facility	21,999,932	22,027,300
all province	Equipment	12,000,000	14,972,700
Program Total*		217,574,000	190,210,000

Souce : Limpopo DOHW and Mopani District Office

* Figure of 2002 corresponds to Programme 6 Health Science and Training and 2003 to Programme 8 Management

Table 2-21shows an estimation of annual costs of operation and maintenance including consumables, spare parts and maintenance contract necessary for implementation of the Project.

Table 2-21 Operation and Maintenance Costs of Each Facility (ZAR)

		Maintenance Contract Total	Consumables/ Spare Parts Total	Facility Total
	All Facilities Total(ZAR)	83,547	798,267	881,814
Hospital	Letaba	67,904	71,117	139,020
	Dr. C.N.Phatudi	15,644	78,856	94,500
Health Centres	Mgodeni Grace	0	42,278	42,278
	Nkowankowa	0	42,278	42,278
	Shilvane	0	37,751	37,751
	Julesburg	0	37,751	37,751
Clinics	Makgope	0	17,052	17,052
	Mamitwa	0	17,052	17,052
	Nyavana	0	17,052	17,052
	Mokgwathi	0	17,052	17,052
	Ramotshinyadi	0	17,052	17,052
	Ooghoek	0	17,052	17,052
	Dr.Hugo Nkabinde	0	17,052	17,052
	Letsitele	0	19,433	19,433
	Mohlaba	0	19,433	19,433
	Khujwana	0	17,052	17,052
	Dan	0	17,052	17,052
	Mariveni	0	17,052	17,052
	Tzaneen	0	37,751	37,751
	Motupa	0	17,052	17,052
	Morapalala	0	17,052	17,052
	Madumane	0	17,052	17,052
	Morutji	0	17,052	17,052
	Carlotta	0	17,052	17,052
	Tours	0	17,052	17,052
	Mogapeng	0	17,052	17,052
	Zangoma	0	17,052	17,052
	Jamela	0	17,052	17,052
	Mogoboya	0	17,052	17,052
	Maake	0	19,433	19,433
	Lenyenye	0	17,052	17,052
	Lephephane	0	17,052	17,052
	Moime	0	17,052	17,052

Those 2 tables above indicate that the operation and maintenance costs borne by each facility will be within their budget of FY 2003. Percentage of the operation and maintenance costs over the budget is as follow.

Letaba Regional Hospital 27.8%

Dr. CN Phatudi District Hospital 38.9%

Health Centres and Clinics 45.1%

(2) Facility

The present operation and maintenance of the clinics in Limpopo province are managed by the sub district

offices in charge of each clinic. The expenditures are divided only into personnel expenditure and others. The other expenditures are disbursed as they occur and no statistical data on each clinic have been prepared.

The operation and maintenance cost of the three clinics at Letsitele, Mohlaba and Maake after completion of the Project is determined as follows.

- Personnel expenditure

  There will be no increase in number of staff at Mohlaba and Maake clinics after completion of the Project because the clinics will be run by the same number of staff. Letsitele clinic on the other hand will have an increase of personnel expenses for security guards who need to be newly hired because there are no guards stationed at the moment since the present operation is carried out in a rented place within a store complex.

  4 security guards (2 shifts) x Rd.4,850/person･month = Rd.19,400/month
- Administrative, stores and livestock, and equipment expenditure

  This expenditure will be the same as the present one.
- Expenditure on heat, electricity and water

  An estimated cost on heat, electricity and water is Rd.8,500/month per clinic. Because the present expenditure is unknown, this whole amount is indicated as an increase for the sake of calculation.
- Maintenance cost of each clinic

  According to the DOHW, maintenance cost is to be calculated as 3% of the construction cost (net building cost) per year which is about Rd.4,500/month per clinic. For the same reason as heat, electricity and water cost, this whole amount is indicated as an increase.

Based on the above conditions, an expected increase in operation and maintenance cost of the clinics per month are calculated as follows.

Table 2-22 Expected Increase in Operation % Maintenance Cost (ZAR)

Name	Personnel	Administrative, Stores, livestock, and Equipment	Heat, Electricity, and Water	Maintenance	Total Increase
Letsitele	19,400	No change	8,500	4,500	32,400
Mohlaba	No change	No change	8,500	4,500	13,000
Maake	No change	No change	8,500	4,500	13,000

2-6 Other Relevant Issues (Technical Assistance by Consultant)

(1) Background

All the equipment in the health facilities under the Limpopo province are divided into 2 categories, the equipment that require installation work such as X-ray unit, Steam sterilizer, Operation light, etc. and the equipment other than that. The former is administered by Physical Resource Management Sub-directorate, Strategic Management and Planning Directorate, Strategic Management Services Branch of the Limpopo DOHW. Each facility requests the Sub-directorate for repair or checkups and then the Sub-directorate requests the agents or distributor of the manufacturers to dispatch the engineer to each facility.

Other basic equipment are administered by each relevant section of the Limpopo DOHW or district/sub-district health office. When requested by a facility, the section places an order for repair to agents.

Having no budget or staff for maintenance of their own, the health facilities depend for equipment maintenance on the relevant section of Limpopo DOHW, which can respond only within the budget.

