Chapter 2 Contents of the Project

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2-1 Basic Concept of the Project

The Government of Mozambique's five-year plan (2000-2004) targets economic and social development. To this end, the Government of Mozambique recognizes that freeing its people from poverty is its greatest challenge. As part of its strategy to face this challenge, it has drawn, up the "Action Plan for the Reduction of Absolute Poverty 2001-2005, PARPA," the main pillar of its basic national policy.

Under the national policy, the country's health sector attaches great importance on qualitative and quantitative improvements in primary care in the country. More specifically, the health sector aims to achieve the following three goals: 1) improve the quality of medical care service, 2) expand the quantity of medical care service, and 3) improve the health sector's planning and managing capabilities. The Ministry of Health of Mozambique worked out the "Strategic Plan for the Health Sector 2002-2005, PESS" on the basis of the central government's basic national policy (PARPA). In the belief that the improvement of the quality of healthcare service is the key to the "reduction of absolute poverty," the Ministry assigns the highest priority to developing high-quality human resources in the health sector, namely highly trained medical professionals. The relation between the Government of Mozambique's basic national policy and the objective of this project can be illustrated as follows.

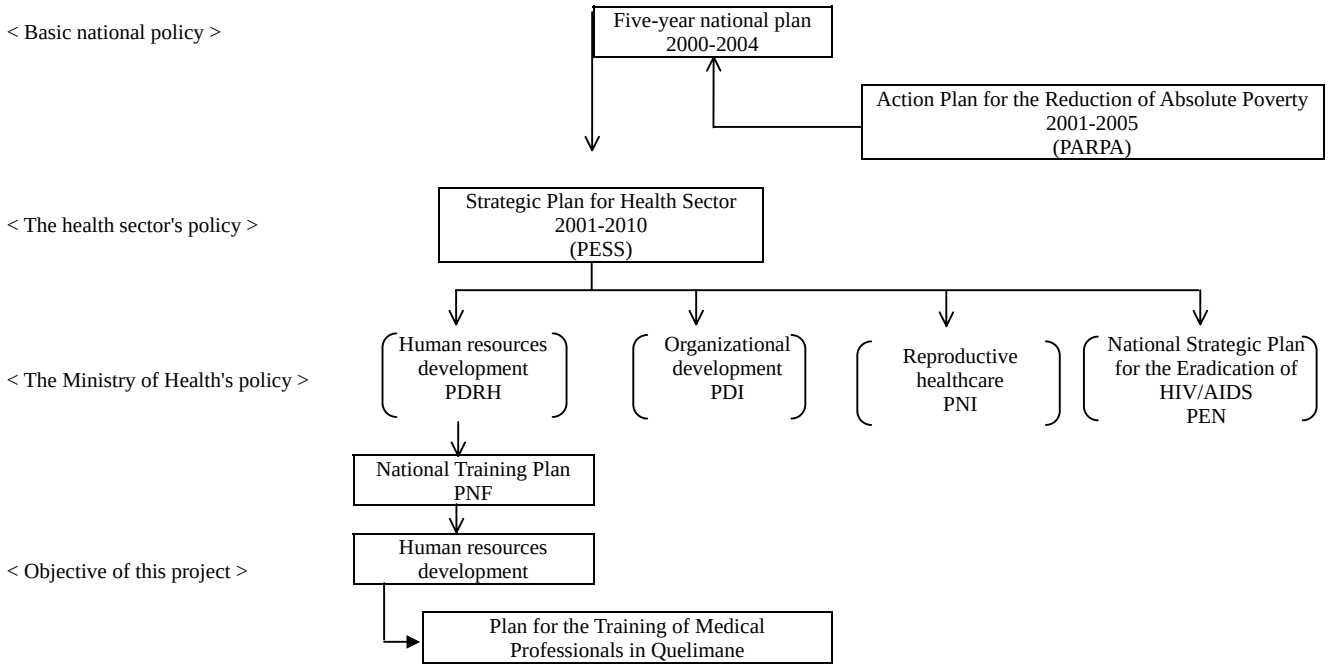


Fig. 2-1 Relation Between Human Resources Development Plan and the Government of Mozambique's Basic National Policy

There are currently four institutes of health science in Mozambique that offer intermediate-level training courses (located in Maputo, Beira, Quelimane and Nampula) and 10 training centers that offer basic and primary level courses (located in Chicumbane, Chikete, Chimoio, Tete, Mocuba, Pemba, Lichinga, Inhambane, Nhamatanda and Massinga).

The Health System in Mozambique is composed of a Central Hospital, the top referral hospital in the country, with provincial hospitals, district hospitals, health centers, and health posts operating peripherally throughout the country. Unfortunately, the referral system is functioning poorly due to the shortage of medical professionals who link with people and hospitals in the community. In addition, Mozambique still faces an absolute shortage of medical professionals. Training center graduates entering the healthcare system still lack knowledge to reliably run the health posts. Therefore, as a new policy, the core efforts to improve the quality of medical services in Mozambique will focus on basic-level and intermediary-level healthcare.

In this context, this project seeks to improve the facilities and equipment at the Quelimane Institute of Health Science as part of PARPA, thereby improving, both qualitatively and quantitatively, the institute's basic/entry level and intermediate-level training courses.

Under the conditions stated above, this project seeks to improve the educational environment and curricula of the Quelimane Institute of Health Science located in the province of Zambezia. More specifically, this project seeks to provide new facilities and educational equipment for the institute of health science.

The expected immediate beneficiaries are the 270 students to be given the opportunity to train at the institute and fulfill their ambition of becoming medical professionals in Mozambique. The health care service provided by the graduates from this institute in various parts of the country is also expected to enhance the overall quality of healthcare service in the country.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Design

Upon completion of this project, the institute will offer a total of nine training courses, namely four basic courses with four classes and five intermediate-level courses with five classes (replacing the present curricula of four basic courses with five classes and one intermediate-level course with one class).

Table 2-1 Future Courses Offered at Quelimane Institute of Health Science

Basic level (period)			Intermediate-level (period)		
1.	Pharmacy assistant	(18 months)	1.	Pharmacy technician	(30 months)
2.	General medical assistant	(18 months)	2.	General medical technician	(30 months)
3.	Mother/child healthcare assistant	(18 months)	3.	Mother/child healthcare technician	(30 months)
4.	General nursing assistant	(18 months)	4.	General nursing technician	(30 months)
			5.	Laboratory technician	(30 months)

The most important point to assure in working out the equipment plan for the project is that all the equipment is suitable for the functions and activities required of the facilities. Equipment procured under this project should be selected by giving due consideration to the activities carried out in the existing facilities, the institute's curricula, the technical level of the institute's staff and the institute's capability.

Quelimane Institute of Health Science to be constructed will offer a total of nine courses--four basic courses (General medical assistant, Assistant pharmacist, General nursing assistant and Mother/child healthcare assistant) and five intermediate-level courses (General medial technician, Pharmacy technician, Laboratory technician, General medical technician, and Mother/child healthcare technician). The equipment plan for this project should therefore be consistent with this system. Since the dormitories, instructor’s accommodations, and auditorium are an integral part of the institute's educational activities, the equipment plan should include the equipment to be installed in these facilities.

In order to avoid problems attributable to the duplication of existing equipment and the equipment to be procured for this project, the existing equipment in short supply should be replaced with the equipment to be procured. In principle, the equipment plan does not include expendables, but those indispensable in actual training should be included in the new facilities.

The project site is located approximately 10 kilometers northeast of the city of Quelimane in the direction of the road leading to Zalala Beach, on the southeastern side of the road. The level of the ground of the project site is almost the same as that of the road. The perimeter is rectangular in shape (approximately 240 meters by 150 meters) with a rectangular lot attached on the southwestern side measuring approximately 170 meters by 50 meters.

Approximately one kilometer behind the project site is a lake called Lago Segundo. The water level in the lake rises during the rainy season and threatens to flood the project site. In working out the facility plan, therefore, it will be necessary to place the building higher than the road in order to avoid flood damage.

The facility arrangement plan should include a zoning scheme that indicates the distinction between the public and private areas by clearly identifying the function and role of each facility. The following diagram shows zoning by function.

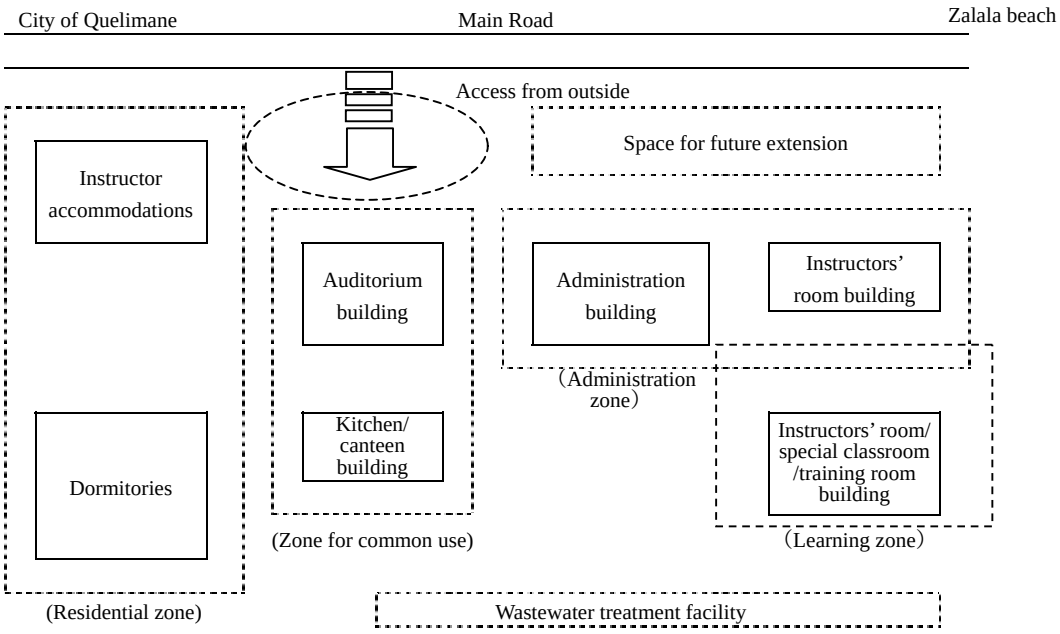


Fig. 2-2 Outline of the Zoning Scheme

(2) Design Policy Relative to Natural Conditions

The facility plan for this project will specify that maximum use should be made of natural air conditioning in order to minimize the use of mechanical air conditioning.

The soil at the project site is rather sandy and unsatisfactory, with an average bearing capacity of 3 tons/m^2. For this reason, the facilities to be newly constructed under this project should all be single-story buildings.

Since there are no public sewage systems available in the project site, wastewater from the new facilities is to be discharged directly into the soil. This presents a problem, however, as the sandy soil at the project site contains a fine silt that makes it rather impermeable. Furthermore, the groundwater level rises during the rainy season, which makes the soil even more impermeable at that time of year. In selecting the wastewater treatment method, careful attention should be paid to the possible adverse effect of wastewater treatment on the surroundings of the project site.

(3) Design Policy Relative to Socio-economic Conditions

The 20-year civil war in Mozambique was brought to an end in 1992 with the conclusion of a comprehensive peace treaty. As a result, the political situation stabilized and financial assistance from foreign aid organizations followed.

In the country's health sector, however, health-related indicators still remain at low levels. Some improvements are being made with the support of foreign aid organizations, but the underdevelopment of the health service system due to the shortage of medical professionals and medical facilities/equipment poses a serious problem.

As budgetary appropriations for the implementation of this project are limited, costs of facility operation upon completion of this project should be minimized by carefully studying the conditions of the existing facilities of the institute.

As part of the overall plan to improve the country's health sector now being implemented within the framework of the World Bank's "Health Sector Recovery Program," many programs and projects are being carried out by other foreign aid organizations.

Assistance to the health center is referred to as "Sector-wide Approach" (SWAp). The framework for coordination among foreign aid organizations and promotion of assistance is taking shape through a system for sharing goals among Mozambique, foreign aid organizations and NGOs.

In organizing this project, due consideration should be given to SWAp activities in order to avoid duplication of the details of individual programs and projects.

(4) Present Conditions of the Local Construction Industry

Mozambique is dependent on foreign countries for the supply of most building materials other than basics such as cement, aggregate, and wooden materials. As most of the imported building materials come from South Africa, the building materials for the new facilities for the institute should be procured from that source as well.

Mozambique has its own building standards, but they have remained unrevised for a long time and do not reflect the present conditions of the local construction industry. As a result, the selection of suitable building standards is left to the discretion of individual architects. In many cases, however, the building standards of South Africa (SABS) are adopted from the standpoint of availability of building materials. The SABS are to be adopted in designing the new facilities to be procured under this project.

It should be noted that the design and construction of every facility that falls within the jurisdiction of the Ministry of Health are subject to the approval of the Ministry's project planning and coordination office (GACOPI). Building permits must also be obtained from the City of Quelimane after obtaining GACOPI's approval.

(5) Design Policy Relative to the Use of Services of Local Contractors

The services of local contractors are to be utilized as subcontractors of the Japanese contractor for the purpose of efficiency in maintaining and managing the new facilities. At the same time, the construction work under this project should be carried out using locally available building materials and familiar construction methods widely used in the country.

In principle, equipment that needs to be periodically maintained and repaired by its manufacturers (e.g., expendables, reagents, and replacement parts), should have distributors in the country or South Africa.

(6) Design Policy Relative to the Project Implementing Organization's Facility/Equipment Operating and Maintaining Capability

After completion of the new facilities, heating and lighting expenses and part of personnel expenses are to be defrayed from the budget of the province. Since budgetary appropriations for heating and lighting expenses, in particular, are limited, the design of the new facilities should be such that heating and lighting costs may be minimized. This arrangement will minimize the provincial government's financial burden relative to heating and lighting.

The suppliers of the equipment should provide training courses at the time of its delivery. In addition, technical data, manuals, a list of distributors, and other data crucial for the maintenance and management of the equipment should be prepared.

- Method of operation
  (outline of equipment, procedural steps, important points to note during operation)

- Method of periodical maintenance and management (cleaning/adjustment, minor repairs, etc.)

(7) Design Policy Relative to Grading of the Facilities/Equipment

1) Facilities

There are four institutes of health science in Mozambique, which offer intermediate-level training courses. Quelimane Institute of Health is one of them. As in the case of the three other institutes of health science, it is necessary to grade the new facilities according to the functional standard applicable to these institutes of health science.

2) Equipment

In the process of selecting equipment and deciding the required quantities and details of expendables and attachments, each piece of equipment should be graded and the quantity should be decided with reference to the details of the curricula and existing equipment.

① Specifications

The project should adopt specifications applicable to equipment of a type widely used in the country's institutes of health science and not unduly, difficult to operate, maintain or manage. Unlike that in use in hospitals, the equipment to be procured for the institute is to be used mainly for educational purposes and therefore does not require large quantities of expendables. In order to save maintenance and management costs, relatively simple specifications should be adopted. As power supplies are unstable (i.e., frequent voltage variations and power stoppages), a voltage stabilizer should be attached to each of the precision instruments (computers and so on).

② Quantity

Each item of equipment should be procured in a minimum quantity for the nine courses (nine classes; enrollment quota for each class: 30). The use of equipment in training is to be shared by a number of students under an arrangement that will not interfere with the actual training. The maximum number of articles of furniture to be installed in the dormitories should be decided according to the enrollment quota of the institute.

(8) Design Policy Relative to the Method of Construction/Procurement of Building Materials and the Term of the Construction Work

The construction industry in Mozambique is small in scale. Most of the building materials used in the country are imports. In addition, the number of skilled construction workers is limited. For these reasons, building materials that can be easily procured locally and familiar construction methods widely used Mozambique should be adopted for the project to reduce the chances of trouble during construction.

Electrical equipment and medical equipment for training that need to be maintained and managed and require the use of expendables should be procured in the country or in South Africa so that they can be easily maintained and managed after completion of this project.

It will take at least one month to follow the procedure for receiving exemption from customs duty. It will therefore be necessary to control the project implementation schedule by closely consulting with the project implementing organization in advance to ensure the smooth implementation of the project.

2-2-2 Basic Plan (Facility Plan/Equipment Plan)

2-2-2-1 Construction Plan

(1) Facility Plan

In the course of our consultation on the planned facilities, we have considered the following requests regarding the details and size of the planned facilities.

- Due consideration should be given to the present conditions of the institutes of health science and training centers, all of which operate under the jurisdiction of the Ministry of Health of Mozambique.
- Specifications that will help minimize facility/equipment maintenance and management costs after the completion of the project should be adopted.
- Building standards applied in advanced countries, such as the SABS, should be adopted.

In response to these requests, joint examination of the type and size of the existing facilities was conducted on the basis of the present conditions of Beira Institute of Health Science, Numpula Institute of Health Science, and Inhambane Training Center.

(2) Enrollment Quota for Quelimane Institute of Health Center

Quelimane Institute of Health Science is one the four institutes of health science in the country

(Maputo Institute of Health Science, Nampula Institute of Health Science, Beira Institute of Health Science and Quelimane Institute of Health Science)).

The following table shows the number of applicants and the number of successful applicants for 2002 and 2003 at Quelimane Institute of Health Science. Although the institute invites applications and holds entrance examinations, it should be noted that it cannot enroll all successful applicants. Thus, some are forced to enroll in other institutes.

Table 2-2 No. of Students to Be Admitted, No. of Applications, and No. of Students Enrolled at Quelimane Institute of Health Science

Course	Level	No. of students to be admitted	No. of applicants	No. of successful applicants	Date of announcement of successful applicants	Institute of health science to enroll successful applicants
General nursing assistant	Basic	30	46	32	2002.07.12	Mocuba
General medical assistant	Basic	8	28	10	2002.07.12	Quelimane
Mother/child healthcare assistant	Basic	6	24	8	2002.07.12	Tete
Mother/child healthcare assistant	Basic	10	35	12	2002.11.22	Quelimane
General nursing assistant	Basic	10	7	4	2002.11.22	Quelimane
General medical assistant	Basic	6	78	11	2003.07.03	Chimoio
Mother/child healthcare assistant	Basic	5	12	8	2003.07.16	Beira
Pharmacy assistant	Basic	4	5	4	2003.07.16	Beira
General medical assistant	Basic	-	6	6	2003.08.06	Chimoio
Mother/child healthcare assistant	Basic	-	15	13	2003.08.06	Quelimane
General medical assistant	Basic	4	22	8	2003.12.04	Nhamatanda
Mother/child healthcare assistant	Basic	6	33	12	2003.12.04	Pemba
General nursing assistant	Basic	20	54	38	2003.12.04	Mocuba
Preventive medical assistant	Basic	3	19	4	2003.12.04	Inhambane
Total			384	170		
Laboratory technician	Intermediate	4	10	6	2002.07.12	Tete
General medical technician	Intermediate	6	44	8	2002.11.22	Nampula
General medical technician	Intermediate	-	189	33	2003.07.25	Quelimane
General medical technician	Intermediate	-	37	37	2003.08.06	Quelimane
General medical technician	Intermediate	-	35	35	2003.08.16	Quelimane
Psychiatric technician	Intermediate	3	19	2	2003.12.04	Maputo
General medical technician	Intermediate	10	95	26	2003.12.04	Quelimane
Anesthesiology technician	Intermediate	3	5	4	2003.12.04	Beira
Total			434	151		

The Province of Zambezia is expected to continue suffering both a qualitative and quantitative shortage of medical professionals. Under these circumstances, the number of applicants for admission to Quelimane Institute of Health Science is unlikely to fall short of the institute's quota.

The following table compares the quotas for the Quelimane Institute of Health Science, Beira Institute of Health Science, and Nampula Institute of Health Science.

Maputo Institute of Health Science was excluded because it is located in an area with a large population and therefore is very large in scale.

Table 2-3 Comparison of Enrollment quotas at the Three Institutes of Health Science

Name of Institute	enrollment quota for	No. of courses	No. of classes	No. of Instructors	
				Full-time	Part-time
Nampula	315	10	10	22	50
Beira	320	10	10	27	60
Quelimane (Plan)	270	9	9	39	-

Upon completion of this project, Quelimane Institute of Health Science is to operate with an official enrollment quota of 270 students. Compared with Beira Institute of Health Science and Nampula Institute of Health Science, the planned scale of the institute is judged to be feasible.

(3) Determination of the Number of Instructors

When Quelimane Institute of Health Science opens to offer new courses, it is to operate with a total of 94 staff members, an increase of 39 from the present number of staff (56: 41 (full-time) plus 15 (part-time)). Of the 94 staff members, 39 are to be instructors (including curriculum advisors), 8 more than the total number at present (31: 16 (full-time) plus 15 (part-time)). All of these instructors are to teach intermediate- to- advanced-level courses (mostly advanced-level courses). The instructors newly recruited are to train intermediate-level medical professionals.

Table 2-4 Instructors to Work at the Quelimane Institute of Health Science (plan)

Full-time

Category	Level	No. of instructors	Department/section
Advisor	Advanced	4	Educational Affairs Dept.
Health technician	Intermediate	1	Instructors Section
Health technician	Intermediate	5	Same as above
Health technician	Intermediate / expert	5	General medical technician Course
Senior-level expert	Advanced	1	Same as above
General nurse	Intermediate	4	Mother/Child Healthcare Nursing Course
Senior-level expert	Advanced	2	Same as above
Pharmacy technician	Intermediate	4	Pharmacist Course
Senior-level expert	Advanced	1	Same as above
Laboratory technician	Intermediate	4	Laboratory Technician Course
Senior-level expert	Advanced	2	General nursing
Psychiatrist	Advanced	1	Instructors Section
Anthropologist	Advanced	1	Same as above
Preventive medical technician	Intermediate	1	Same as above
Professor	Advanced	2	Mathematics/Physics
Professor	Advanced	1	Chemistry/Biology
Librarian	Intermediate	1	Library
Health technician	Basic	2	Same as above
Administration technician	Intermediate	1	Administration Dept.
Administration technician	Intermediate	1	Same as above
Accountant	Basic	2	Same as above
Clerk	Basic	4	Same as above
Office assistant	Elementary	20	Same as above
Chauffeur	Basic	4	Same as above
Guard	Elementary	4	Same as above
Electrician	Basic	1	Maintenance Dept.

Category	Level	No. of instructors	Department/section
Carpenter	Basic	1	Same as above
Plumber	Basic	1	Same as above
Gardener	Elementary	4	Same as above
Dormitory superintendent	Intermediate	1	Dormitory
Cook	Basic	8	Kitchen
Total		94	

The Ministry of Health of Mozambique worked out the staffing plan for Quelimane Institute of Health Science to be opened. The details of the plan are shown in the above table. The number of instructors, 39, forms a basis both for the management of this project and the determination of the project scale. The instructors, whom are to number 39 in total, form the basis both for the management of this project and the determination of the project scale is Six of the instructors are to teach the General Medical Technician Course, 6 are to teach Mother/Child Healthcare Nursing Course, 6 are to teach Pharmacist Course, 4 are to teach the Laboratory Technician Course, 5 are to teach General Nursing Course, 4 are serve as administrators (including the principal and curriculum coordinator), 3 are to teach general subjects, and 6 are to teach special subjects.

The following table shows the results of calculation of the necessary number of instructors, which was conducted on the basis of the details of the curriculum for each course. In calculating the necessary number of instructors on the basis of the details of the curricula, the term with the longest hours of instruction was chosen as the term of the highest demand for instructors. The necessary number of instructors was calculated by dividing the total number of hours of instruction during the term of the highest demand for instructions by the hours of instruction per instructor (15 to 20 hours).

Table 2-5 Necessary Number of Instructors (calculated on the basis of the hours of instruction)

Course	Level	Longest hours of instruction	Necessary number of instructors (15〜20 hours /instructor/week)	Total number of instructors	Planned number of instructors
Pharmacy assistant	(Basic)	39 (1 academic year: 2 terms)	3	5	5
Pharmacy technician	(Intermediate)	30 (1 academic year: 1 term)	2		
General medical assistant	(Basic)	31.1 (2 academic years: 2 terms)	2	5	6
General medical Technician	(Intermediate)	32.4 (1 academic year: 1 term)	3		
Mother/child healthcare nursing	(Basic)	33 (1 academic year: 1 term)	3	6	6
Mother/child healthcare nurse	(Intermediate)	34 (1 academic year: 1 term)	3		
General medical nursing	(Basic)	34 (1 academic year: 1 term)	3	5	5
General medical nursing	(Intermediate)	32 (1 academic year: 2 terms)	2		
Laboratory Technician	(Intermediate)	35 (1 academic year: 1 term)	3	3	4
Total				24	26

The number of instructors totals 39, including 10 to teach general and special subjects in and 26 to teach the Pharmacist Course, General Medical Technician Course, Mother/Child Healthcare Nursing Course, General Medical Nursing Course, and Laboratory Technician Course.

(4) Site Plan

The project site is located approximately 10 km northeast of the City of Quelimane, on the southeastern side of a road running from the center of the City of Quelimane to Zalala Beach. The perimeter is rectangular in shape (approximately 240 meters by 150 meters) with a rectangular lot attached on the southwestern measuring approximately 170 meters by 50 meters.

The project site borders on a road on the northwestern side. The demarcation line between them can be easily identified by a series of stone piles and barbed-wire entanglements placed there. On the northwestern side, the height of the project site is almost the same as that of the road running in front. From there the project site slopes gently downward toward its center, and onward in the same direction from the center it begins to rise. The southwestern side is now densely covered with coconut palm trees. The site plan should make full use of these trees; hence only a minimum number should be felled.

Since the project site provided by the Government of Mozambique is likely to be submerged when floods occur, all the planned facilities should be higher than the road running in front.

(5) Architectural Planning and Design

1) Floor Plan

① Administration Building

This building is for the use of the principal and the clerks.

Rooms in Administration Building

Name of room	Floor area (m^2)	Remarks
Principal's office	28.80	Includes a space for visitors.
Small conference room	28.80	To be used for meetings by people in administration
Office	57.60	To be used for clerical work.
Accounting room	28.80	To be used for accountancy.
Printing room	28.80	To be used for printing documents to be distributed on campus.
Storage 1	28.80	For the use of the staff of the Administration Dept.
Pantry	6.72	To be provided with a small sink and hanging cabinet.
Toilet	17.28	For the use of the staff of the Administration Dept.
Other	63.50	Corridor, stairs, etc.
Total	289.10	

② Instructors Buildings No. 1, No. 2, and No. 3

This building is for the use of a total of 37 instructors.

Rooms in Instructors Building No. 1

Name of room	Floor area (m²)	Remarks
Advisor's room 1	28.80	For the use of a senior-level staff member.
Advisor's room 2	28.80	For the use of a senior-level staff room.
Advisor's room 3	28.80	For the use of a senior-level staff member.
Small conference room	28.80	To be used mainly for meetings among the senior-level staff members and visitors.
Storage 2	28.80	For the use of the staff of Educational Affairs Section.
Other	72.95	Corridors, stairs, etc.
Total	217.50	

Rooms in Instructors Building No. 2

Name of room	Floor area (m²)	Remarks
Instructors section's/General medical nursing	28.80	For the use of 2 staff members of Instruction Section and 2 nurse course instructors.
Professors' room	28.80	For the use of a total of 3 professors.
Conference room	57.60	For the use of the staff of Educational Affairs Section.
Storage 3	28.80	For the use of the staff of Educational Affairs Section
Other	73.50	Corridor, stairs, etc.
Total	217.50	

Rooms in Instructors Building No. 3

Name of room	Floor area (m²)	Remarks
General medical technician instructors' room	28.80	For the use of a total of 6 general medical technician course instructors (4.8m²/person)
Mother/child healthcare nurse instructors' room	28.80	For the use of a total of 6 mother/child healthcare nursing course instructors. (4.8 m²/person)
Pharmacy technician instructors' room	28.80	For the use of a total of 5 pharmacist course instructors (5.8 m²/person)
Laboratory technician course instructors' room	28.80	For the use of a total of 4 laboratory technician course instructors. (7.2 m²/person)
Storage 4	28.80	For the use of the staff of Educational Affairs Section.
Other	73.50	Corridor, stairs, etc.
Total	217.50	

③ Toilets for Instructors

These two toilets, one for males and one for females, are for the use of occupants of Instructors Buildings Nos. 1, No. 2, and No. 3.

Toilets in Instructors Buildings

Name of room	Floor area (m²)	Remarks
Toilet for males	12.96	
Toilet for females	12.96	
Other	23.04	Corridor, stair, etc.
Total	48.96	

④ Classroom Buildings No. 1 to No. 3

As each of the three classroom buildings is to have three classrooms, the buildings will have the collective capacity to provide of nine courses (a total of 270 students) at any given time. Each classroom should be provided with appropriate space between the blackboard wall and the desks in the front row, as well as an appropriate space for the cabinet to be installed by the side of the wall opposite the blackboard wall. Each classroom is to measure 7.2 meters wide and 9.9 meters deep (standard module) so that it may accommodate a total of 30 students.

Rooms in Classroom Building No. 1

Name of room	Floor area (㎡)	Remarks
Classroom 1	71.28	For the use of a total of 30 students taking the basic mother/child healthcare nursing course (2.4m^2/person)
Classroom 2	71.28	For the use of a total of 30 students taking the basic nursing course (2.4m^2/person)
Classroom 3	71.28	For the use of a total of 30 students taking the general medical assistant course (2.4m^2/person)
Other	49.50	Corridor, stairs, etc.
Total	263.34	

Rooms in Classroom Building No. 2

Name of room	Floor area (㎡)	Remarks
Classroom 4	71.28	For the use of a total of 30 students taking the assistant pharmacist course (2.4 m^2/person)
Classroom 5	71.28	For the use of a total of 30 students taking intermediate Mother/child healthcare course (2.4 m^2/person)
Classroom 6	71.28	For the use of a total of 30 students taking the intermediate general nursing course。(2.4 m^2/person)
Other	69.72	Corridor, stairs, Connecting corridor, etc.
Total	283.56	

Rooms in Classroom Building No. 3

Name of room	Floor area (㎡)	Remarks
Classroom 7	71.28	For the use of a total of 30 students taking the intermediate general medical technician course (2.4 m^2/person)
Classroom 8	71.28	For the use of a total of 30 students taking the intermediate pharmacist course (2.4 m^2/person)
Classroom 9	71.28	For the use of a total of 30 students taking the intermediate laboratory technician course (2.4 m^2/person)
Other	69.72	Corridor, stairs, connecting corridor, etc.
Total	283.56	

Toilet for Classroom

Name of room	Floor area (㎡)	Remarks
Toilet	71.28	For 270 students
Other	69.72	Corridor, stair, connecting corridor, etc.
Total	141.00	

⑤ Special Classroom Buildings No. 1 and No. 2

Special Classroom Building No. 1 consists of special rooms for use in training and experimenting. Special Classroom Building No. 2 consists of a library and a computer room. The library is to be located near the road running in front of the site so that it may be easily accessible to high-school students and others in the local community.

Rooms in Special Classroom Building No. 1

Name of room	Floor area (㎡)	Remarks
Training room	95.04	To be used for nurse training.
Equipment storage	23.76	To store experimental equipment.
Laboratory	95.04	For use in experimenting.
Reagent room	11.88	To store reagents for use in experimenting.
Storage	11.88	To store experimental instruments.
Other	85.50	Corridors, stair, etc.
Total	323.10	

Rooms in Special Classroom Building No. 2

Name of room	Floor area (㎡)	Remarks
Library	106.84	To contain approx. 30 seats.
Book storage	11.88	To store books.
Copying room	11.88	To be used for copying pages of books.
Computer room	71.28	To contain a total of 15 computers for a total of 30 students and one for the use of the instructor.
Storage	11.88	To store computer and associated equipment.
Other	74.25	Corridor and others.
Total	288.01	

⑥ Auditorium

The auditorium is to be used for admission/commencement ceremonies, entrance examinations, and seminars. This is an indispensable space for organizing seminars to standardize the curricula of the institutes of health science and training centers. The standardization of the curricula will make it possible to raise the skill and unify the technical level medical workers throughout the nation.

Rooms in Auditorium

Name of room	Floor area (㎡)	Remarks
Auditorium	323.30	To accommodate a total of 270 students who attend admission/ commencement ceremonies and 39 instructors ($1.1m^2$/person)
Anteroom	13.20	For the use of lecturers.
Storage 1 and 2	36.30	To store desks and chairs.
Toilets	11.22	One for males and one for females.
Other	172.36	Corridor, stairs, etc.
Total	556.38	

⑦ Canteen

As a total of 270 students are to use the canteen in rotation, about a half of them using it at a time, detailed care should be taken, in working out the circulation plan for the canteen, to ensure that it can be operated efficiently without affecting the students' activities after school.

In consideration of the needs of its users, the canteen should be located adjacent to the auditorium.

Room in Canteen

Name of room	Floor area (㎡)	Remarks
Canteen	177.60	To be used in rotation by a total of 270 students (About a half of them are to use it at a time.) ($1.3m^2$/person)
Pantry	31.08	To be used to serve meals.
Kitchen	88.80	The size is to be determined based on the number of users. To be equipped with an electric dresser.
Office	14.00	For the use of the chef.
Locker room (for males)	8.12	For the use of cooks.
Locker room (for females)	10.36	For the use of cooks.
Food storages 1 and 2	24.00	To refrigerate perishables.
Toilet	16.80	To have two sections, one for males and one for females. To be equipped with showers.
Other	205.52	Corridor, stairs, etc.
Total	576.28	

⑧ Dormitories

It is assumed that approximately 25 percent of the 270 students will be day students, attending school from their homes or their relatives' homes located near the City of Quelimane. The number of boarders will therefore be approximately 200.

Since the ratio of male students to female students is expected be one to one, two dormitory buildings, one to accommodate a total of 100 male students and the other to accommodate a total of 100 female students, are to be constructed.

Each dormitory room is to be provided with bunk beds and is to accommodate up to eight students in one bedroom for effective use of the limited space. Rooms in the modern dormitories in Mozambique that have been designed and constructed under the direction of the Ministry of Health of Mozambique are provided with desks. When a dormitory room is to accommodate up to eight students, desks will occupy a considerable portion of its floor space. This will be uneconomical. For this reason, desks should be installed in a separate study space where all the boarders can study at night without disturbing their roommates' sleep. The study space will be secured at the dead end of the passage and will be not isolated by a partition.

All of the boarders will be free to use the laundry installed in the center of each of dormitory.

Rooms in Dormitory for Male Students

Name of room	Floor area (㎡)	Remarks
Dormitory room	446.88	A total of 14 rooms, each accommodating up to eight students. ($4.5m^2$/person)
Toilet	63.84	To be provided with showers.
Study space	145.92	Desks/chairs for a total of 100 students. ($1.3m^2$/person)
Corridor, stairs, etc.	184.50	Corridor, stairs, etc.
Laundry	127.68	A total of 16 washing stands are to be installed.
Subtotal	968.82	

Rooms in Dormitory for Female Students

Name of room	Floor area (㎡)	Remarks
Dormitory room	446.88	A total of 14 rooms, each accommodating up to eight students. ($4.5m^2$/person)
Toilet	63.84	To be provided with showers.
Study space	145.92	Desks/chairs for a total of 100 students. ($1.3m^2$p/erson)。
Corridor, stairs, etc.	194.40	Corridor, stairs, etc.
Laundry	127.68	A total of 16 washing stands are to be installed.
Subtotal	978.72	

⑨ Instructor Accommodations

In light of the need to increase the number of instructors to teach at the institutions the Ministry of Health of Mozambique is trying hard to construct instructor accommodations on the premises of the institutes of health science and training centers.

Upon completion of this project, the number of instructors will be increased by eight at Quelimane Institute of Health Science. Thus, instructor accommodations are to be constructed for the eight new instructors. Two houses, each partitioned into four units, are to be constructed.

Instructor Accommodations No. 1 and No. 2

Name of room	Floor area (m^2)	Remarks
Bedroom 1	11.93	Main bedroom for the use of two instructors. To be provided with a cloak room. ($6.0m^2$/person)
Bedroom 2	11.93	For the use of two adults (or for the use of four children). To be provided with a cloak room.
Dining room	15.23	To accommodate up to six persons。($2.5m^2$/person)
Kitchen	5.51	To be equipped with a dresser, a sink, a hanging cabinet and a food stockroom.
Laundry	2.01	To be equipped with washing stands.
Toilet	3.50	To be equipped with a shower.
Other	8.40	Wardrobe, corridor, stairs, etc.
Total	58.50	Floor space/unit

The following table lists the sizes of the respective facilities, all of which were determined in consideration the above descriptions.

	Building/Room	m^2
1	Adminstration Building	
	Principal's Office	28,80
	Small Conference Room	28,80
	Office	57,60
	Accomting Room	28,80
	Printing Room	28,80
	Storage 1	28,80
	Pantry	6,72
	Toilet	17,28
	Inside Corridor	52,80
	Outside Corridor, Stair	10,70
	Total	289,10
2	Instructors Building No.1	
	Advisor's Room 1	28,80
	Advisor's Room 2	28,80
	Advisor's Room 3	28,80
	Small Conference Room	28,80
	Storage	28,80
	Coridor, Stairs	72.75
	Total	216.75
3	Instructors Building No.2	
	Instructors Section/General Medical Nursing	28,80
	Professors Room	28,80
	Conference Room	57,60
	Storage 3	28,80
	Corridor, Stairs	73.50
	Total	217.50
4	Instructors Building No.3	
	General Medical Technician Instructors` Room	28,80
	Mother/child healthcare Nursing Instructors` Room	28,80
	Pharmacy Technician Instructors` Room	28,80
	Laboratory Technician instructors` Room	28,80
	Stirage 4	28,80
	Corridor, Stairs	73.50
	Total	217.50
5	Toilets in Instructors Building	
	Toilet	25,92
	Corridor, Stairs	23,04
	Total	48,96
6	Classroom Building No.1	
	Classroom 1	71,28
	Classroom 2	71,28
	Classroom 3	71,28
	Corridor, Stairs	49,50
	Total	263,34
7	Classroom Building No.2	
	Classroom 4	71,28
	Classroom 5	71,28
	Classroom 6	71,28
	Corridor, Stairs	69,72
	Total	283,56
8	Classroom Building No.3	
	Classroom 7	71,28
	Classroom 8	71,28
	Classroom 9	71,28
	Corridor, Stairs	69,72
	Total	283,56
9	Toilet for Classroom	
	Toilet	71,28
	Corridor, Stairs	69,72
	Total	141,00

	Building/Room	m^2
10	Special Classroom Building No.1	
	Training Room	95,04
	Equipment Storage	23,76
	Laboratory	95,04
	Reagent Room	11,88
	Storage 1	11,88
	Corridor, Stairs	85,50
	Total	323,10
11	Special Classroom Building No.2	
	Library	106,84
	Book Storage	11,88
	Copying Room	11,88
	Computer Room	71.28
	Storage 1	11,88
	Corridor, Stairs	74,25
	Total	288,01
12	Auditorium	
	Auditorium	323,30
	Ante Room	13,20
	Storage 1	36,30
	Toilet	11,22
	Corridor, Stairs	172,36
	Total	556,38
13	Canteen	
	Canteen	177,60
	Pantry	31,08
	Corridor, Stairs	160,13
	Kitchen	88,80
	Office	14,00
	Locker Room (for male)	8,12
	Locker Room (for female)	10,36
	Food Storage 1	12,00
	Food Storage 2	12,00
	Toilet	16,80
	Inside Corridor	15,52
	Outside Corridor, Stairs	29,87
	Total	576,28
14	Dormitory for Male	
	Dormitory	446,88
	Toilet	63,84
	Study Space	145.92
	Corridor, Stairs	184,50
	Laundry	127,68
	Total	968.82
15	Dormitory for female	
	Dormitory	446,88
	Toilet	63,84
	Study Space	145.92
	Corridor, Stairs	194,40
	Laundry	127,68
	Total	978.72
16	Instructor's Accommodation No.1, 2	
	Bed Room 1	11,93
	Bed Room 2	11,93
	Canteen	15,23
	Kitchen	5,51
	Laundry	2,01
	Toilet	3,50
	Wardrobe: Corridor: Stair	8,40
	One Unit Total	58,50
	Eight Unit Total	468,00
17	Guard House	10,89
18	Electric Room Building	71,50
19	Out side Substation	67,24
20	Reservoir Tank	58,83
21	Elevated Tank	21,50
	Grand Total	6,350.54

2) Sectional Plan

In Mozambique, a country situated in the Southern Hemisphere, strong sunlight comes from the north. To protect against this strong sunlight, there should be a minimal number of openings in the walls on the northern side of the planned facilities.

In order to save maintenance and management costs, the use of air conditioners should be minimized. In the rooms not to be air-conditioned mechanically, the ceiling should be high enough to secure a satisfactory air volume per person. Comfortable indoor conditions should be secured through ample use of natural ventilation and natural lighting.

(6) Structural Plan

1) Structure of New Facilities

- Outline of Structure

No. of stories : 1

Story height : 2.7m (Instructor accommodations)
3.1m (Administration building, instructor building)
3.6m (Classroom buildings, special classroom buildings)
4.0m (Auditorium, canteen, dormitories)

Type of structure : reinforced concrete (below roof girder)
steel truss (roof structure)

Foundation : spread foundation

- Load and External Force

Superimposed load : The following value of the superimposed load of each of the main rooms was determined in working out the structural design.

(N/m²)

Use	For floor/beam design	For column/beam design	For seismic load design
Classroom	2,300	2,100	1,300
Dormitory room	1,800	1,300	600
Kitchen	2,900	2,400	1,300

Wind pressure: The following formulas were adopted in accordance with the Building Standard Law of Japan.

$q = 0.6 E V_O^2$

q : velocity pressure (N/m²)
E : regional coefficient

V_O : wind velocity (M/S)

$w = q \cdot Cf$

w : wind pressure (N/m^2)

q : wind pressure (N/m^2)

Cf : coefficient of wind force

Seismic force: The design horizontal external force during earthquakes must be properly determined based on past records of earthquakes. The records of the Council of Geoscience of South Africa show that earthquakes of medium seismic intensity occur in Mozambique. The value of base shear coefficient should therefore be 1, that is, half the value of base shear coefficient as stipulated by the Building Standard Law of Japan.

Measures against liquefaction: The geological structure of the project site is characterized by the existence of sandy soil up to a depth of approximately five meters. Given that earthquakes of medium seismic intensity have occurred in the past, there is likely to be some liquefaction of the ground if and when an earthquake of considerable seismic intensity occurs during the rainy season. The structural plan for this project should therefore include measures against liquefaction of the ground during earthquakes. Differential settlement of the ground is to be prevented by means of continuous footing. Anti-settlement piles are also to be installed in order to prevent the settlement of the buildings due to liquefaction of the ground.

- Main building materials

  Concrete : SABS 0144 Fc＝25N/mm^2
  (4-week test specimen for compressive strength)

  Reinforcing bar : SABS4449、Grade 460/425

  Steel frame : SABS4848, equal-angle steel

(7) Electrical Equipment Plan

1) Power Receiving System

The Mozambique Electric Power Corporation (EDM) will install a 3-phase, 3-line 33 KV (high-voltage) power distribution line from a substation located approximately one kilometer away from the road running on the northern side of the project site to a point in front of the

project site.

A utility pole for the incoming line, on which a section switch is to be mounted, will be installed within the project site, near the road running on the northern side. The utility pole is to serve as the point to divide responsibility between the institute site and the EDM. Then a power cable is to be laid underground up to the high-voltage substation.

2) Power Supply System

- High-voltage Substation

  An outdoor, ground level, open-type substation is to be constructed at the western corner of the project site. An electric room equipped with a low-voltage switchboard is to be constructed adjacent to the substation. Low-voltage electricity is to be distributed from the electric room to each of the planned facilities.

  The substation should be protected against intrusion by means of fences.

  The EDM's integrating wattmeter and related instruments are to be installed within the electric room.

- Main Power System

  Electric power is to be supplied to the distribution switchboard and the power control board in each building from the low-voltage main switchboard installed in the electric room.

  The main voltage is to be 3-phase, 4-line 380/220V 50Hz. The table below shows demand for power in each building.

  An alarm display board is to be installed in the office of the administration building in order to detect irregularities in the water receiving tank, the elevated water tank, the pumps, the substation, and the emergency generator.

- Emergency Generator

  As a number of planned power stoppages are expected to occur in and around the project site due to the EDM's work to extend service and periodic checks, it will be necessary to secure a stable supply of electric power to the canteen (to the refrigerator/freezer, the pump, and the storage pump), the administration building, and the instructors buildings. For this reason, an indoor low-noise type 75kVA generator is to be procured as the emergency generator.

  The emergency generator is to be installed in the generator room to be located adjacent to

the electric room.

There should be a space for storing fuel drums near the generator room.

Table 2-6 Demand for Power

Facility	Assumed installed capacity	Assumed demand factor	Maximum demand for power	Remarks
Administration building	5.78kVA	60%	3.46kVA	
Instructors buildings No. 1 to No. 3	11.28kVA	40%	4.51kVA	
Classroom buildings No. 1 to No. 3	12.73kVA	60%	7.63kVA	
Special classroom buildings No. 1 and No. 2	21.38kVA	30%	6.41kVA	
Auditorium	11.12kVA	20%	2.22kVA	
Canteen/kitchen	11.52kVA	20%	3.45kVA	
Dormitory (for males) No. 1 and No. 2	28.50kVA	20%	5.70kVA	
Dormitory (for females) No. 1 and No. 2	28.80kVA	20%	5.76kVA	
Instructors accommodations No. 1 and No. 2	16.38kVA	30%	4.91kVA	
Guardroom	0.22kVA	60%	0.13kVA	
Electric room	1.42kVA	50%	0.71kVA	
Other buildings	1.41kVA	50%	0.70kVA	
Single-phase power equipment	146.23kVA	85%	124.29kVA	
3-phase power equipment	33.87kVA	30%	10.16kVA	
Total	330.64kVA		180.04kVA	

3) Lighting Fixtures and Wall Outlets

A distribution switchboard with an appropriate circuit composition is to be installed in each building for secondary piping and wiring to the lighting fixtures and the wall outlets.

- Lighting Fixtures

The lighting fixtures should be mostly fluorescent lamps. It will be possible to save electricity by segmenting the circuit system as much as possible.

The following table shows the design illuminance for the main rooms.

Table 2-7 Design Illuminance for the Main Rooms

Name of room	Lighting fixture	Design illuminance
Office/principal's office/manager's room	FL40W×2（trough type）	200 LX
Classroom	FL40W×2（trough type）	200 LX
Auditorium	FL40W×2 (provided with light reflector; raceway)	200 LX
Canteen	FL40W×2 (provided with light reflector; raceway)	200 LX
Dormitory room/ instructor accommodations/staff accommodations	FL40W×1（trough type） FL20W×1（trough type）	100 LX
Toile/equipment storage	FL40W×1（trough type） FL20W×1（mirror light）	50 LX

- Wall Outlets

Approximately two wall outlets are to be installed in each room and classroom. For wall outlets for connection points to equipment, circuit composition should be suitable for power supply voltage and located properly.

An independent power supply panel for use in events should be installed in the auditorium.

4) Telephone System

A telephone should be installed in each room where telephone communications are to be required. A private automatic branch exchange (PABX) is to be installed in the office of the administration building for conduit piping and wiring to the terminal board and telephone outlets in each building.

Telephone outlets should be installed properly after clearly defining their respective uses (e.g., connection to extension, connection to outside line, connection to facsimile, and connection to the Internet). The following eight circuits are to be installed.

- 1 circuit for direct connection to the principal's office
- 2 circuits for connection to extensions via PABX
- 1 circuit for connection to facsimiles
- 2 circuits for connection to the Internet
- 2 circuits to connect to public telephones

The TDM will install an antenna on the premises of the institute for direct microwave communication from the Quelimane Telephone Office.

5) Public Address System

A public address system to be used for paging and other communication purposes is to be procured. The amplifier is to be installed in the office of the administration building and a loud speaker is to be installed in each of the main rooms.

6) Emergency Alarm System

Only an area audio system is to be procured. A push button with a bell is to be installed in each building and monitoring is to be conducted with an indicator installed in the office of the

administration building.

7) Lightning Arrester

A lightning arrester to protect the elevated water tank against lightning is to be installed.