The largest problem that Limpopo DOHW has faced is the situation where no unified responsible agents for equipment maintenance exist in either the Limpopo DOHW or health facilities.

To cope with the situation, the Limpopo DOHW, as of 2003, decided to transfer all the responsibility for equipment maintenance to regional and district hospital and allocate the budget for equipment maintenance within the discretion of them.

Even Letaba Regional Hospital, the only hospital where specialized doctors are stationed, does not have a system of medical equipment maintenance. They only have a list of equipment in Finance, Procurement and IT Management Section.

So Letaba Hospital decided to establish a system of medical equipment in Finance, Procurement and IT Management Section to make the best use of the budget. They started with sending a manager of the above section to the counterpart training for medical equipment organized by JICA and wishes that the manager will play an important role in establishing a new Equipment Management Section. During the Explanation of Draft Report, the study team confirmed that a Medical Equipment Management section

would be established under Subdirectorate: Technical Support Services (headed by Mr. Banda).

Under the circumstances in which need for establishing an Equipment Management Section and a system of management of their own, Letaba hospital requested the Basic Design study team for Technical Assistance by Consultant on instruction of computerized equipment management as a soft component of the Project.

(2) Purpose

To establish a medical equipment management system designed for effective use of budget and for making the best use of equipment.

(3) Outputs

1) To be able to grasp the situation of medical equipment based on the ledger for equipment management

2) To be able to grasp the annual cost for maintenance

(4) Activities

First phase: Completion of equipment management ledger and centralised management of equipment

1) Assist establishment of an Equipment Management Section in Letaba Hospital headed by Mr. Derrick Baloyi, who should have finished the counter part training for equipment management by JICA
2) Assist to extract the data of medical equipment from the list of equipment used by Mr. Baloyi and then define the name of equipment.
3) Discuss necessary item to be used in the computerized ledger and assist to make a formula for the ledger. Also assist data input.
4) Discuss the method of requesting quotation and assist to make slips for repair. Assist to establish a system for storing and supplying spare parts and consumables.
5) Assist to pick the equipment that need spare parts, consumables, periodical checkups and maintenance contract from the ledger.

After the First phase, the trainee should be able to complete the equipment management ledger. Then the

trainee requests quotation for spare parts, consumables, periodical checkups and maintenance contract to manufacturers or agents.

Second phase: Making an annual maintenance budget

1) Assist to check the quotation from manufacturers or agents.
2) Assist to request additional quotation, if necessary.
3) Discuss the possibility of outsourcing of maintenance contract (what equipment and how)
4) Assist to classify the data of annual maintenance cost, spare parts, consumables and outsourced maintenance contract. Also assist to input the data of collected quotation.
5) Assist to establish an annual maintenance budget, calculate the cost of outsourced maintenance contract and draft a policy for allocation of maintenance budget.

(5) Inputs

Management Method of Equipment

1 Japanese Consultant x 3.5 months (0.34M/M in Japan, 3.16M/M in South Africa)

- First phase, 1.5 months (0.17M/M in Japan, 1.33M/M in South Africa)
- Second phase, 2.0 months (0.17M/M in Japan, 1.83M/M in South Africa)

A Japanese consultant shall be dispatched twice for assistance of the above activities.

The first stage shall start immediately after installation of equipment under the project.

The second stage shall start after completion of construction work under the project.

The Japanese consultant shall have wide knowledge of medical equipment and be able to instruct on management of spare parts and consumables. He/she also shall have at least 12 years of experience including an experience of equivalent technical assistance.

Table 2-23 Activities of Technical Assistance

		Activities	In Japan (Day, MM)	In South Africa (Day, MM)	Japan	South Africa				
					Consultant	Letaba Hospital			Limpopo DOHW	Maker / Agent
					Japanese Consultant	Medical Equipment Management	Material Management	CEO, Manager	Physical Resource Management	
First phase		Work in Japan (sort out equipment, etc)	3		○					
	1	Assistance in establishment of an Equipment Management Section		2	○	○	○	○		
	2	Assist to extract data and define the equipment title		9	○	○	○		○	
	3	Discuss the necessary item for ledger and make formula.		12	○	○		○	○	
		Assist for data input		5	○	○				
	4	Assist for method of requesting repair and for making slips		10	○	○	○	○	○	
	5	Assist to pick the equipment for requesting quotation		2	○	○			○	
		Work in Japan (organize data, etc)	2		○					
First phase Total			5 days 0.17MM	40 days 1.33MM						
		Collection of quotation and data input by trainee (for 3 months)				○				○
Second phase		Work in Japan (sort out spare parts, consumables, etc)	3		○					
	1	Check the quotation		10	○	○				
	2	Assist for additional quotation, in necessary		3	○	○				○
	3	Assist for outsourced maintenance contract.		7	○	○		○	○	
	4	Assist to classify the collected data		15	○	○				
		Assist for data input		5	○	○				
	5	Assist to establish an annual maintenance budget		15	○	○	○	○	○	
		Work in Japan (report to JICA, etc)	2		○					
Second phase Total			5 days 0.17MM	55 days 1.83MM						

(6) Final Documents

1) Equipment Maintenance Ledger

2) Slips for equipment repair and spare parts/consumables

3) Annual Maintenance Plan (Draft)