(8) Machinery/Equipment Plan

1) Water Supply Equipment Plan

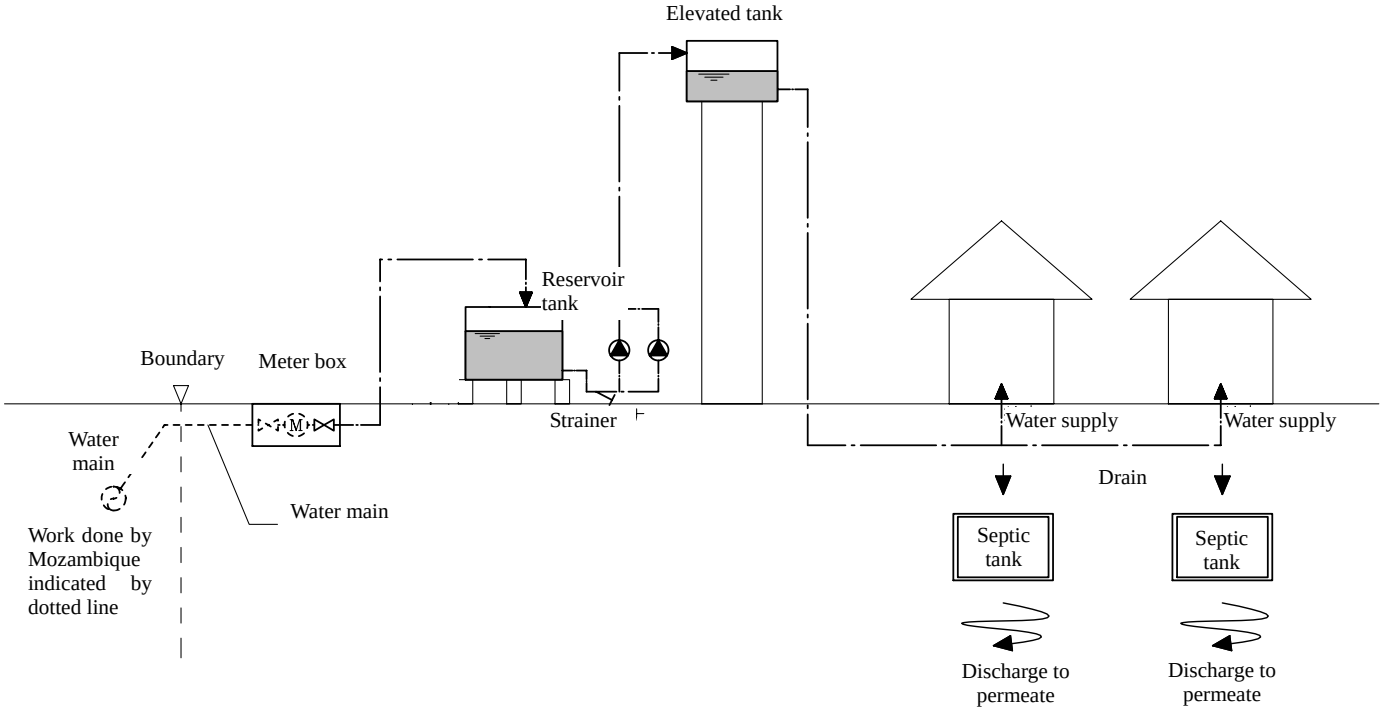
At present, neither water mains nor sewage mains are installed in the project site. Under the City of Quelimane's Water Supply Network Expansion Program, city water supply to the project site is expected to become available within 12 months. City water is the main source of water supply for the existing institutes of health science. However, the municipal water department's lack of ability to supply city water will make it very difficult to secure adequate supplies of city water the project site.

A valve box is to be installed within the project site so that city water from the water mains to be extended to a point in the project site may be connected to the pipe to be installed within the project site.

Water is to be supplied using the gravity water supply method, from an elevated water tank. The city supply water is to be stored in the ground level water reservoir tank, from which water will be pumped up into the elevated water tank for distribution.

The equipment to be procured under this project includes medical equipment that requires water supply. But few of the medical devices will have to meet stringent requirements in terms of allowable water quality and allowable water pressure. From the standpoint of cost reduction, special adjust should be made individually with medical equipment required to meet stringent water quality/water pressure standards.

【Conceptual Drawing of the Water Supply System】



Calculation of water consumption:

Water consumption at the institute was calculated as follows.

Students	:	270 persons	×100 liters/person※・day＝	27,000 liters/day
Instructors	:	94 persons	×100 liters/person・day＝	9,400 liters/day
Instructor accommodations	:	40 persons	×100 liters/person・day＝	4,000 liters/day
		Total daily water consumption		40,400 liters/day

Capacity of the water reservoir tank : 40,400 liters/day×1day＝40,400 liters → 40m^3

Capacity of the elevated water tank : 40,400 liters/day÷8h/day×1h＝5,050 liters → 5m^3

2) Water Heating Equipment Plan

Given that only a limited number of places will require the supply of hot water, a central hot water supply system will not be adopted. Instead, standalone water heaters are to be procured. All water heaters are to be procured as fixtures by the institute, with the exception of those for the showers to be installed in the instructors building.

※ 100 liters/person・day is a half of the demand by Japanese standard due considered the present condition of Mozambique

3) Plumbing Equipment Plan

Plumbing equipment of a type that can be easily used maintained is to be procured. In working out the plumbing equipment, special attention should be paid to local customs.

4) Drainage/Ventilation Equipment Plan

Indoor waste water is to be split into sewage water and other waste water. Indoor waste water is to be discharged into a septic tank installed outdoors. Once settled, it will then be made to permeate through soil. The location of the septic tank and permeation tank is to be decided taking into account the possible adverse effects of offensive smells and relatively bad sanitary conditions. Ventilation is to be provided using the loop and extension method.

There is no medical waste water requiring treatment before discharge.

5) Fire-extinguishing Equipment Plan

Fire-extinguishing equipment that meets the fire fighting law and regulations of Japan is to be procured after due consultation with the City of Quelimane's fire department.

6) Kitchen Appliance Plan

Kitchen appliances suitable for providing meals to students, instructors, and other staff are to be procured. All appliances selected will be conducive to the maintenance of hygienic conditions in the kitchen environment.

7) Air Conditioning/Ventilating Equipment Plan

In principle, split-type, package air-conditioners are to be procured. Only the main rooms in the administration building, the instructors building, the food storage, and the special classroom buildings No. 1 and No. 2 are to be air-conditioned.

Ceiling fans are to be installed in the auditorium, canteen, and kitchen in lieu of air-conditioning.

Ventilators are to be installed only in the kitchen. The third level of ventilation method is to be adopted.

(9) Building Material Plan

Main structural sections:

Section	Material	Remarks
Foundation, underground beam, floor board, beam	Reinforced concrete	As ready-mixed concrete is not available in the country, the field mixing method is to be used.
Roof truss	Steel frame truss	Truss structure that does not require very high skill finish is to be employed.
Exterior wall	Concrete block	Ready-made concrete blocks of the type widely used in the country are to be used.

Exterior finishing materials:

Section	Material	Remarks
Roof	Long steel plate roof (with heat insulator)	Highly water resistant. Can be imported from South Africa.
Exterior wall	Concrete blocks	Manufactured in the country.
Furniture	Wooden sash	Manufactured in the country.
	Steel furniture	Steel furniture of a sufficient sturdiness is to be installed in places that must be protected against theft. Can be imported from South Africa.

Interior finishing materials:

Building	Name of room	Floor	Wall	Ceiling
Administration bldg. Instructor bldg. Classroom bldg. Special classroom bldg. Dormitory (for male students) Dormitory (for female students) Instructor accommodations	All rooms (toilets)	Porcelain tile (mortar steel trowel)	Coating after mortar steel trowel (ceramic tile)	Rock wool acoustical board (paint on calcium silicate board)
Toilet for instructors	—	Porcelain steel trowel finishing	Ceramic tile	Paint on cement fiber board
Canteen	All rooms (toilets)	Cement ceramic tile (mortar steel troweled finishing)	(tiles in some parts (H-1500))	Paint on cement fiber board
Guardroom	—	Cement mortar steel troweled	Paint on cement mortar steel troweled	—
Water storage tank	—	Cement mortar steel troweled	Paint on cement mortar steel troweled	—
Electric room	—	Cement mortar steel troweled	Paint on cement mortar steel troweled	—

2-2-2-2 Equipment Plan

(1) Examination of the Requested Equipment

A detailed examination to determine the propriety and necessity of the requested equipment was conducted in accordance with the following criteria. These criteria were set up as a result of a field study and cover the function, role, technical level of each facility, as well as the institute's financial capabilities and facility/equipment maintenance and management system. The results of the examination are shown in Appendixes 7 "Table of Results on the Examination of the Requested Equipment."

1) Criteria for Selecting Equipment

① Examination in terms of use

○ : Basic equipment consistent with the activities to be carried out in the planned facility.

△ : Equipment whose function must be clarified by separating component parts from it.

× : Equipment not consistent with the activities to be carried out in the planned facility.

② Examination in terms of necessity

○ : Equipment indispensable for the planned curriculum and activities to be carried out in the planned facility.

× : Equipment not greatly needed and offering only limited benefit to the planned facility.

Expendables fall under this category, for example

③ Examination in terms of the technical level

○ : Equipment that meets current technical requirements at the institute.

× : Equipment that requires sophisticated operation techniques and is not expected to become more advanced.

④ Examination in terms of the institute's operation, maintenance, and management system

○ : Equipment that can be easily maintained and managed, and which is produced by a manufacturer with a well-organized management system (factors that make it easier to recruit staff members to take charge of its maintenance and management). Expendables and spare parts procurable in Mozambique or South Africa fall under

this category.

× ： Equipment is difficult to maintain and manage, and therefore likely to cause maintenance/management problems after introduction. Expendables and spare parts difficult to procure in Mozambique or South Africa fall under this category.

⑤ Examination in terms of operation, maintenance and management costs

○ ： Equipment that requires practically no operation, maintenance or management costs, or whose operation, maintenance and management can be conducted by the Mozambique side on its own.

× ： Equipment that requires tremendous operation, maintenance and management costs and is therefore likely to cause budgetary problems.

⑥ Overall evaluation

○ ： Equipment appropriate to include in this project.

× ： Equipment not appropriate to include in this project.

⑦ Examination in terms of quantities required

The equipment arrangement plan and quantity of each piece of equipment required were adjusted in consideration of the total numbers of students and instructors and the main activities to be carried out at the institute.

A) Furniture

Building	Quantity required
Administration building	The office is to operate with a staff of 5, and the accounting room with a staff of 2. These facilities are to be provided with the necessary number of desks, chairs, shelves and cabinets. The printing room is to be provided with a desk for use at reception and a shelf to store copying paper and toners. The principal's office, where the present furniture can be used, is not to be provided with additional pieces of furniture. The small conference room, which is to be used for receiving visitors and for senior-level staff meetings, is to be provided with a conference table and 8 chairs.
Instructors buildings	The necessary number of desks and chairs for instructors and furniture to store documents and office equipment are to be installed in the instructors buildings. The necessary numbers of bookcases, steel shelves and cabinets (to be provided as a set for reach room) is to be determined according to the number of instructors. An advisor's office is to be procured for each advisor. A professors' room is to accommodate three to six instructors. Each professors' room is to be provided with a conference table and 16 chairs so that it may be used for instructors' meetings.
Classroom buildings	Each classroom is to accommodate a total 30 students and an instructor. The total number of desks and chairs are for 9 classes/9 courses. Each classroom is to be provided with a blackboard and the necessary number of lockers to house teaching materials and supplies.
Special classroom building No. 1	The supply storage areas in the training rooms and the supply and reagent storage areas in the laboratory are all to be provided with shelves to store instruments and chemicals. The total number of storage areas should correspond to that in the other institutes of health science. The laboratory is to be equipped with a laboratory table and 30 chairs so that students may receive training in microscopic experiments. The laboratory and training rooms are each to be equipped with a desk and chair for the instructor and a blackboard.

Building	Quantity required
Special classroom building No. 2	The institute's present library, which houses approximately 3,900 books, is equipped with only a total of 19 six-shelf stacks and two cabinets. The stacks are filled with books. As the number of books housed in the library is expected to increase as new courses are introduced, the size of the new library is to be decided based on the sizes of the libraries of the other institutes of health science. The new library should be large enough for approximately 12 percent of the total number of students (approximately 30 students) to use it at a time. It is also to be provided with a desk and a chair for the librarian and a chair for the receptionist. The copying room is to be equipped with a shelf to store supplies. The computer room is to be provided with a total of 15 computer tables and 30 chairs since two students are to share the use of a computer. It is also to be provided with a desk and a chair for the instructor.
Auditorium	As a space to be used for ceremonies, general meetings, and seminars, the auditorium is to be provided with chairs for a total of 270 students and approximately 40 instructors. When used for seminars and entrance examinations, it must be provided with the necessary number of tables. The total number of tables is to be decided on the assumption that approximately 50 persons will sit at a seminar or entrance examination. In order to make effective use of the total floor space of the auditorium, collapsible chairs and tables should be procured. They are to be stored in the storage when not in use.
Canteen	The canteen is to provide meals to a total of 270 students and 94 staff members (including instructors). The students will use it in rotation, about a half of them using it at a time. The instructors and other staff members will be able to stagger their mealtimes according to their respective hours of work. It is estimated that approximately 9 instructors and other staff members will take meals at a time. Tables and chairs for a total of 144 persons are therefore to be procured.
Dormitories	In principle, each of the rooms is to accommodate up to 8 boarders. The maximum number of boarders is 200 (100 for the dormitory rooms for male boarders and 100 for the dormitory rooms for female boarders). The necessary number of bunk beds is to be installed in each room. To make effective use of the total floor space of each dormitory, table/chair sets that seat 4 boarders per table and 200 boarders in total are to be installed in each study space.
Guard House	The guard house is to be provided with a chair for the guard.

B) Audiovisual equipment (for the classrooms, auditorium, and conference rooms)

OHP, slide projector	The use of two overhead projectors is to be shared among a total of nine classes.
Screen	Two screens for used with the two overhead projectors and one for use in the auditorium are to be procured.
Monitor, video player, data projector	One set for use in the auditorium for use in ceremonies and seminars are to be procured.
Speaker/microphone	One set for use in the auditorium is to be procured.
Whiteboard	One each for the small conference room, conference room and the auditorium is to be procured.

C) Laboratory equipment (for the inspection/test training room)

Microscope	Since this equipment is indispensable for inspection/test training, a total of 30 units (one unit for each student) are to be procured.
Portable sterilizer, balance, centrifuge, hot air oven, pH meter, stopwatch, incubator, glassware, colorimeter, bath tank, shaker, mixer, hematocrit centrifuge	Two units each. (The use of one unit each is to be shared by a total of 15 students.)
Refrigerator/freezer, water still, sterilizer	The use of one unit each is to be shared among a total of 30 students.
Micropipette set, funnel set, mortar-and-pestle set	4 sets each for a total of 30 students.

D) Anatomical models and charts (for the classrooms and the training rooms)

Skeleton/skull phantom set	The use of one set each is to be shared among the 9 classes.
Torso, anatomical model set, anatomical wall chart	Two sets. (The use of each set is to be shared among a total of 15 students.)
Injection simulator, training set, human body model for education	Two sets. (The use of one set each is to be shared among a total of 15 students.)

E) Medical equipment (for the training rooms)

Stethoscope, stethoscope for obstetric use	Since there are basic items of medical equipment, a total of 30 sets are to be procured.
Sphygmomanometer set	The use of one set is to be shared among 3 students.
Weighing scale, dressing carriage, instrument table, hand stand support, basin stand, instrument/dressing table, catheter tray, incubator, resuscitator, vapor sterilizer	The use of one set is to be shared among a total of 30 students.
Examination couch, otoscope set, rhinoscope set, airway, ambu-bag set, spirometer, goniometer, suction unit	The use of the set is to be shared among a total of 15 students.
Hospital bed	A total of 3 hospital beds are provided. Each bed is shared by 10 students.
Clamp holder, sponge holder, clamp, medical supplies for education, percussion hammer	The use of one set is to be shared by a total of 5 students.

F) Office equipment (for the administration office and computer room)

Photocopy machine	2 photocopy machines, one equipped with a sorter, are to be installed in the printing room for use in production of teaching materials. Another photocopy machine is to be installed in the book copying room.
Computer (for clerks and instructors)	A computer is to be installed in the office for management of equipment data. The existing computers are to be used in the accounting room and the office, respectively. One computer is to be procured for the new 4 intermediate course. The existing computers are to be used for the existing courses.
Computer (for students)	A total of 15 computers for the use of a class of 30 are to be procured, the use of each computer being shared by 2 students. A printer to be connected to the 15 computers is to be procured.

G) Vehicle

Medium-sized bus, minibus	A medium-sized bus and minibus are to be procured ,for field training and transportation of instructors to and from the institute.

2) Examination of the Main Requested Equipment

① Furniture

Procurement of desks, chairs, shelves and dormitory room beds were requested. Some of them are indispensable for teaching, clerical work, and dormitory life. These items seem to have been requested for reasons of replacement or addition.

Tables and chairs for a seminar room were excluded because none of the existing institutes of health science have seminar rooms.

Cupboards and bedside cabinets were also excluded because they are deemed to be low in priority.

② Audiovisual equipment

Audiovisual equipment is indispensable for teaching. The existing equipment is to be replaced or new audio-visual equipment is to be procured.

OHPs, slide projectors, and screens (all of which are indispensable for teaching) are already in use at the institute. There are no TV sets or videos in use at the institute. They should be newly procured for filming teaching scenes and making effective use of video teaching materials.

An audio set (including an amplifier and speakers) for use in the auditorium is to be procured.

Language laboratory equipment was excluded because no English class is included in the institute's curricula.

Spare electric bulbs were excluded. If it becomes necessary to procure them frequently, they are to be included in the relevant equipment as component parts.

③ Laboratory equipment

Laboratory equipment is indispensable for the newly opened Pharmacist Course and newly opened Laboratory Technician Course. As the institute has no laboratory equipment, it is to be newly procured.

However, both sides have agreed through consultation that the following items are low in priority and should thus be excluded.

- Water quality analysis kit : not so important.
- High-temperature furnace : not necessary for teaching.
- Evaporator : not necessary for teaching.
- Extractor : not necessary for teaching.
- Ion exchanger : requires high maintenance costs and is low in priority.
- Cooler set : not necessary for teaching.
- Photometer : not necessary if the colorimeter is included in the

project.

- Balance stand (aseismic type) : not necessary.
- Homogenizer : not necessary for teaching.
- Skull crucible set : not necessary for teaching.
- Cuvette : to be included in the colorimeter as a component part.

Laboratory glassware sets should be the same as the standard one used in the other institutes of health science. Those requested items included in the standard glassware are to be procured.

Examination couches are to be included in the medical equipment. The necessary number of tables to accommodate a class of 30 are to be procured. As microscopic experiments are a basic routine in laboratory work, the necessary number of microscopes are to be procured. In light of the present situation in the other institutes of health science, all equipment is to be procured in quantities that can be easily and efficiently shared among the students.

④ Anatomical models and charts

Anatomical models and charts are indispensable for teaching human anatomy and physiology. These items were requested for reasons of replacement, addition, and procurement.

As the existing anatomical models are outdated and limited in variety, the procurement of new ones is essential. Many of the anatomical models and charts available in the country are accompanied by English inscriptions. There is no need to replace them with Portuguese inscriptions.

⑤ Medical equipment and instruments

This equipment is indispensable for training in nursing and medical practice.

At present, the Institute of Health Science has the minimum number of basic items of medical equipment. Furthermore, most of the equipment is very superannuated. In this context, it is reasonable to procure the minimum quantities of basic and intermediate level medical equipment and instruments under this project. However, both sides have agreed that the following item be excluded.

- Cleaning cart: The existing institutes of health science are provided with no cleaning

carts. In addition, hospitals in the country are not familiar with garbage trucks.

Mozambique has included infusion sets, infusion solution bottles, and surgeon hand brushes in its request. All of these items ,fall under the category of expendables. As it is necessary for students to see these items with their own eyes, the necessary number of these items are to be procured.

⑥ Office Supplies

These items are necessary for the production of teaching materials and office work. These items seem to have been requested for reasons of addition or replacement.

The institute has no computers for the use of students. (The students are using their instructors' computers.) It is therefore imperative to procure the necessary number of computers for students. In consideration of the present situation with regard to availability of computers for students, the use of one computer is to be shared between two students.

The use of one printer is to be shared among a total of 30 students.

Both sides have agreed that the following items be excluded.

- Toner for intermediate-level photocopy machine:
  Falls under the category of expendables.
- Toner for facsimile : Falls under the category of expendables.
- Toner for computer printer for education:
  Falls under the category of expendables.
- Toner for computer printer for office work:
  Falls under the category of expendables.
- Voice recognition unit : Details unknown.
- Electronic calculator with a printer:
  Office equipment is to be excluded.

⑦ Kitchen appliances

These items are necessary for providing meals to instructors and students. In principle, these items are not to be included in this project, but the procurement of tables and a large-size refrigerator/freezer is to be considered in the building work.

Both sides have agreed that the following item be excluded.

- Drinking fountain: Low in priority.

⑧ Laundry and cleaning equipment

Both sides have agreed that the following items be excluded.

- Washing machine : The need for this item within the scope of mechanical work is to be examined.
- Irons : Household appliances are to be excluded.
- Vacuum cleaners : Household appliances are to be excluded.
- Dust bags for vacuum cleaners : Expendables are to be excluded.

⑨ Vehicles

Vehicles are to be used mainly for transporting students and instructors during field training. They are also to be used for transporting instructors to and from the institute and purchasing of foodstuffs. According to the Mozambique side, the Mocuba Training Center has no vehicles of its own and thus shares the use of the vehicles owned by Quelimane Institute of Health Science. Of the three existing vehicles, one has an accumulated mileage of more than 200,000 kilometers and is now almost unusable. Since there is no bus service between the City of Quelimane and other cities in the country, vehicles are indispensable for operation of the institute and must be included in this project.

Three vehicles have been requested: a 36-seater bus, a 16-seater bus, and a pickup truck. The large 36-seater bus is to be excluded from this project for several reasons: buses of this type are manufactured only by a limited number of vehicle makers, few are in use in Mozambique, and procurement would pose maintenance and management problems. On the other hand, the 16-seater bus is to be included in this project. Buses of this type are in widespread use in the country, including two in use at the Nampula Institute of Health Science. A 26-seater bus is to be procured instead of the 36-seater bus. The 16-seater bus is to serve as a backup for the 26-seater bus when students and instructors are being transported for field training. It is also to be used for transporting instructors to and from the institute. According to the Mozambique side, the pickup truck is to be used for procurement of foodstuffs and transportation of instructors only during field training. As the buses can be used for that purpose, the pickup truck is to be excluded from this project.

(2) Overall Plan

The equipment procured under this project is to be installed in the facilities of Quelimane Institute

of Health Science to be newly opened. Individual items are to be arranged in a manner that makes them consistent with the function of the institute and the activities to be carried out at the institute, in other words, with the facility plan for this project.

(3) Equipment Plan

Table 2-8 lists the main equipment finally to be included in this project as a result of the examination of the requested equipment.

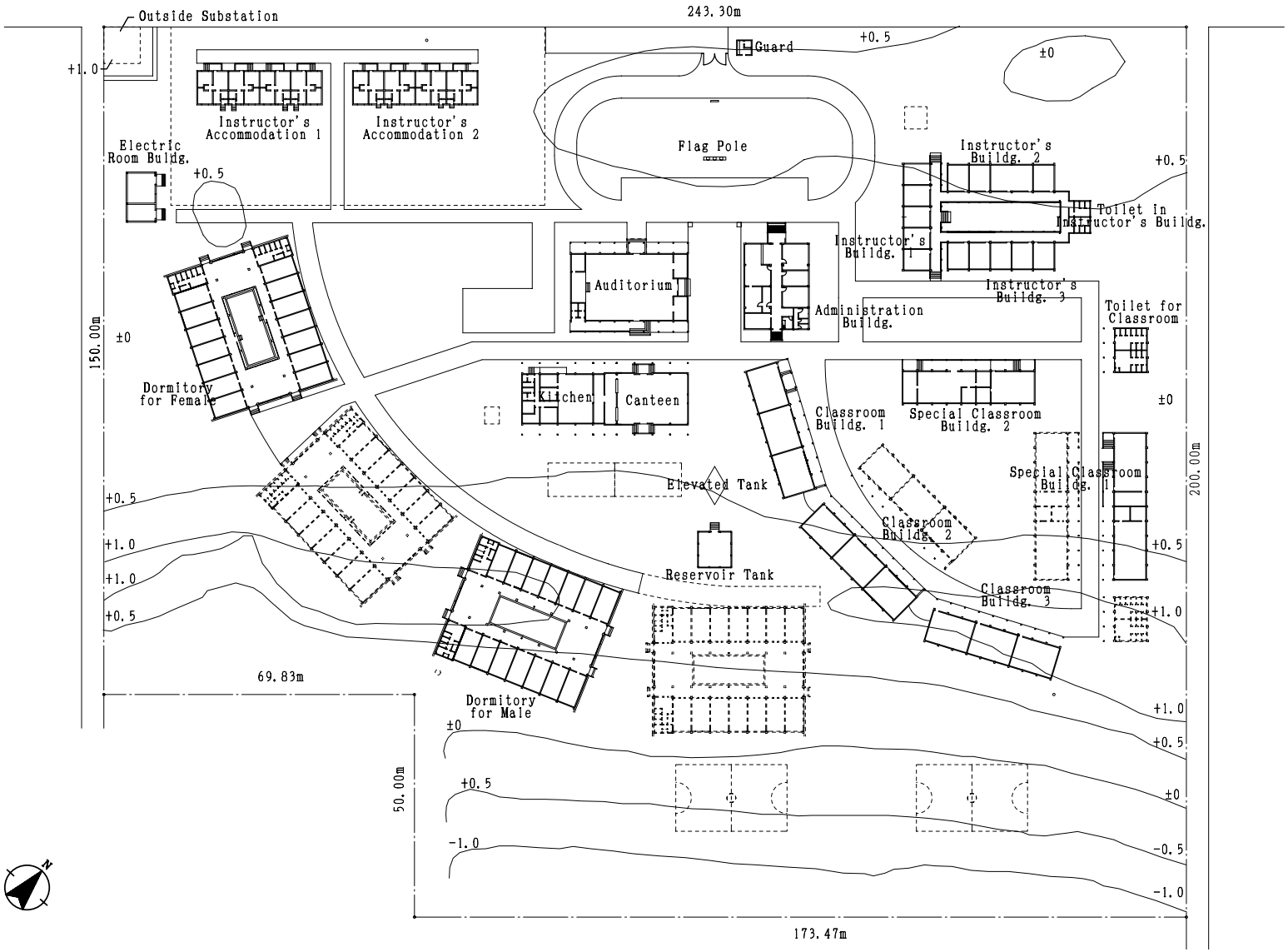
Table 2-8 List of Equipment

Equipment	Main specifications or constituent elements	Planned quantity	Intended use
Binocular microscope for use in training	1. Binocular type 2. Lighting: halogen lamp 3. Magnification: objective lens: 4X, 10X, 40X times, 100X; eyepiece: 10X	30	For use in basic medical education/training
Surgical needle set	1. Surgical needle: 5 types 2. Surgical needle: 5 types 3. Gynecologic needle: 5 types 4. Surgical silk: 5 types	6	For use in basic medical education/training
Forceps set	1. Material: steel 2. No. of constituent elements:	6	For use in basic medical education/training
Hospital ware for use in medical education/training	1. Surgical gloves: 2 sizes 2. 3. Infusion set: 200 sets 4. Infusion bottle: glass, 1000 ml 5. Elastic bandage 6. Nutrient catheter: 5 sizes, with funnel tube 7. Endotracheal tube: 15 sizes, with cuff/without cuff 8. Urethral catheter: 3 sizes	6	For use in basic medical education/training
Desktop computer for use in training	1. OS: Windows XP Professional 2. CPU: Pentium 4 2.60 Ghz 3. Primary memory: 128 Mb 4. Hard disk: 40 GB 5. CD-ROM drive 6. Floppy disk 7. Monitor: 15” liquid crystal monitor	16	To be used in training in computer room.
Desk for student	1. Desk for student 2. 2. Materials 1) Top board: melamine-coated decorative laminate 2) Frame: steel 3. With storage case and side hook 4. Dimensions: approx. 650 mm (W) by 450 mm (D) by 700 mm (H)	270	For student to use in the class.
Reading table	1. Carrel 2. Materials: decorative plywood 3. For a single student 4. Approx. 900 mm (W) by 700 mm (D) by 1200 mm (H)	12	Reading table
Desk for instructor	1. Materials 1) Top board: melamine-coated decorative laminate 2) Base: steel 2. No. of drawers: 3 or more (right side of desk) 3. With key-operated lock 4. Approx. 1200 mm (W) by 700 mm (D) by 700 mm (H)	40	Desk for general instructor. To be used in staff room and classroom.
Chair for instructor	1. Seat separated from seat back 2. With armrest 3. Materials 1) Seat/seat back: cloth-covered urethane 2) Base: plastic 4. With casters	40	Chair for use in staff room. To be used in staff room and classroom.

Equipment	Main specifications or constituent elements	Planned quantity	Intended use
Chair for use in accommodations	1. Materials 1) Seat/seat back: cloth-covered urethane 2) Base: plywood 2. Dimensions of seat: approx. 500 mm (W) by 550 mm (D) by 450 mm (H)	200	Chair for use with study desk. To be used in study area within accommodation.
Chair for use in auditorium	1. Materials 1) Seat/seat back: plastic covered with artificial leather 2) Base: steel 2. Dimensions of seat: approx. 500 mm (W) by 480 mm (D) by 440 mm (H)	310	To be used in the auditorium curing ceremonies, general meetings, or seminars.
Chair for use in canteen	1. Stackable 2. Materials 1) Seat/seat back: polypropylene 2) Base/frame: steel 3. Dimensions 1) Seat/seat back: 400 mm (W) by 400 mm (D) by 440 mm (H) 2) Height of seat back: approx. 850 mm	144	Chair for use with table in canteen
Bunk bed	1. Type: bunk bed 2. Materials 1) Frame: steel 2) Mattress: urethane or polyester 3 Dimensions 1) Frame: approx. 1900 mm (L) by 600 mm (D) by 1700 mm (H)	100	For use in student accommodations
Steel shelf	1. Material: steel 2. Max. capacitive load 3. No. of shelves: 5 4. Dimensions: approx. 900 mm (W) by 600 mm (D) by 1700 mm (H)	72	Furniture. To be used for storing books.
Medium-sized bus	1. Diesel engine 2. 30 or more passengers 3. Manual, 5-speed 4. With air conditioner	1	For transportation of students and instructors during extramural training
Minibus	1. Diesel engine 2. 15 or more passengers 3. Manual, 5-speed 4. With air conditioner	1	For transportation of students and instructors during extramural training

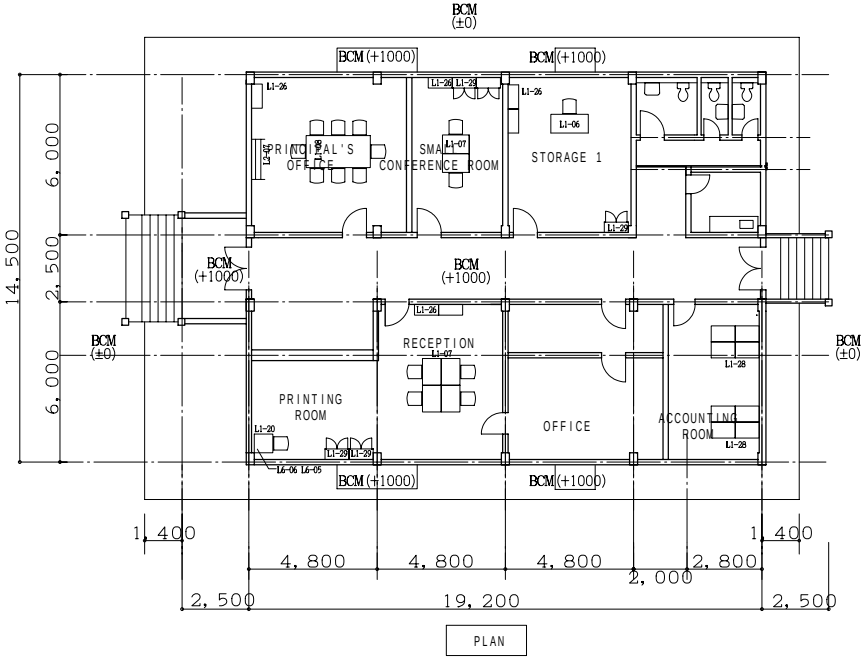
2-2-3 Basic Design Drawing

1.	Site plan	
2.	Administration building	floor plan, elevation, section
3.	Instructors building No. 1	floor plan, elevation, section
4.	Instructors building No. 2	floor plan, elevation, section
5.	Instructors building No. 3	floor plan, elevation, section
6.	Toilet for instructors	floor plan, elevation, section
7.	Classroom building No. 1	floor plan, elevation, section
8.	Classroom building No. 2	floor plan, section
9.	Classroom building No. 3	floor plan, section
10.	Toilet for classroom	floor plan, elevation, section
11.	Special classroom building No. 1	floor plan, section
12.	Special classroom building No. 1	elevation
13.	Special classroom building No. 2	floor plan, elevation, section
14.	Auditorium	floor plan, section
15.	Auditorium	elevation
16.	Canteen building	floor plan, section
17.	Canteen building	elevation
18.	Dormitory for male students	floor plan, section
19.	Dormitory for male students	elevation
20.	Dormitory for female students	floor plan, section
21.	Instructor accommodations No. 1	floor plan, elevation, section
22.	Instructor accommodations No. 2	floor plan, elevation
23.	Guard station, electric room building, outdoor substation	floor plan, elevation, section
24.	Water storage tank, elevated water tank	floor plan, elevation, section

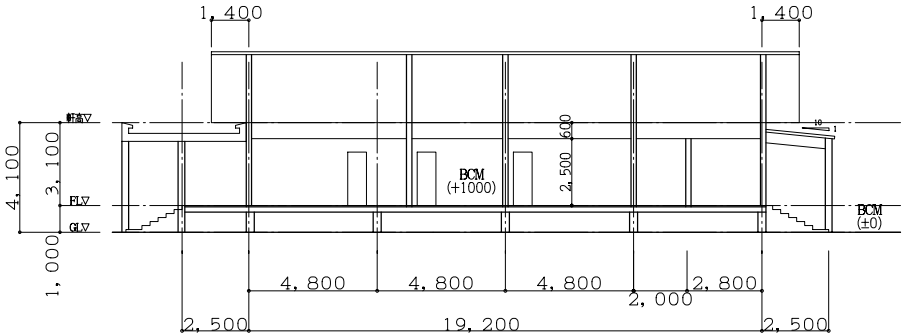


The Project for Improvement of the Institute of Health Science of Quilimane in the Republic of Mozambique

Site Plan



PLAN



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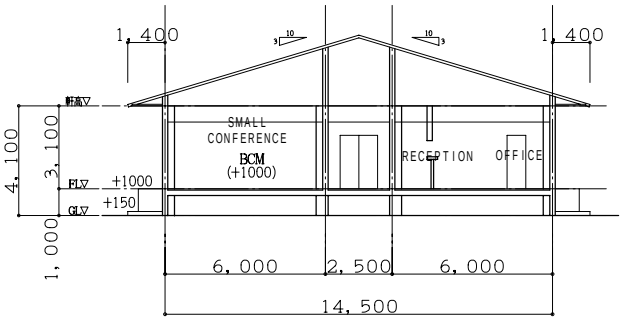

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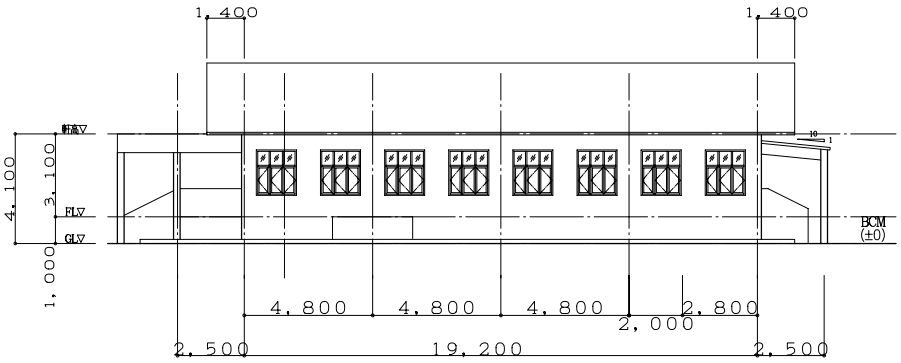
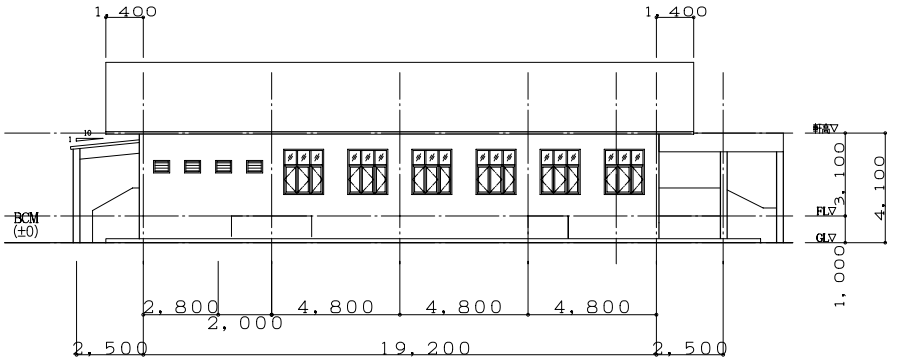
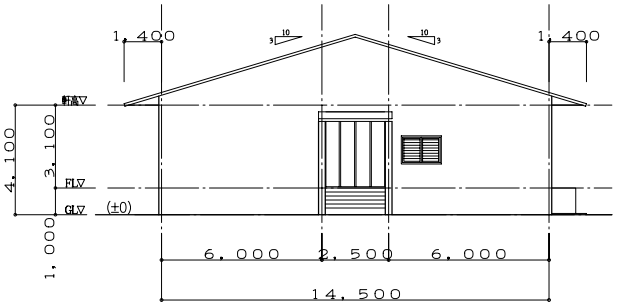


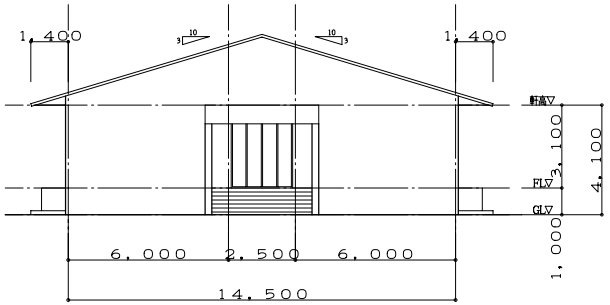
SOUTH ELEVATION



NORTH ELEVATION



EAST ELEVATION



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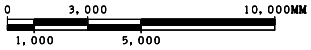
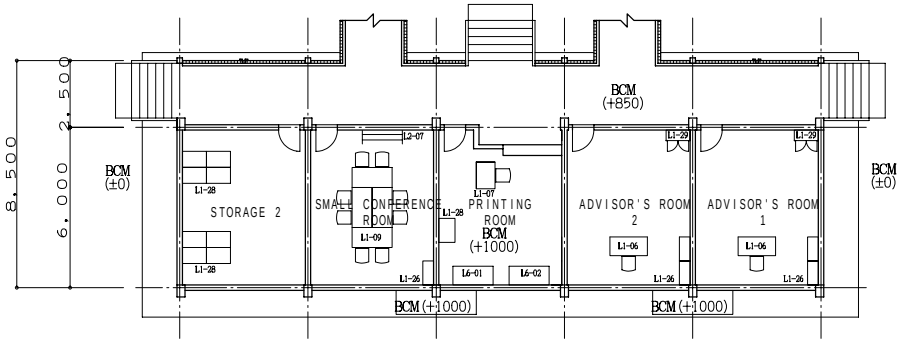
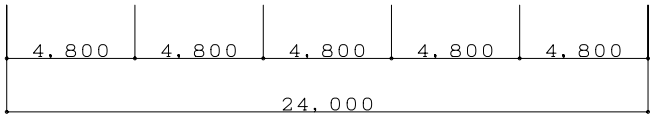


THE PROJECT FOR IMPROVEMENT OF THE INSTITUTE OF HEALTH SCIENCE OF QUELIMANE IN THE REPUBLIC OF MOZANBIQUE

ADMINISTRATION BUILDING PLAN, SECTION, ELEVATION





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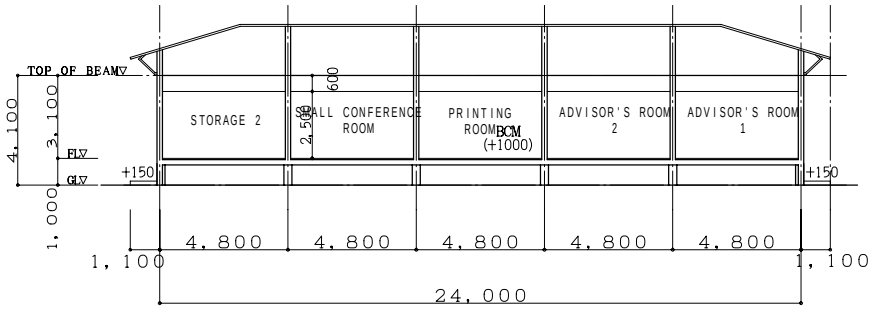

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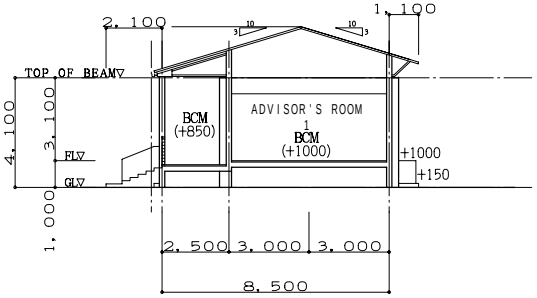

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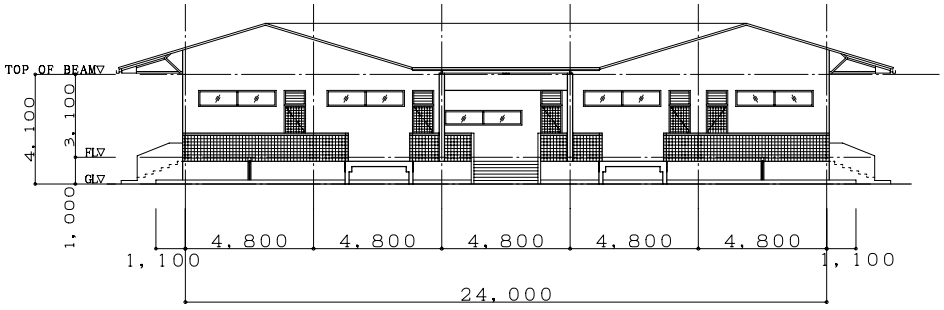

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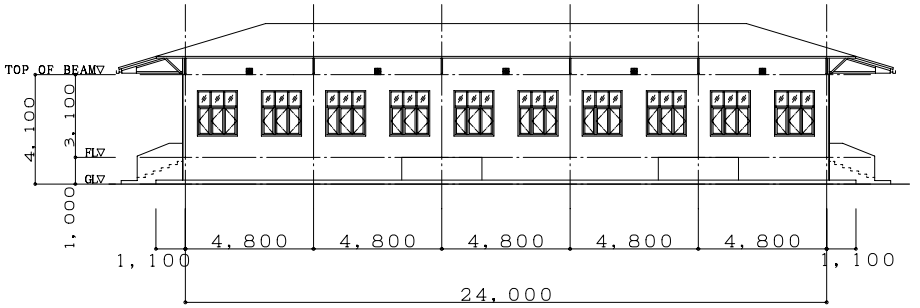
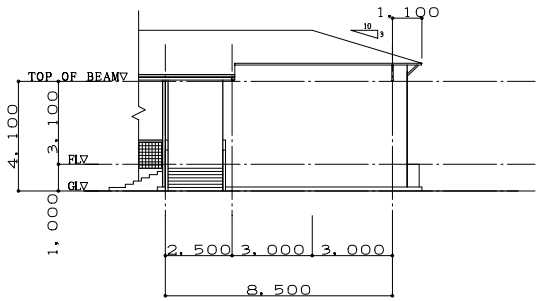


NORTH ELEVATION



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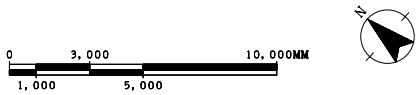

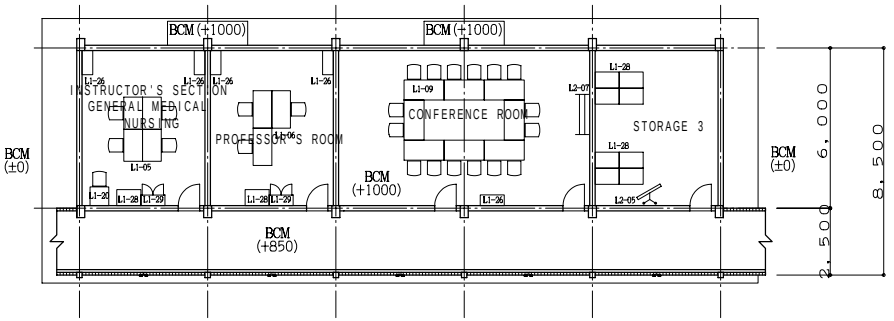

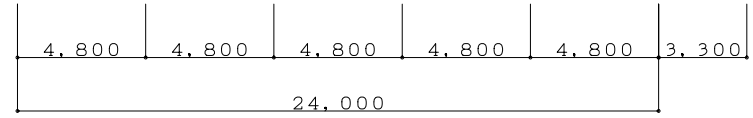

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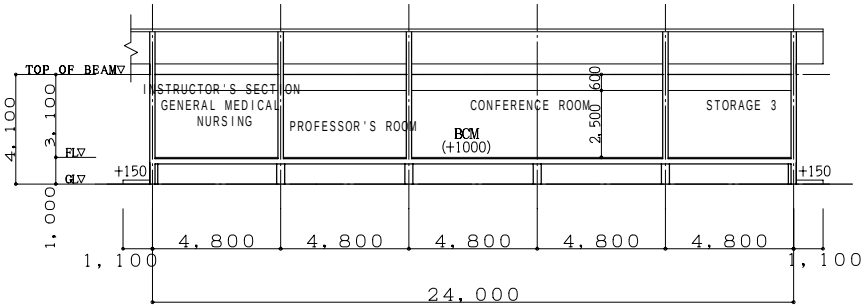

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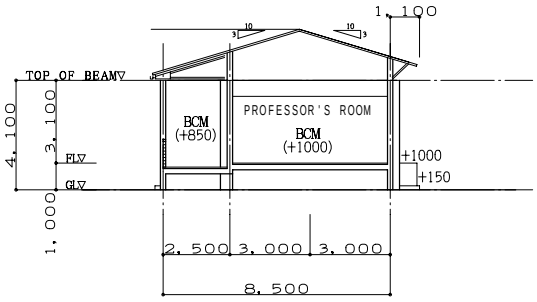

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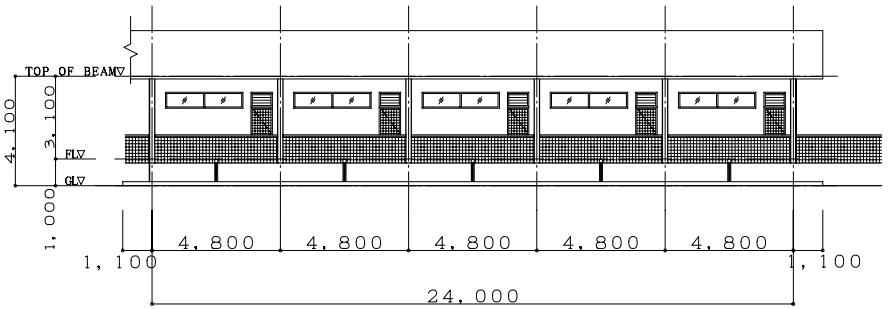
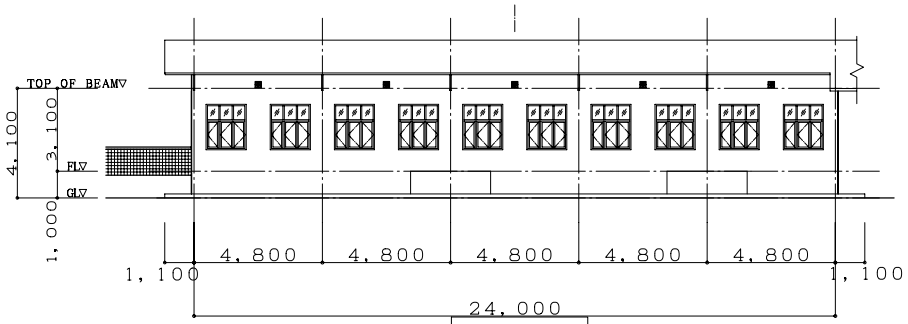


SOUTH ELEVATION



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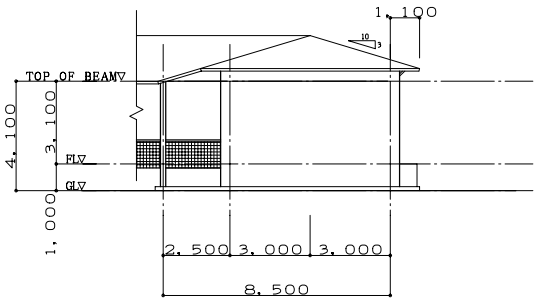
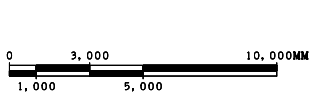
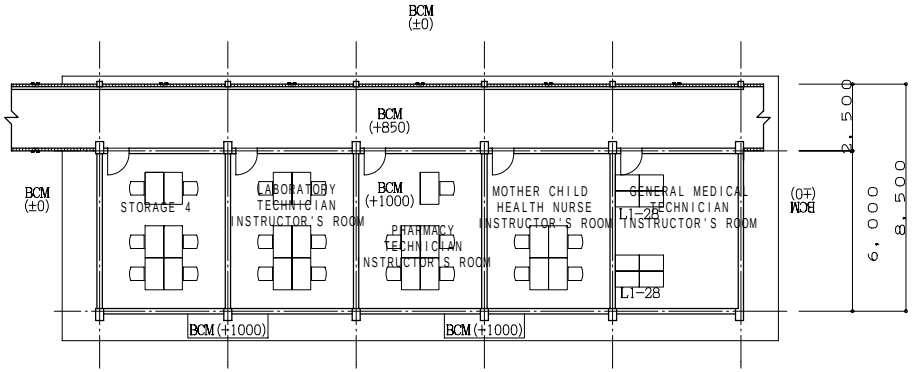


EAST ELEVATION





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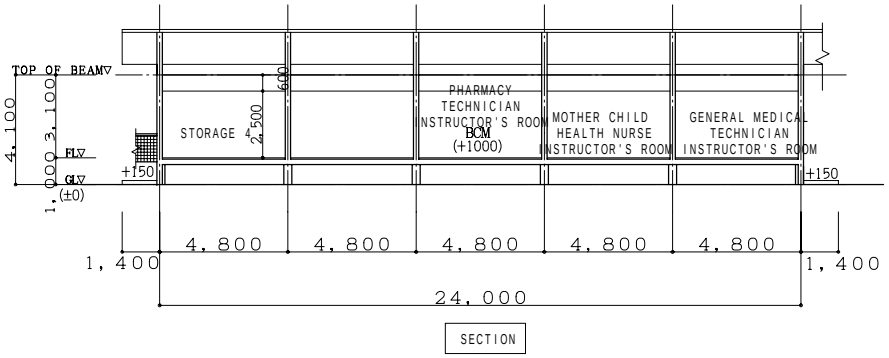

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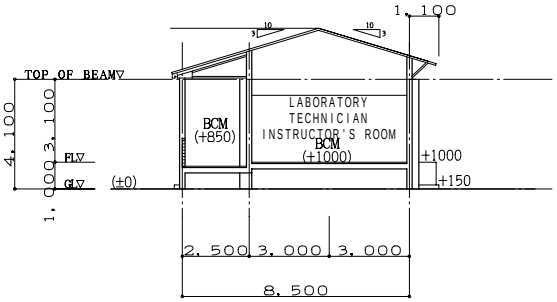

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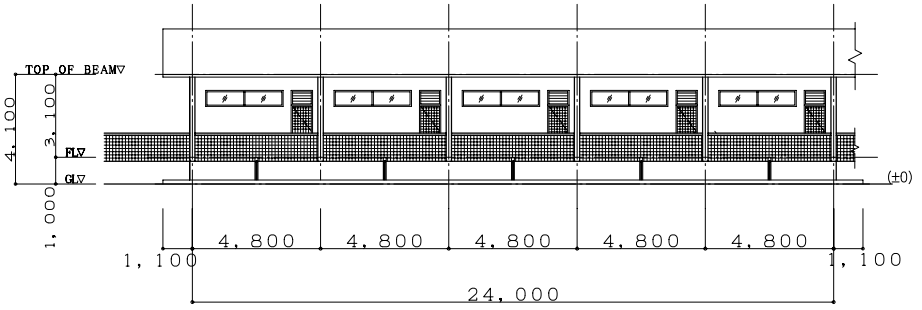

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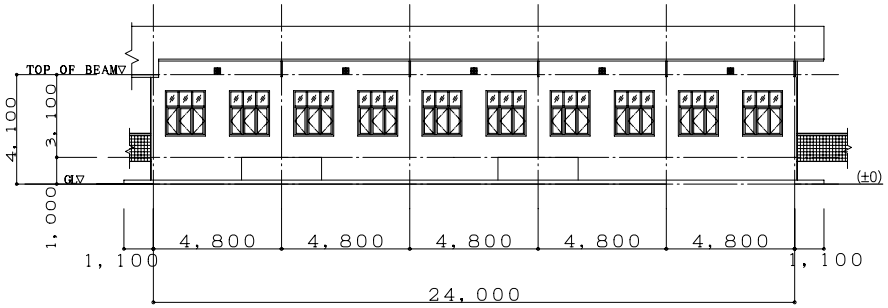
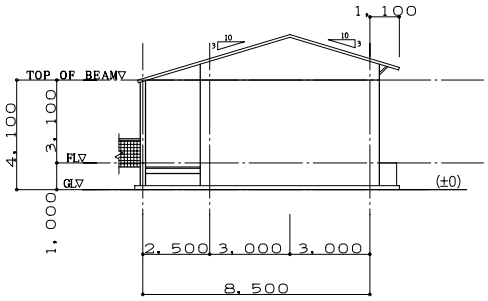


NORTH ELEVATION



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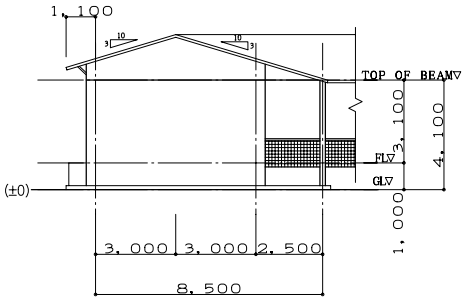

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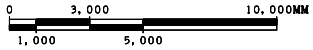

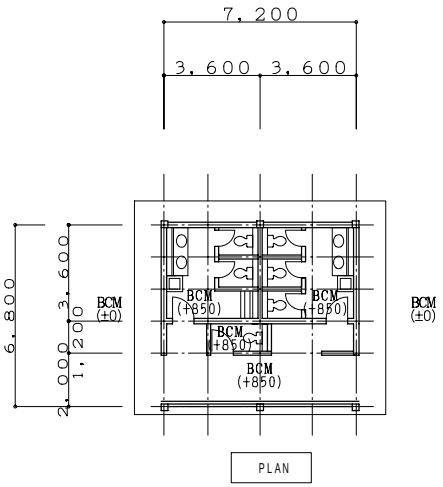

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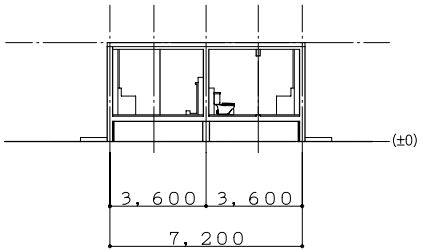

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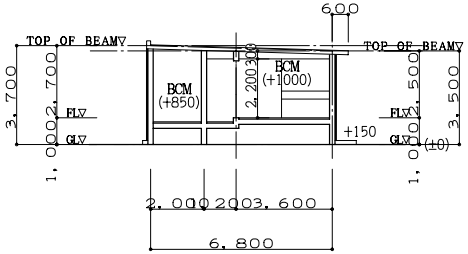

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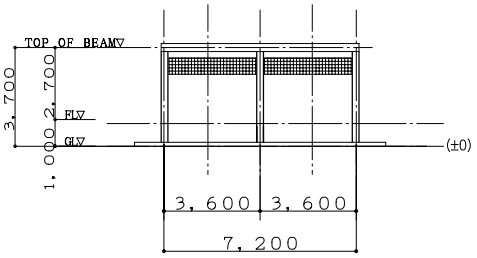
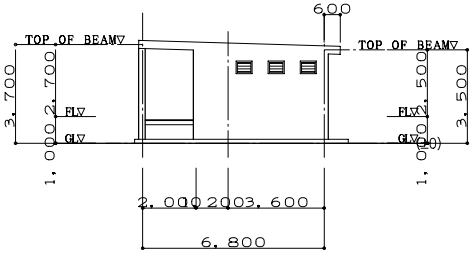
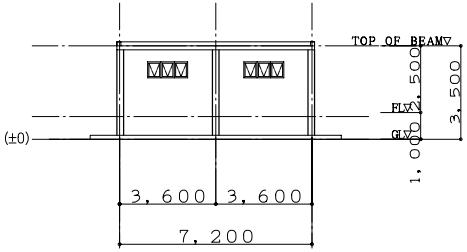


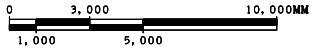
SOUTH ELEVATION

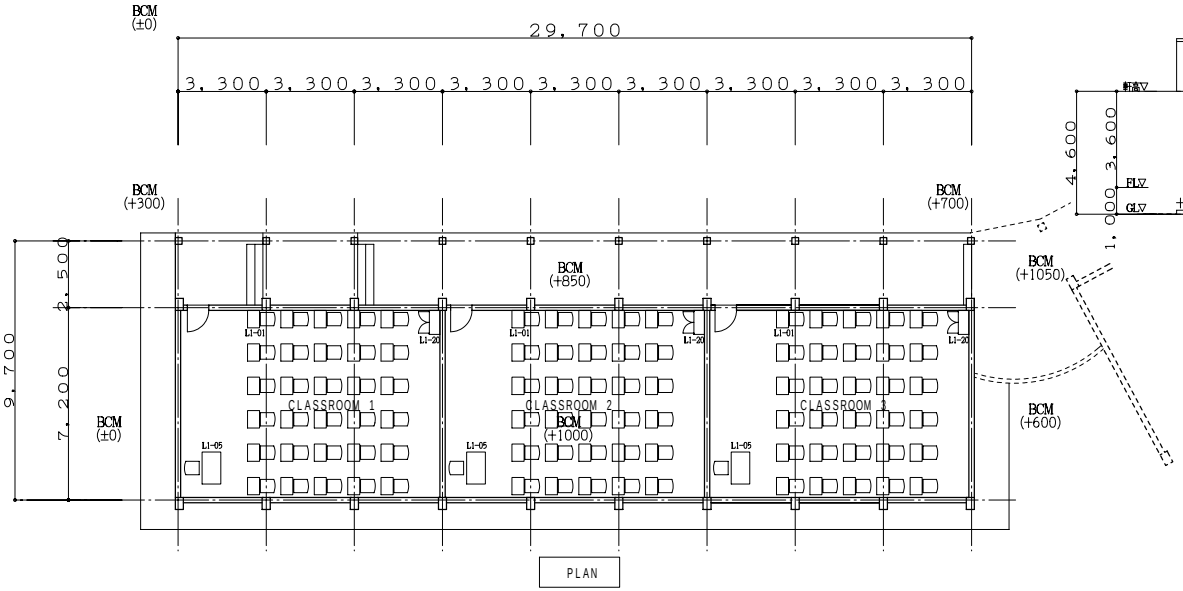


EAST ELEVATION



NORTH ELEVATION





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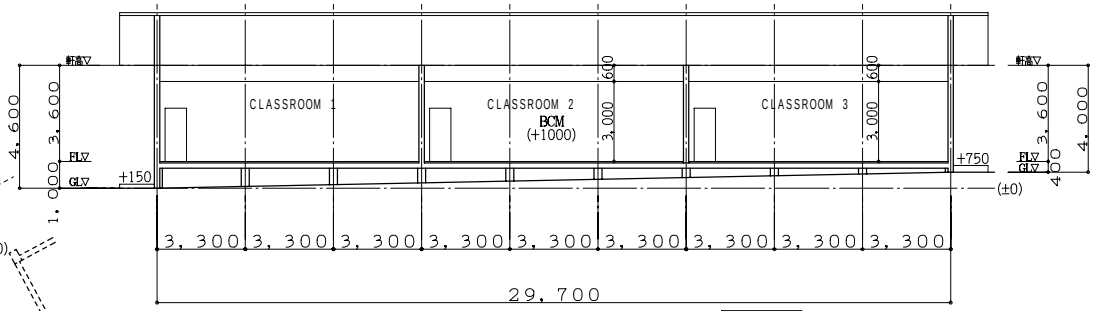

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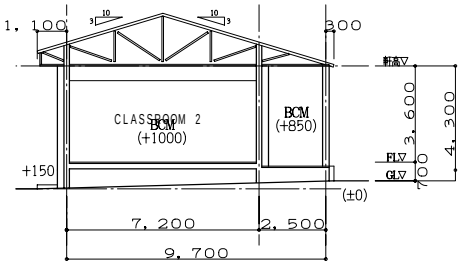

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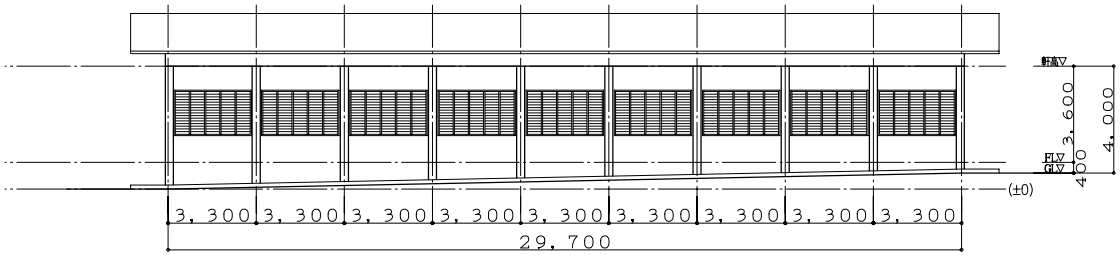

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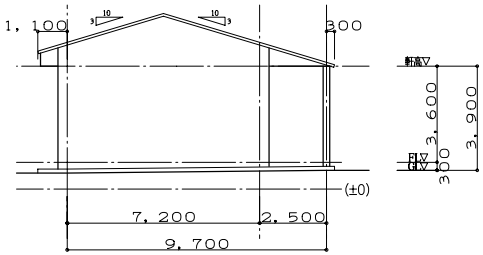
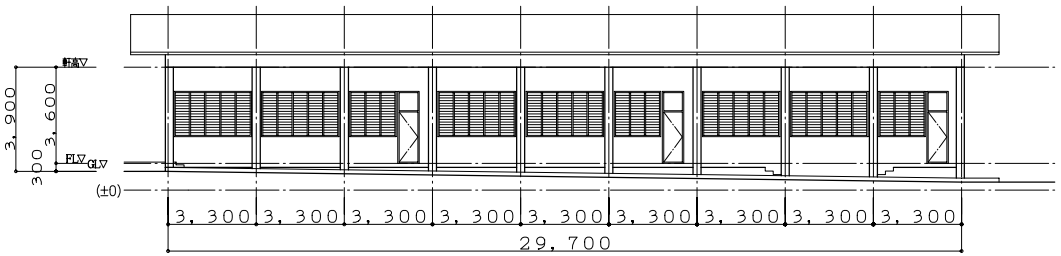


EAST ELEVATION



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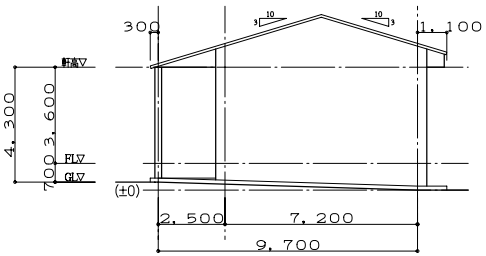
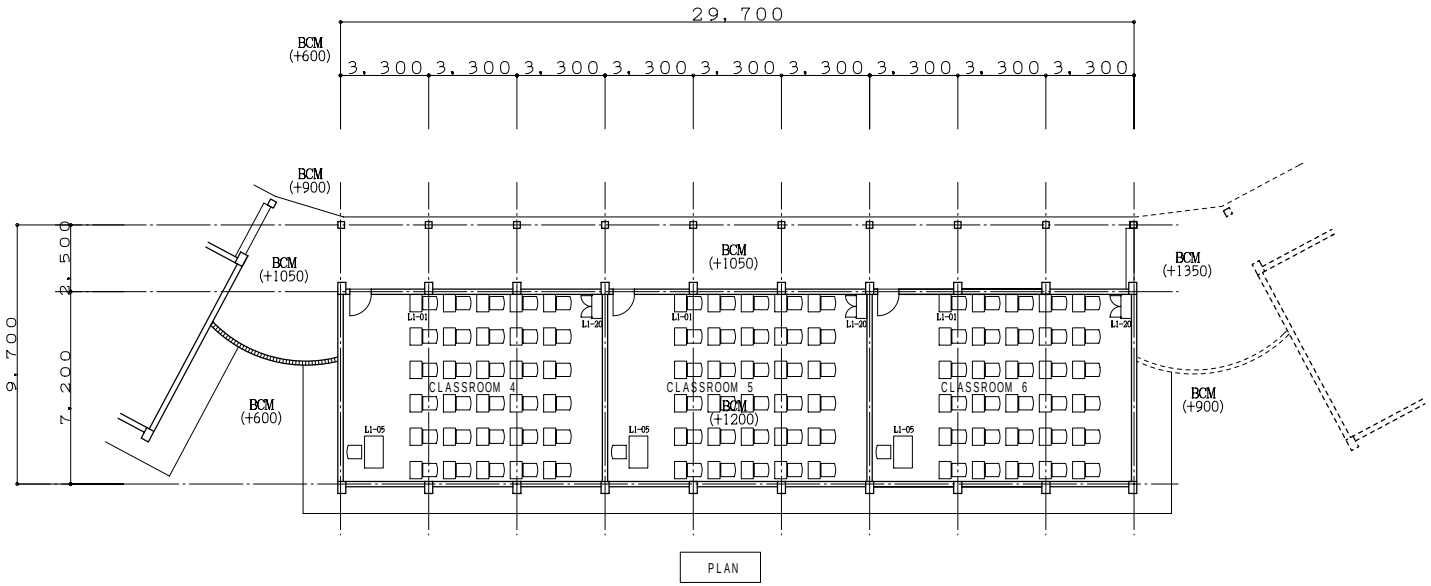


WEST ELEVATION



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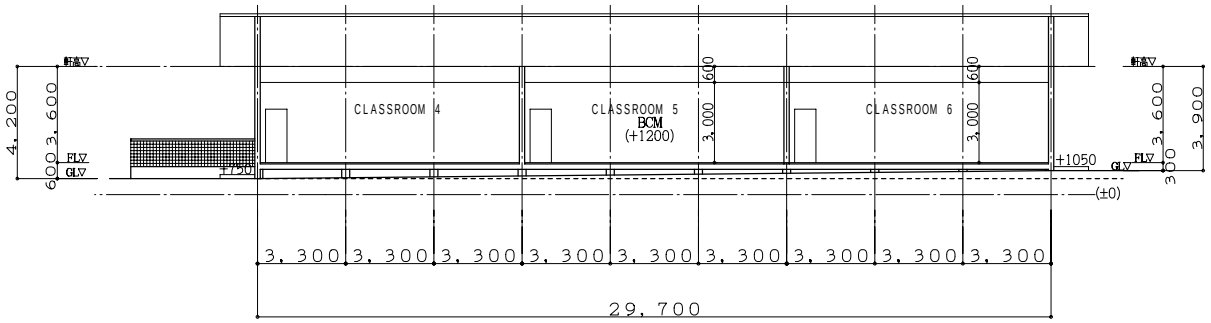

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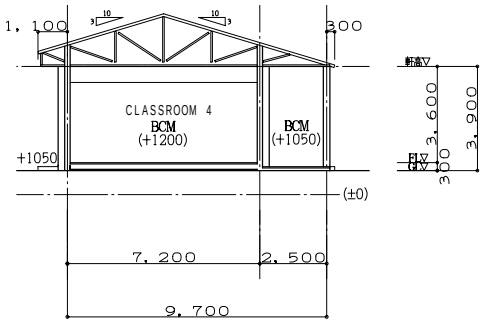

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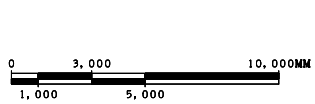

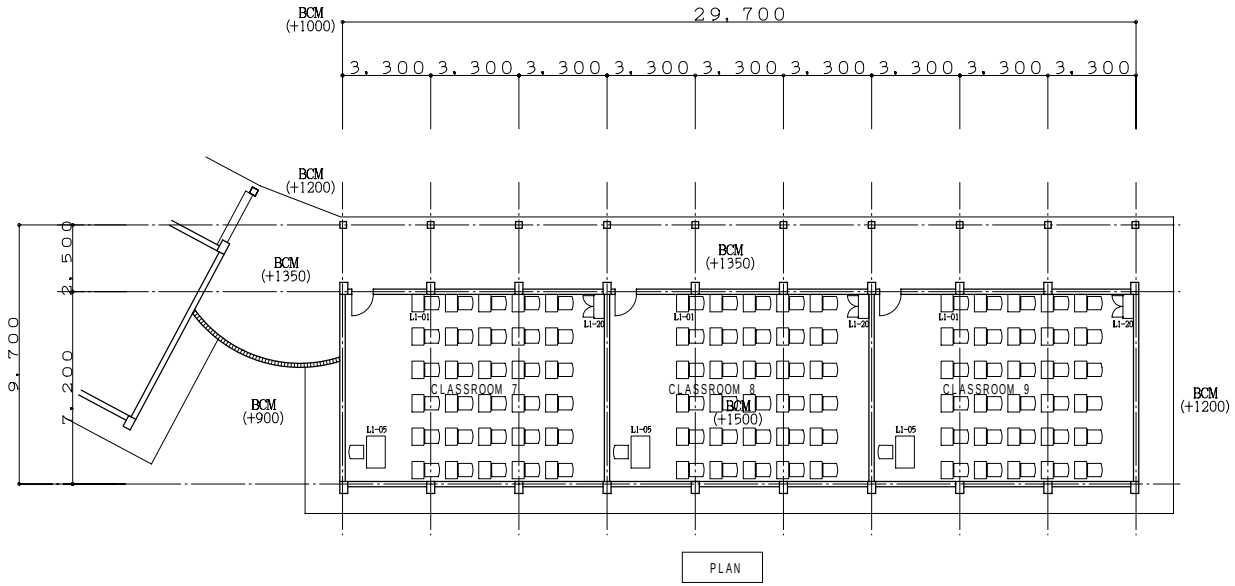

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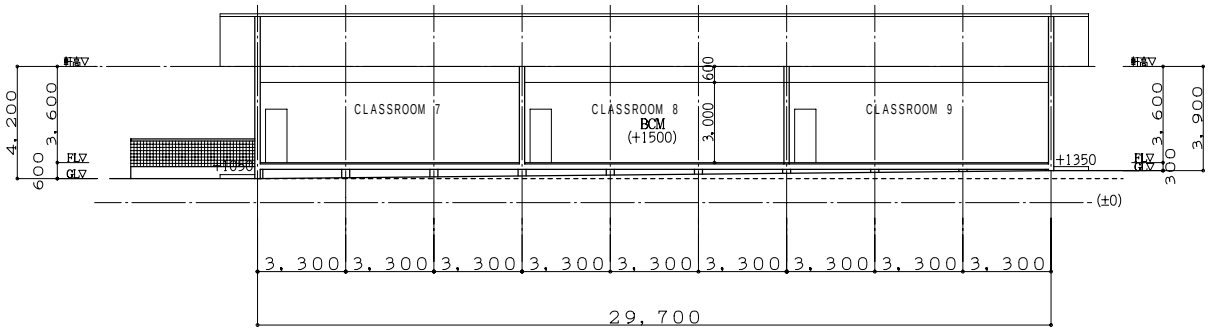

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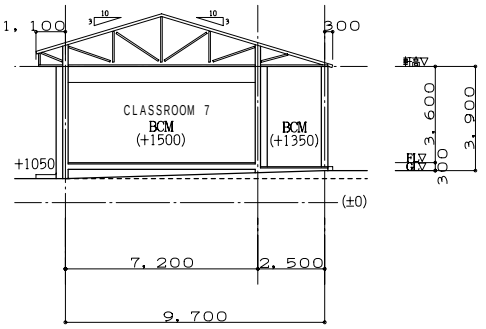

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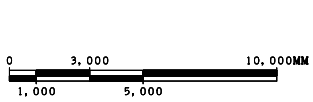

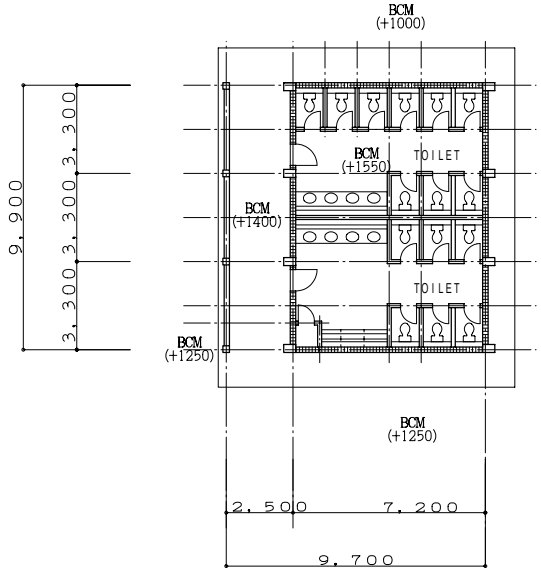

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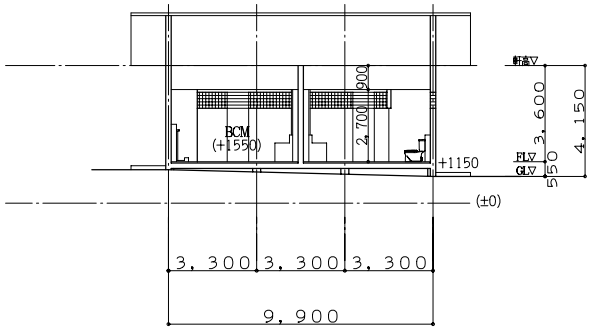

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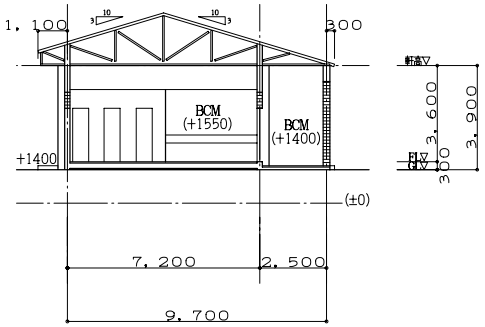

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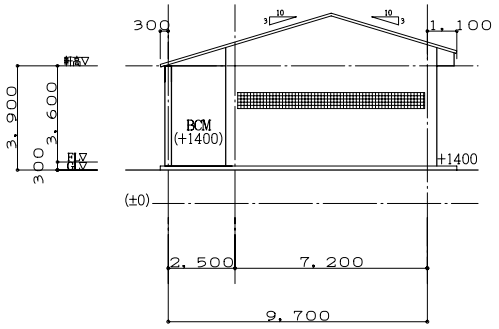

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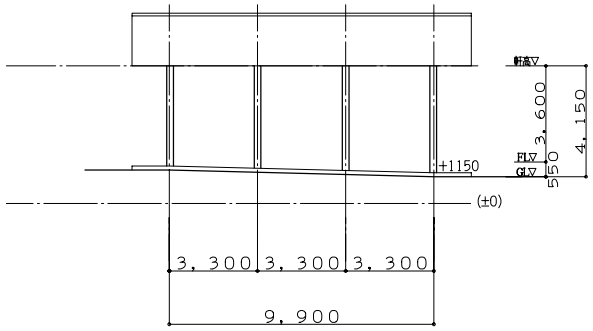

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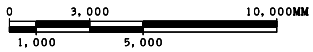

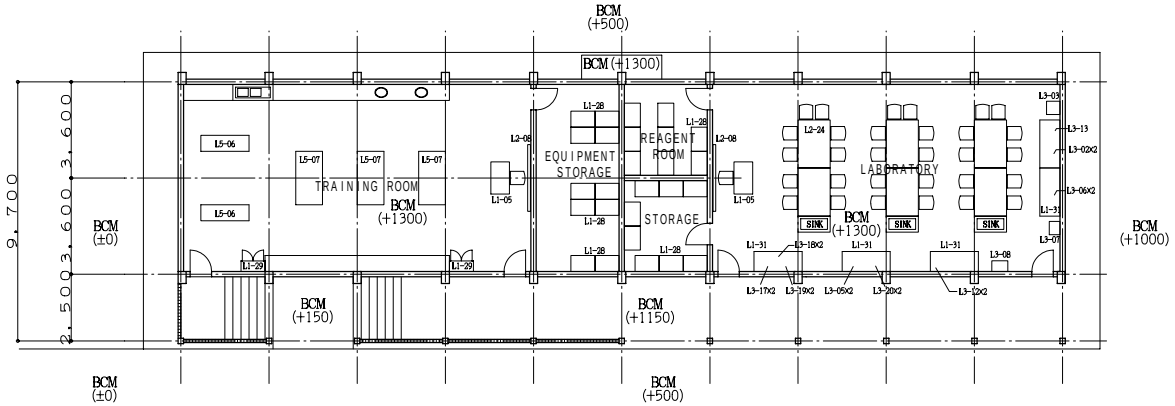

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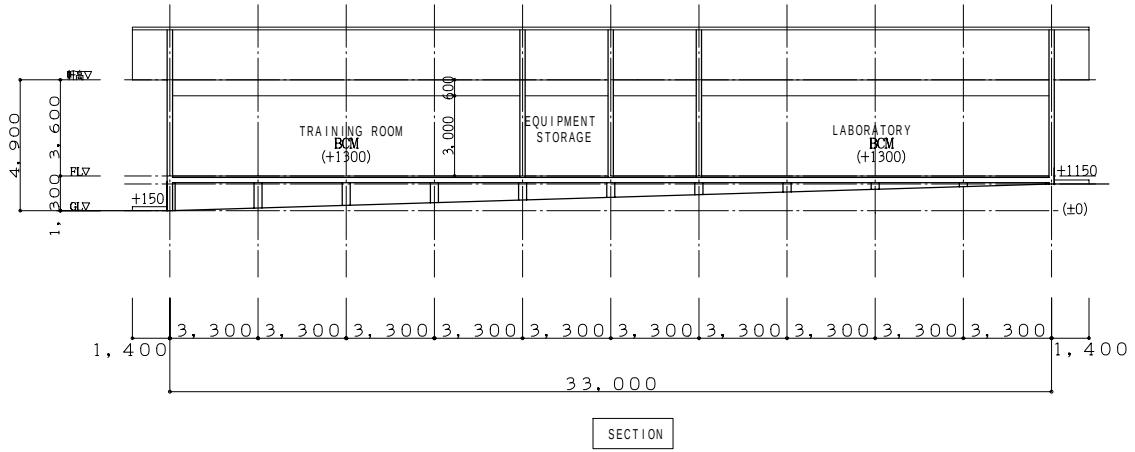

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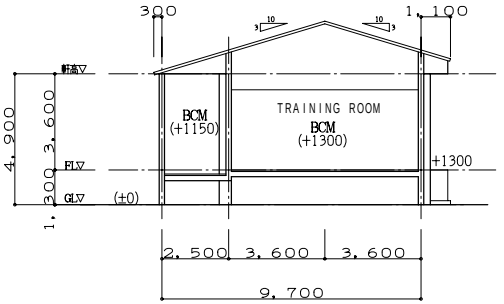

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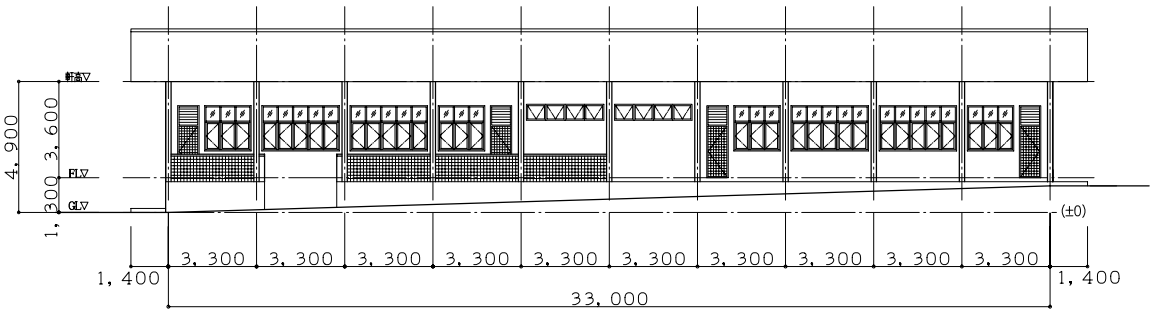
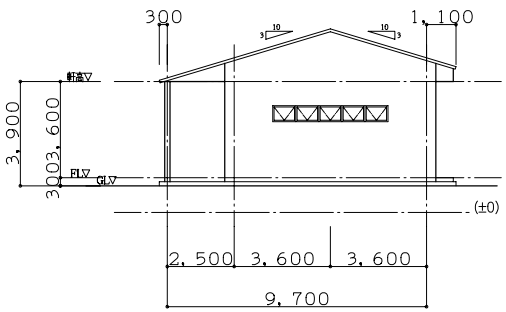
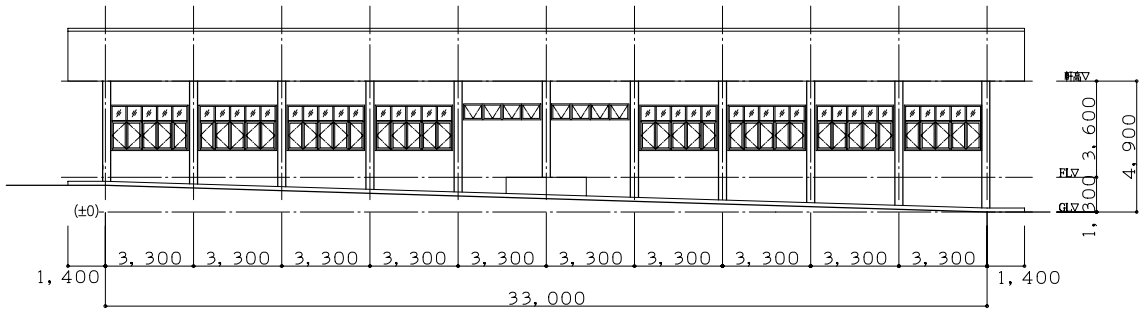


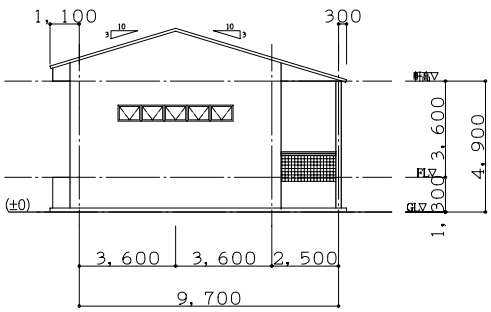
SOUTH ELEVATION



EAST ELEVATION

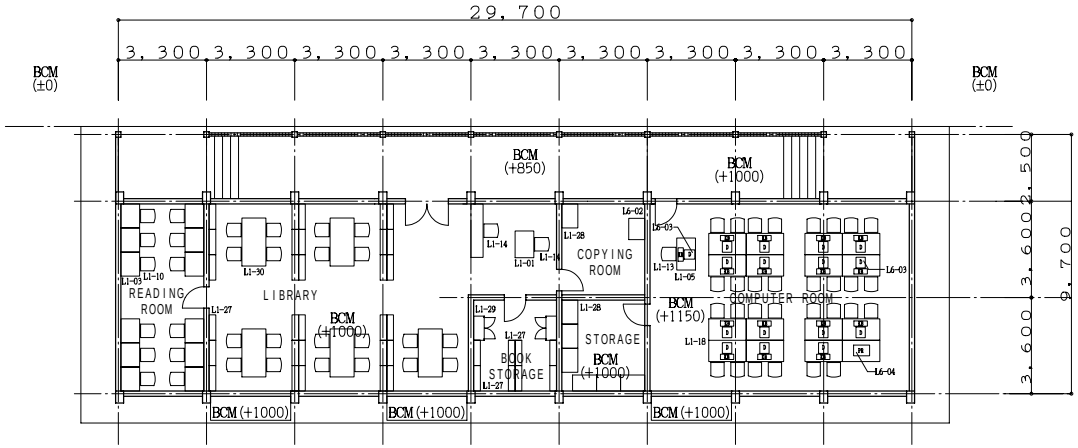


NORTH ELEVATION



WEST ELEVATION

0 3, 000 10, 000MM
1, 000 5, 000



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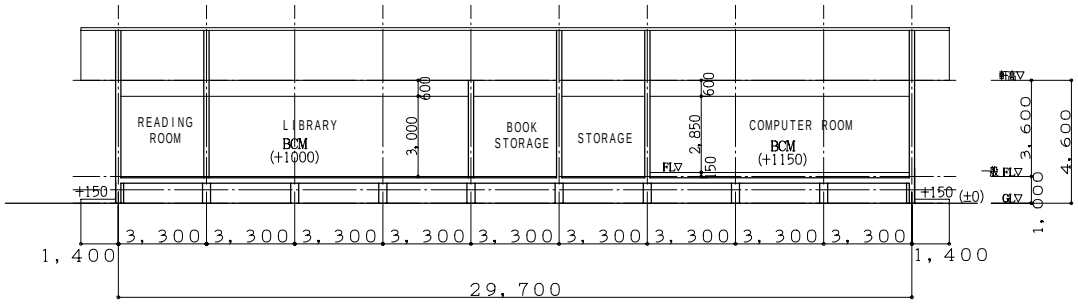

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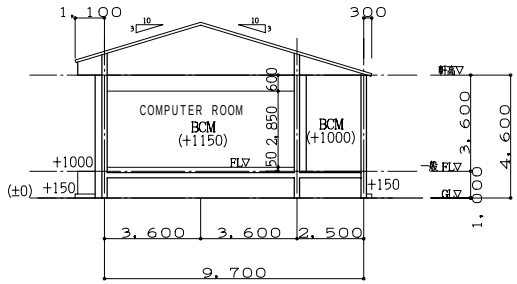

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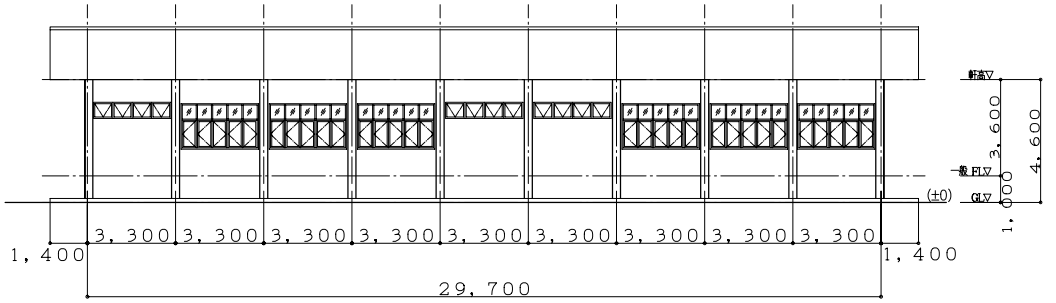
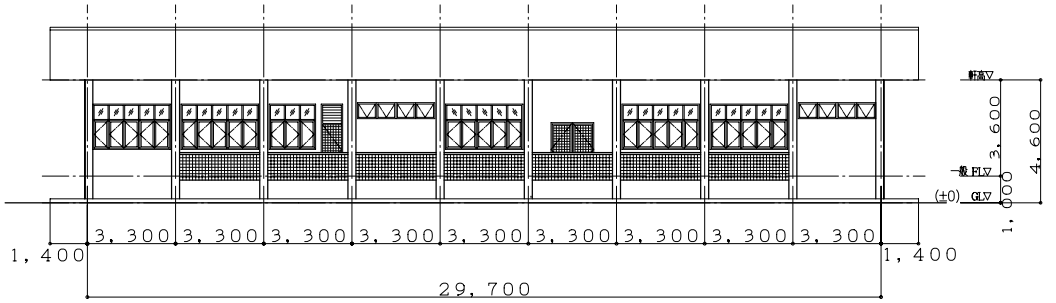
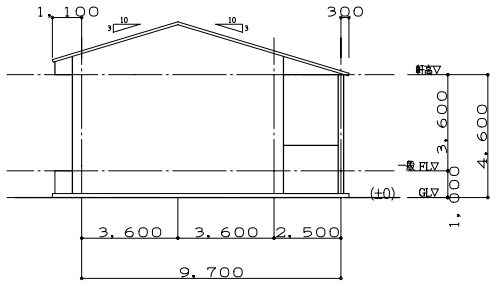


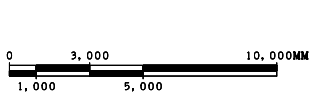
SOUTH ELEVATION

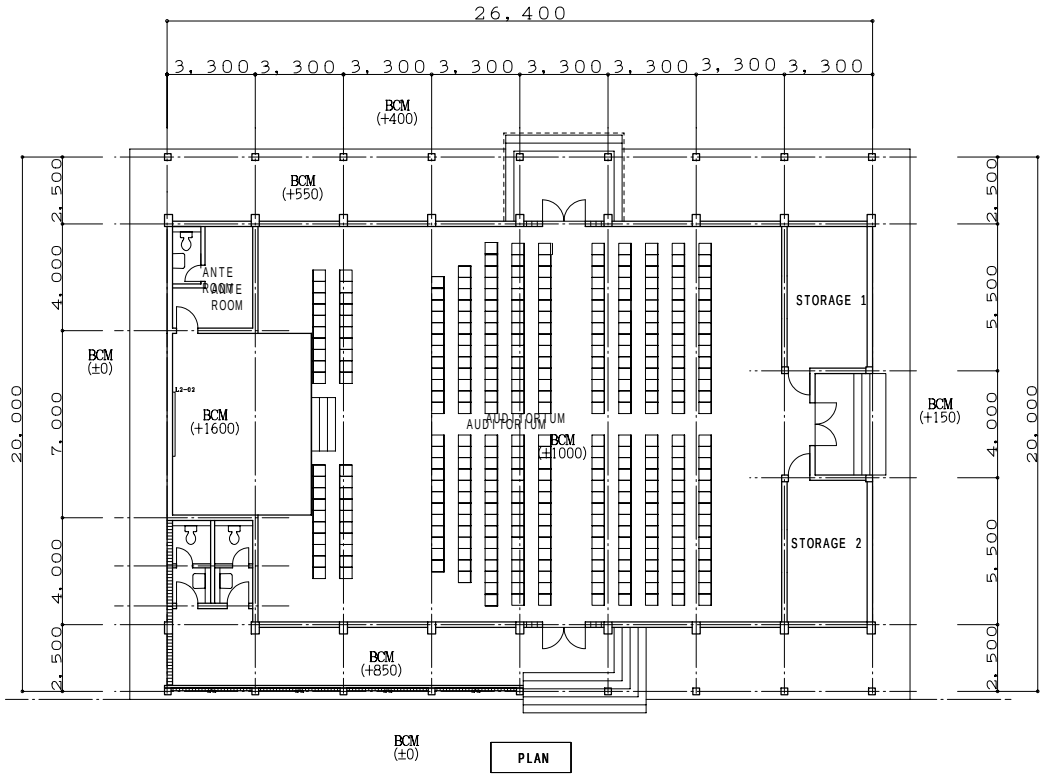


NORTH ELEVATION



EAST ELEVATION





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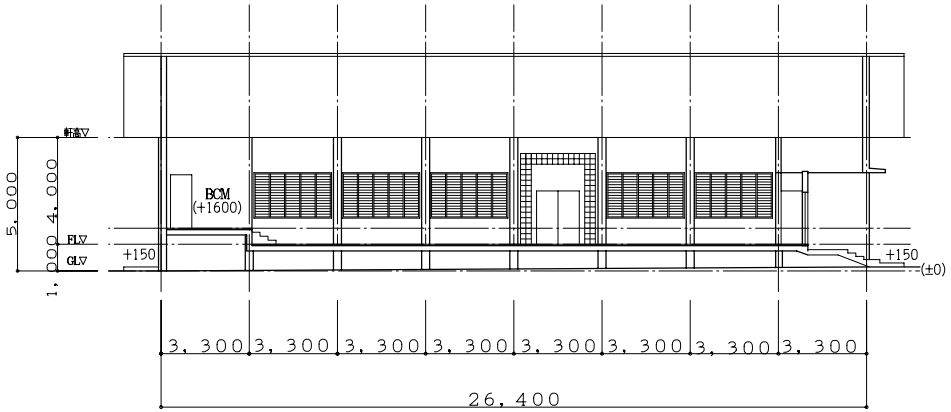

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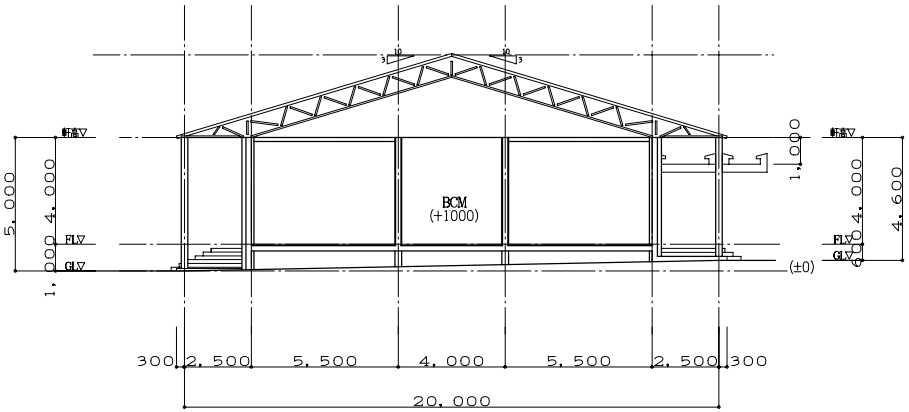

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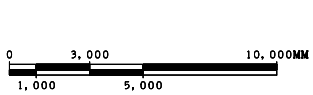
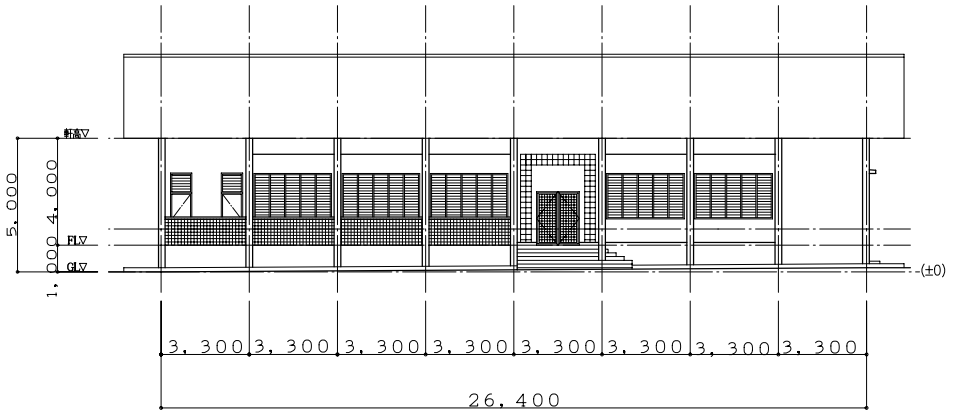
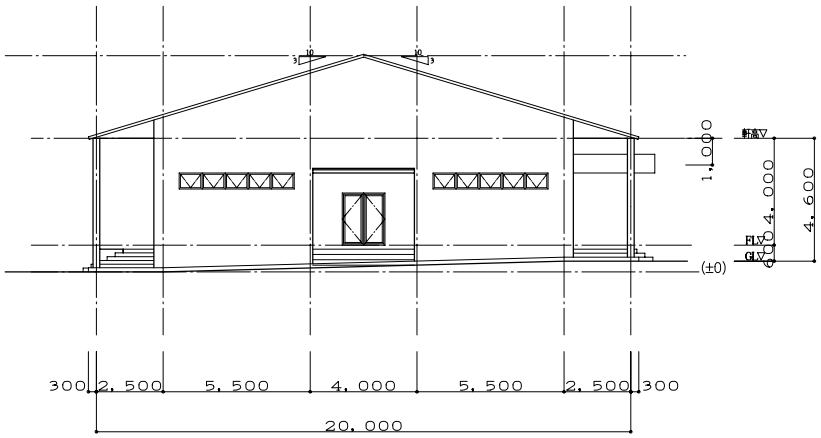
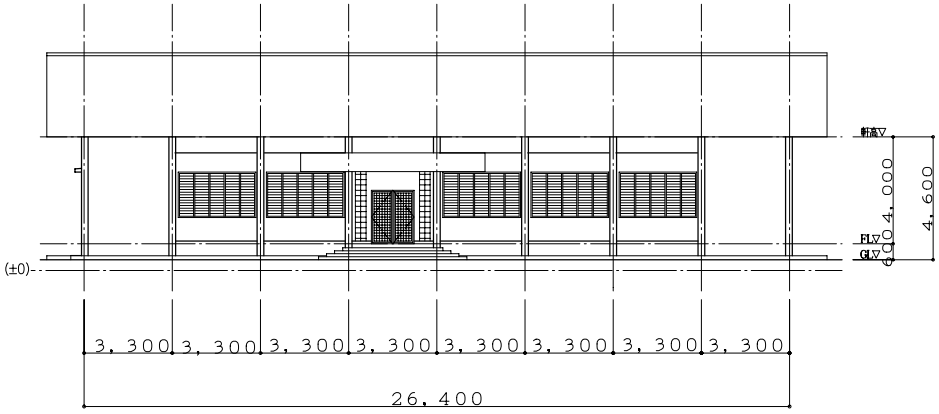




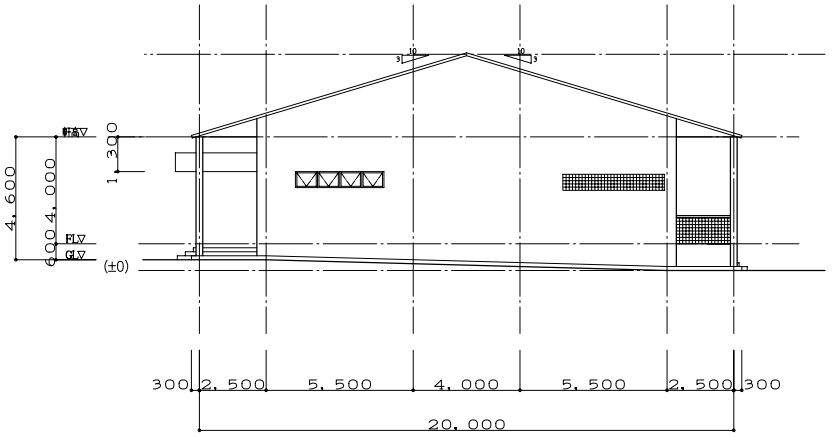
SOUTH ELEVATION



EAST ELEVATION

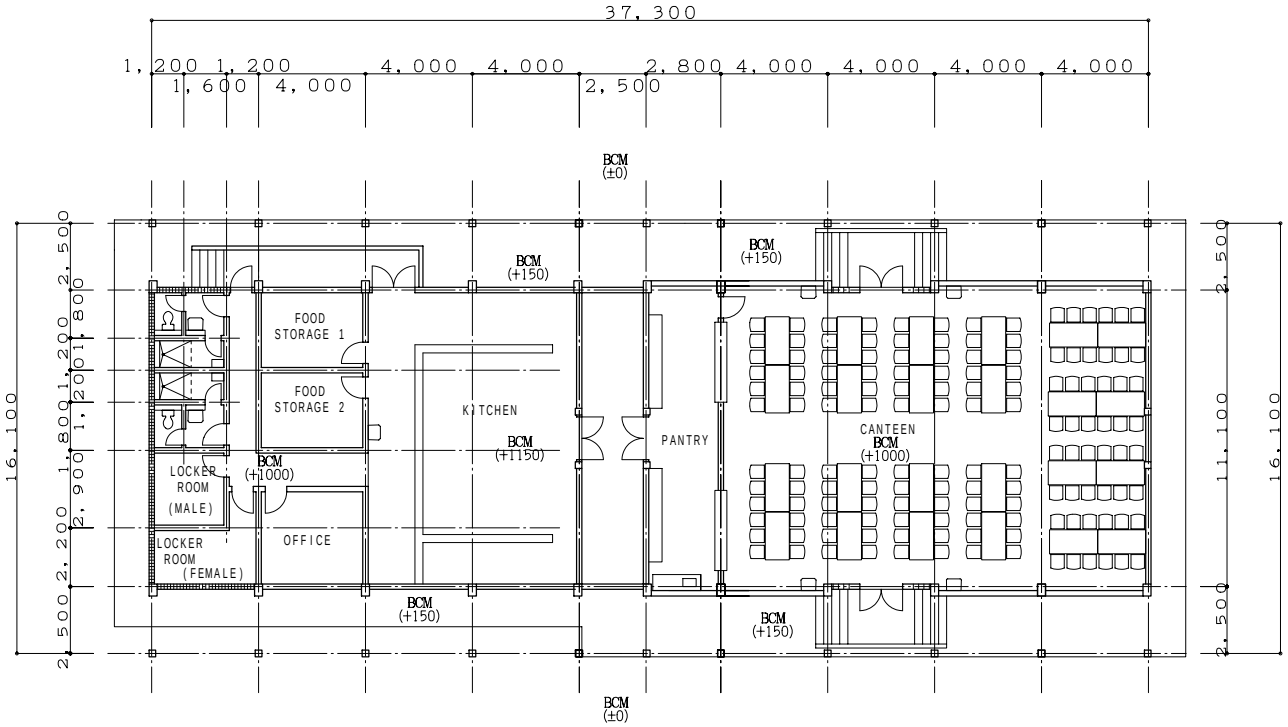


NORTH ELEVATION



WEST ELEVATION

0 3,000 10,000MM
1,000 5,000



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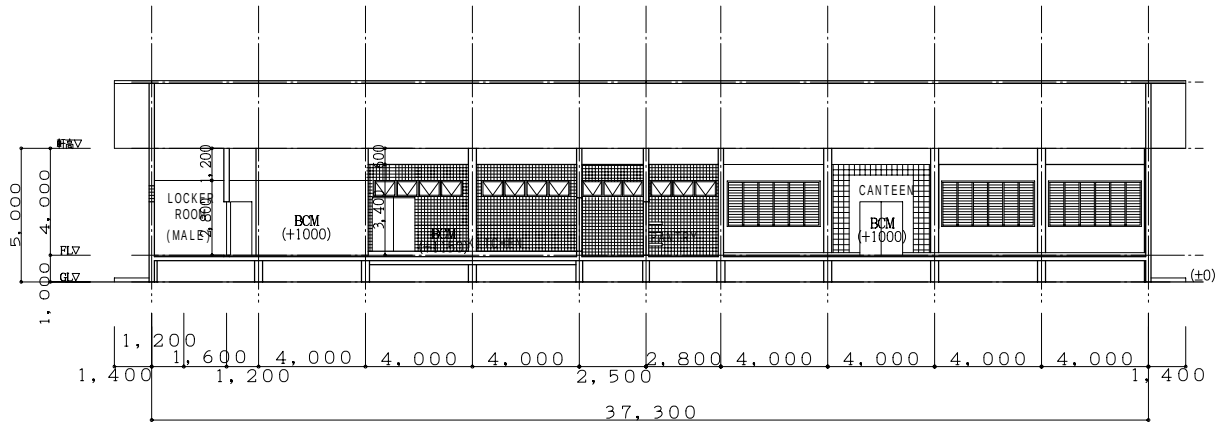

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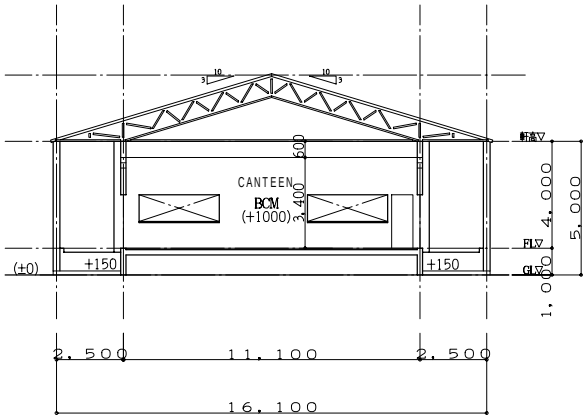

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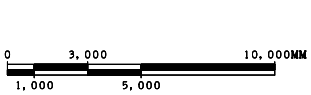

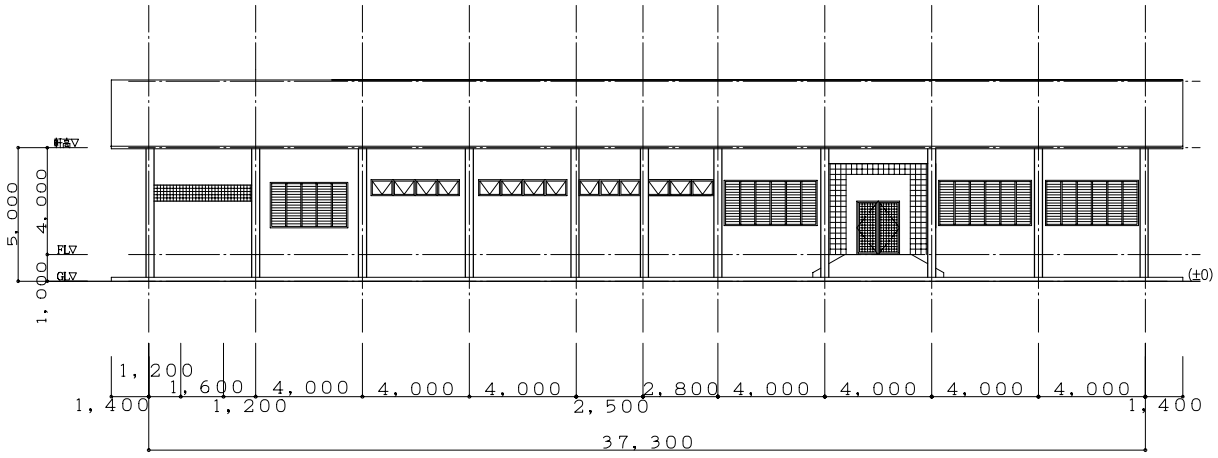

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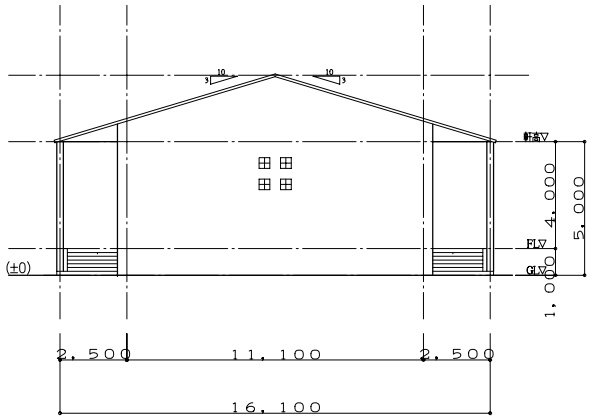

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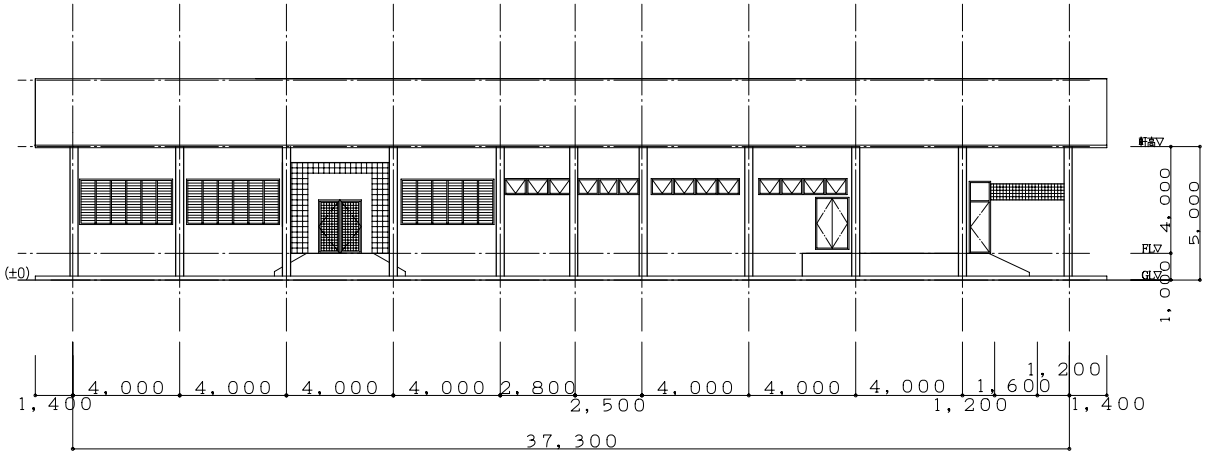

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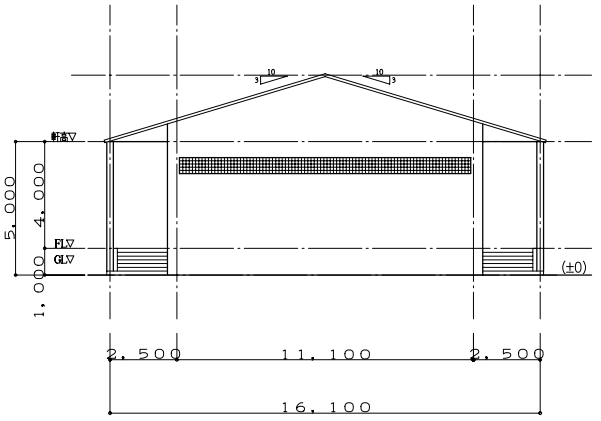

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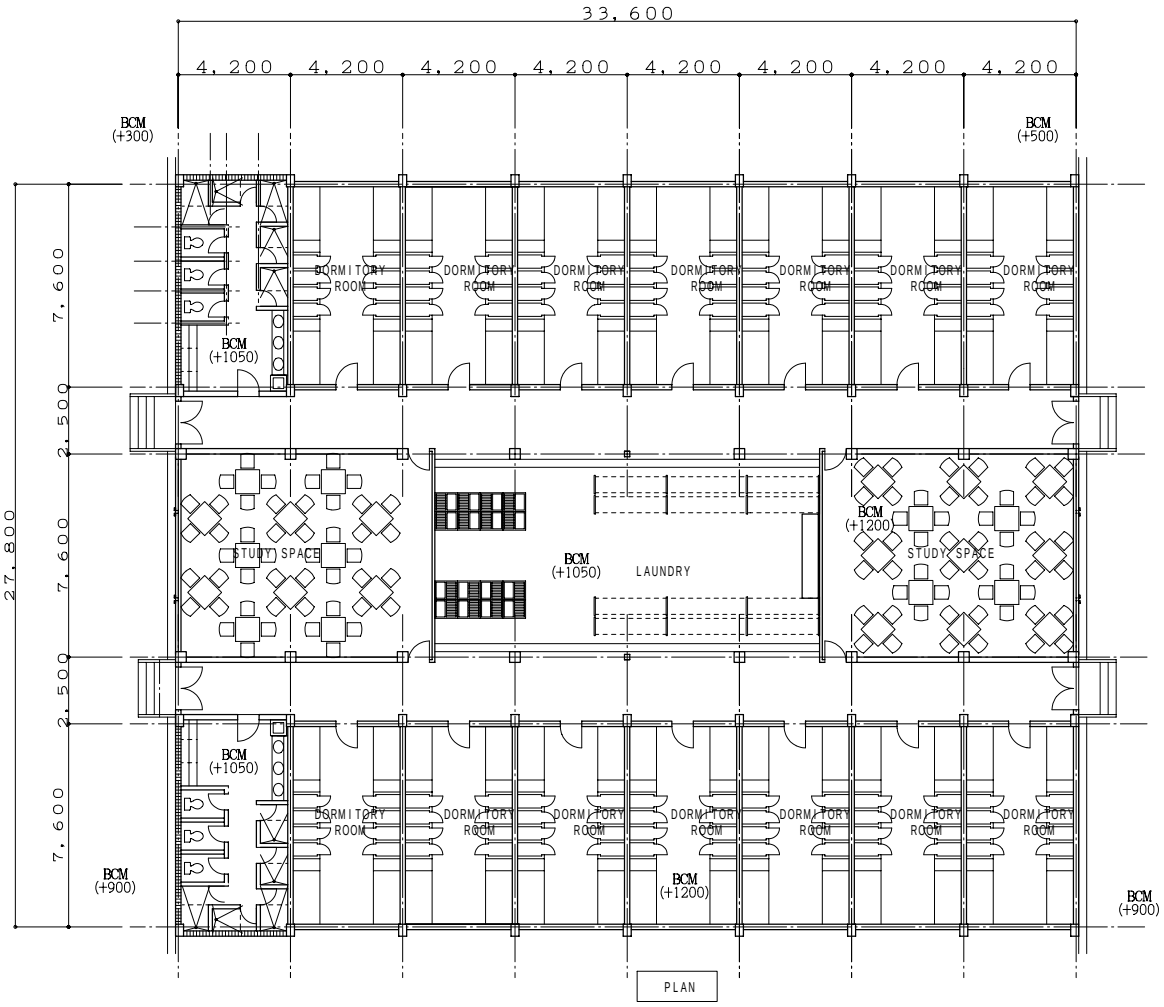
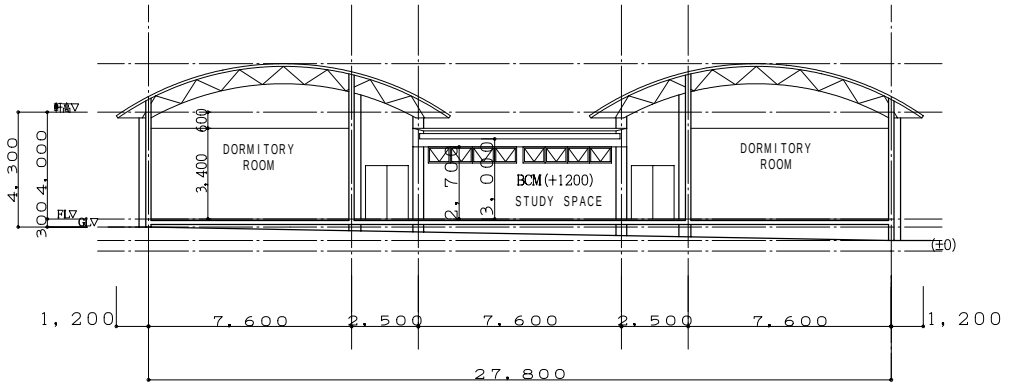
1,000 5,000





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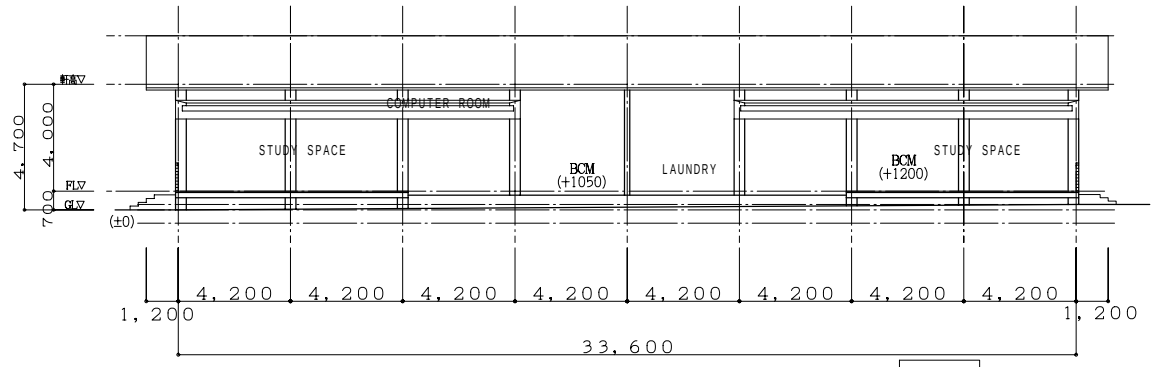

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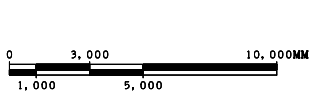

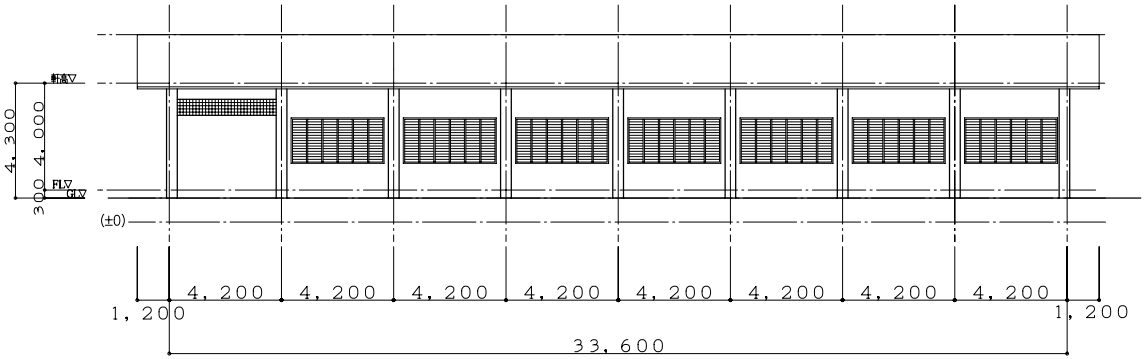

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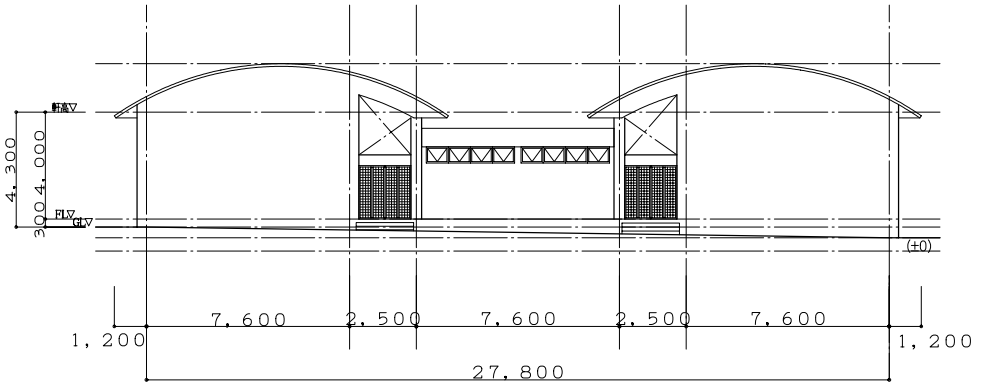

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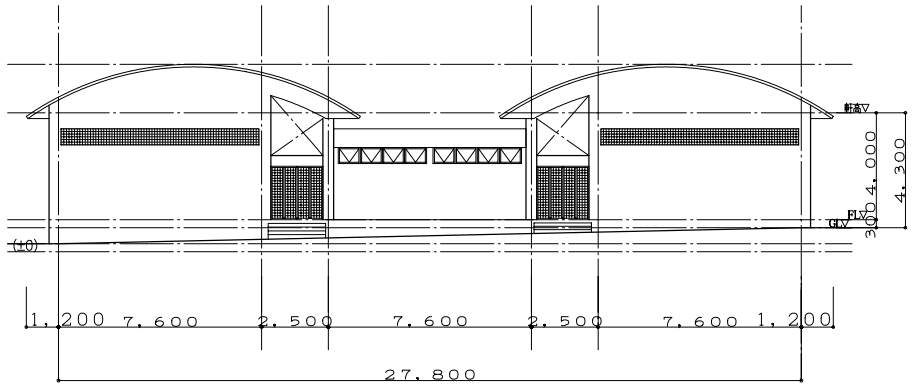
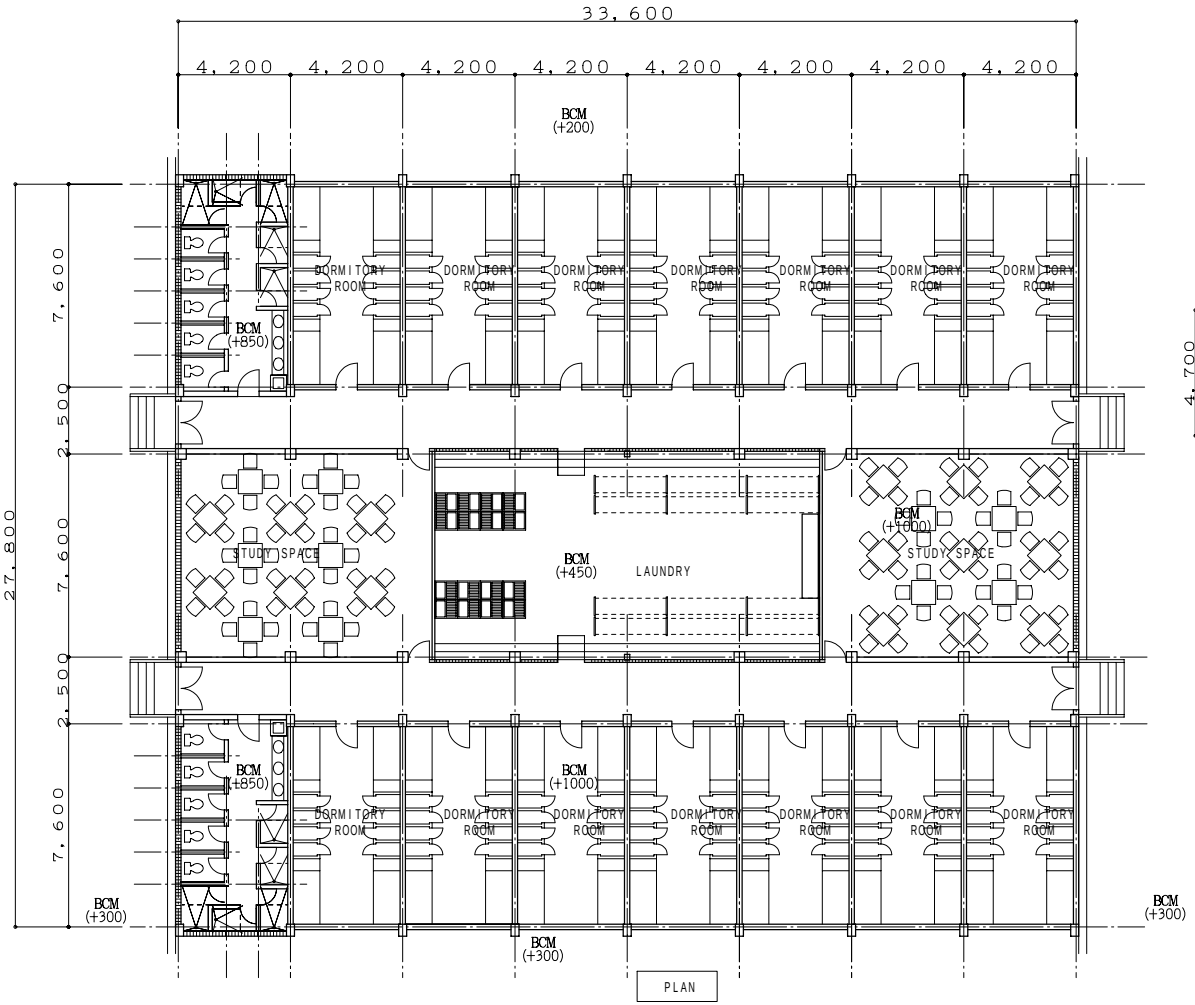
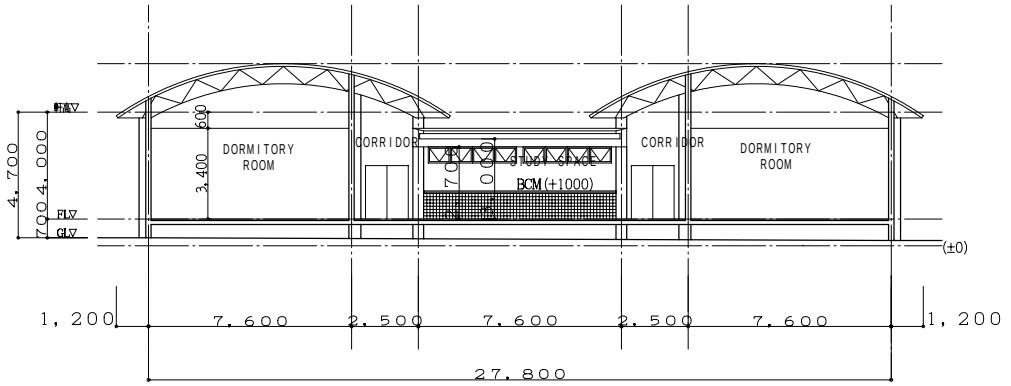


WEST ELEVATION

0 3,000 10,000MM
1,000 5,000





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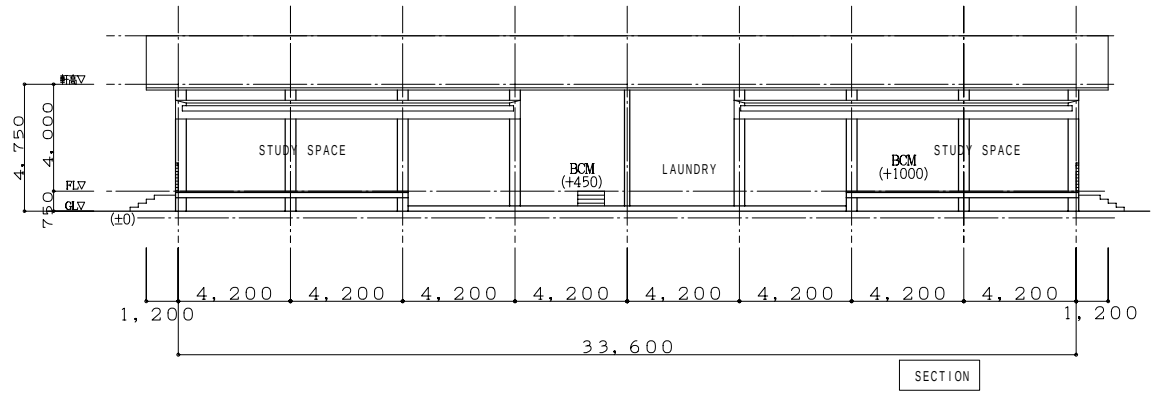

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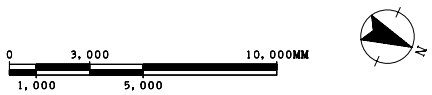

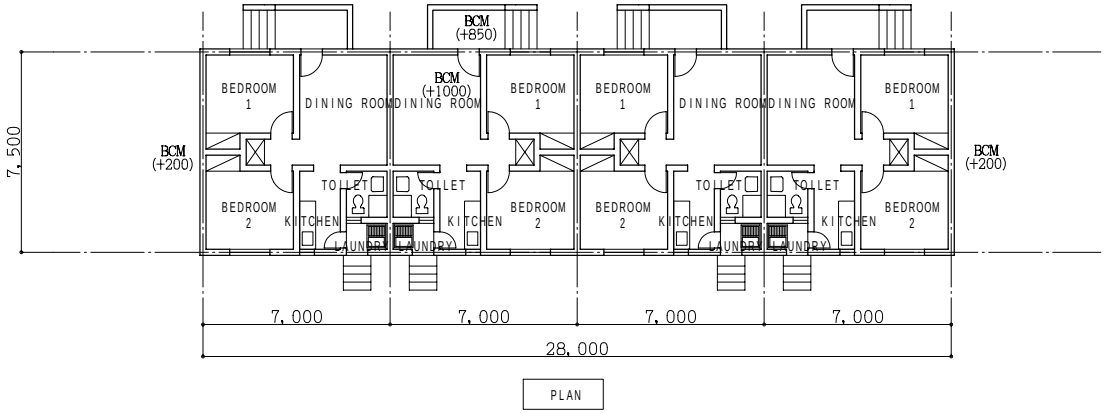

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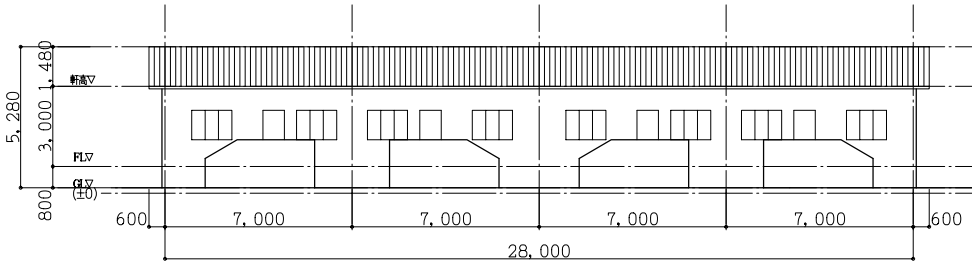

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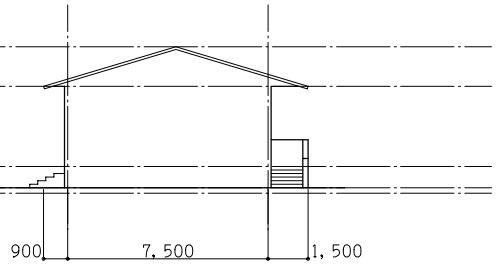

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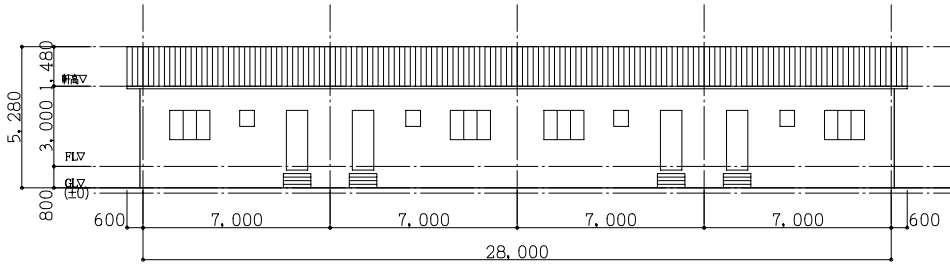

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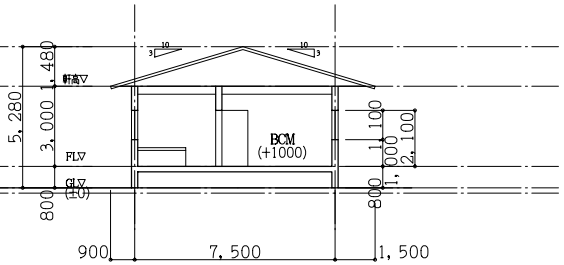

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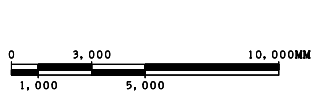

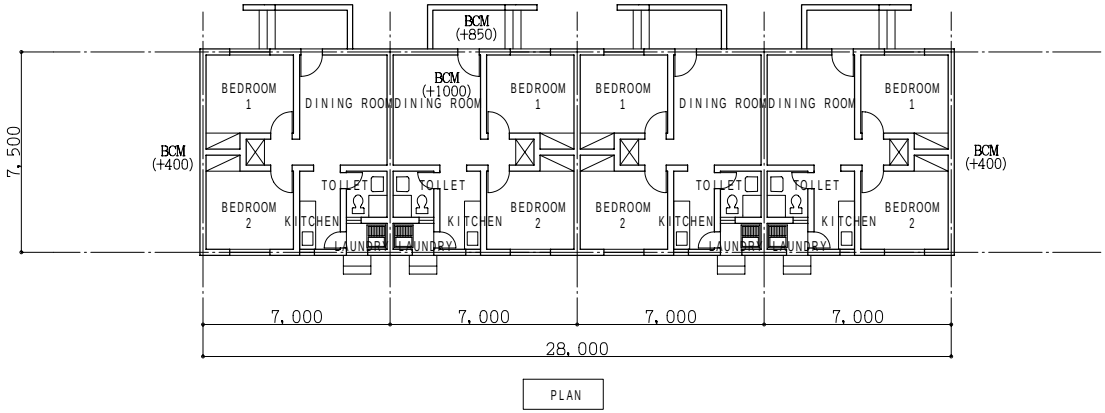

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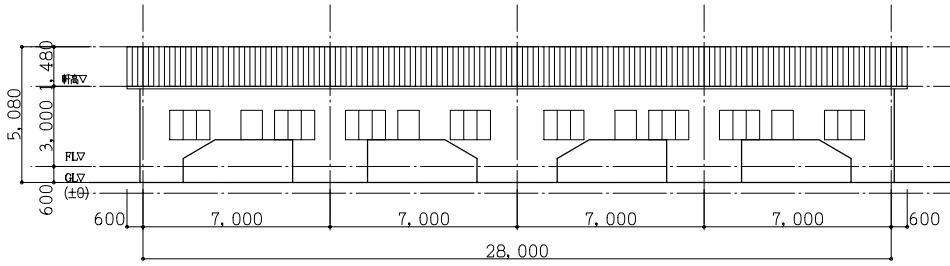

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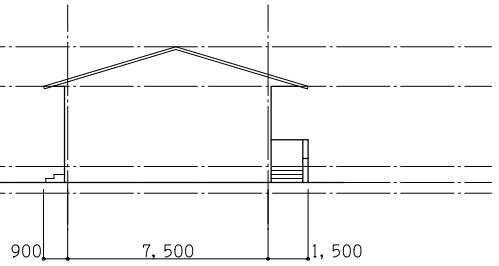

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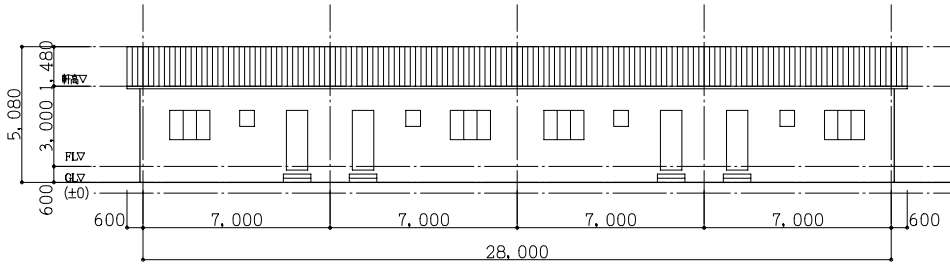

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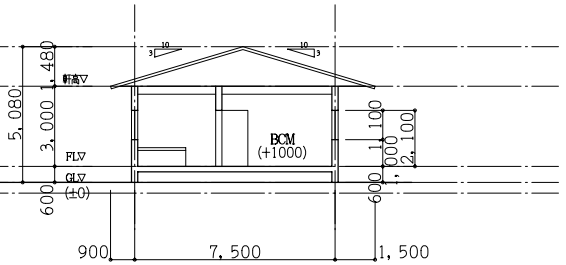

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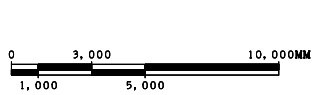

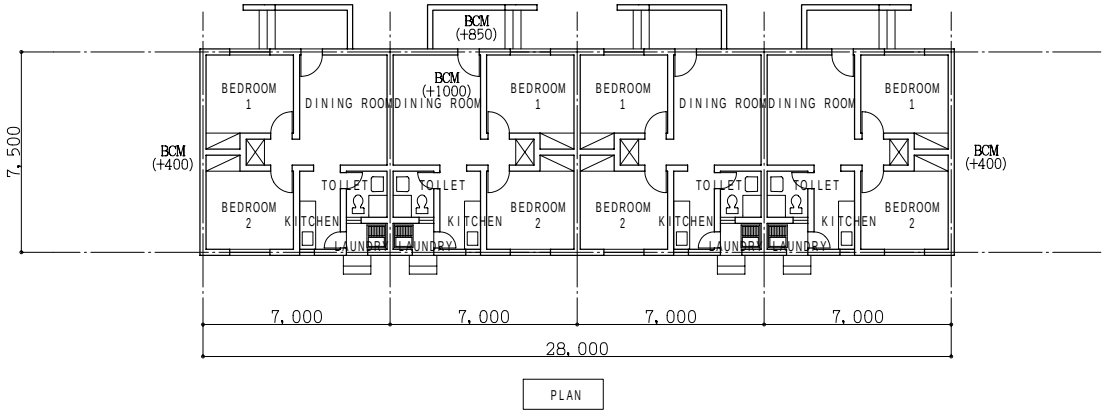

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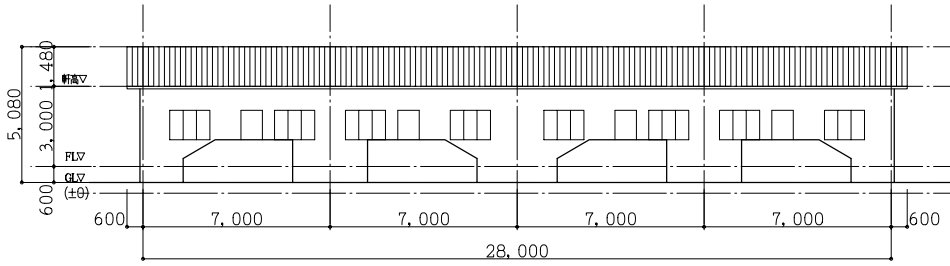

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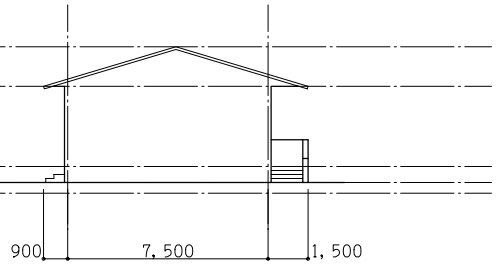

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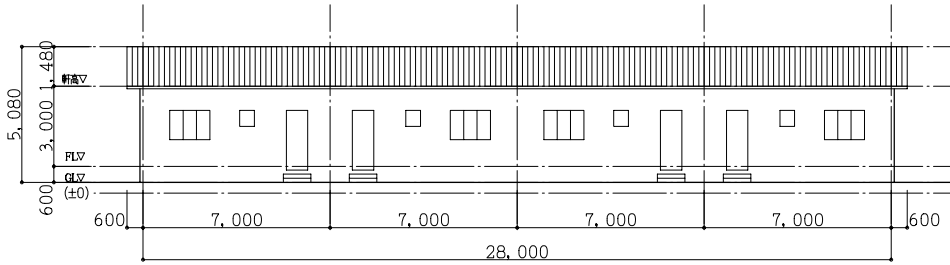

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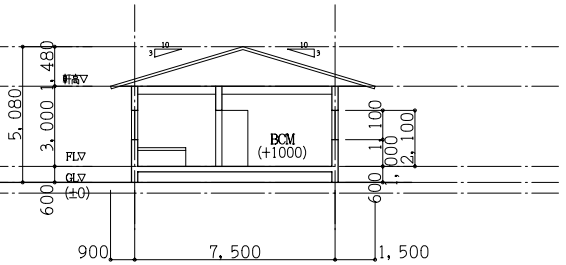

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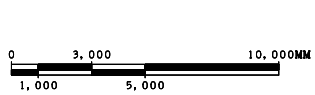
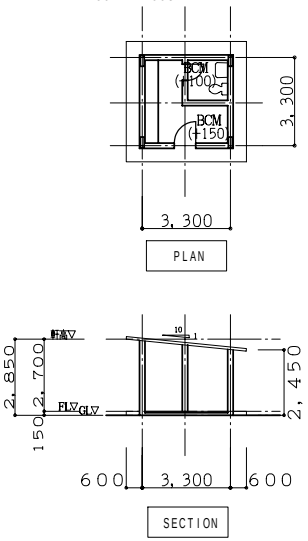


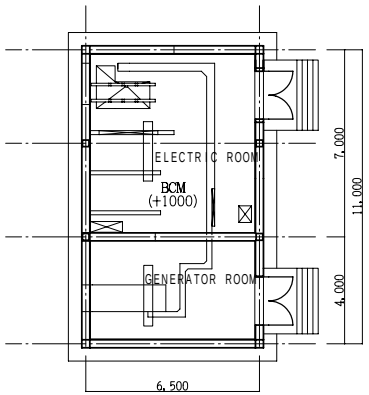
GUARD HOUSE



PLAN

SECTION

ELECTRIC ROOM BUILDING



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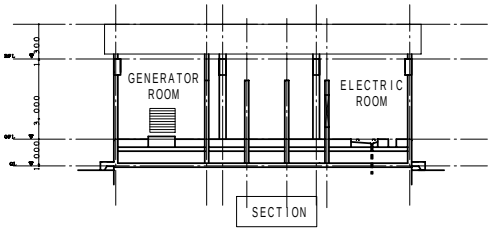
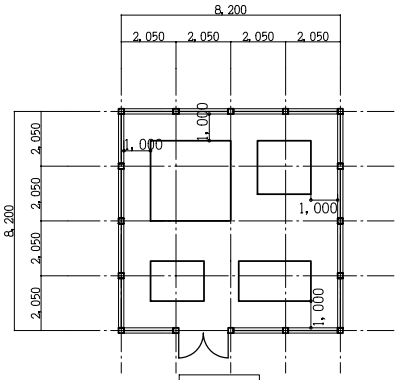


SECTION

OUTDOOR SUBSTATION



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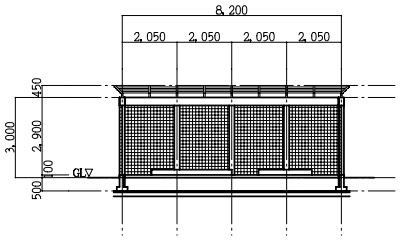

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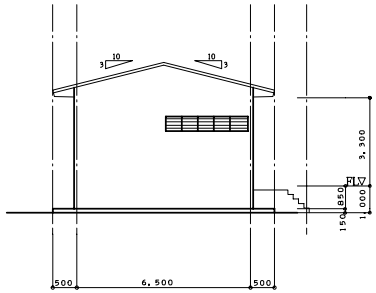

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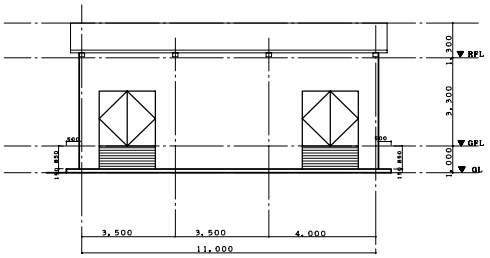

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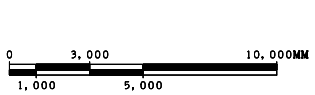
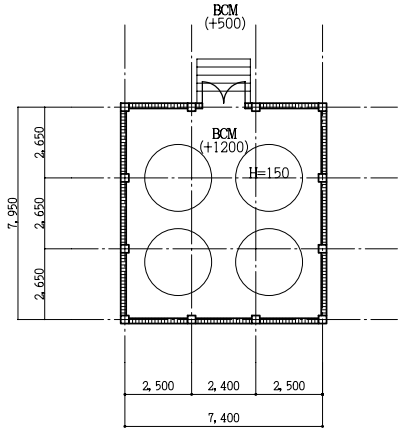
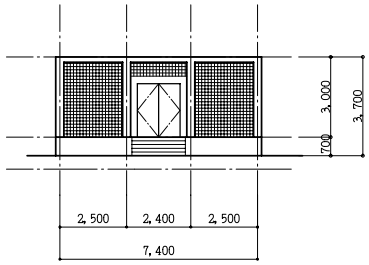


RESERVOIR TANK

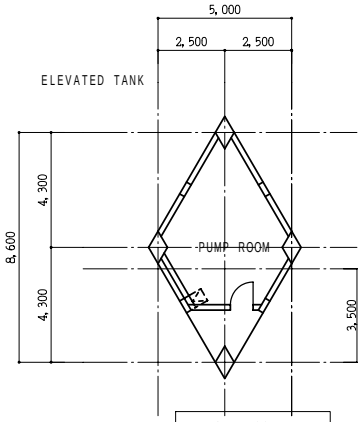


PLAN

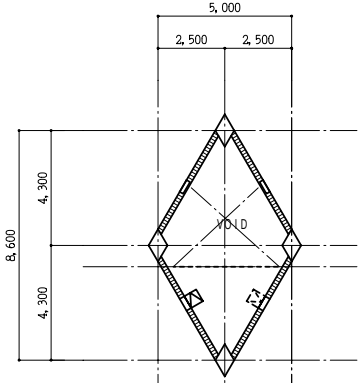


NORTH ELEVATION

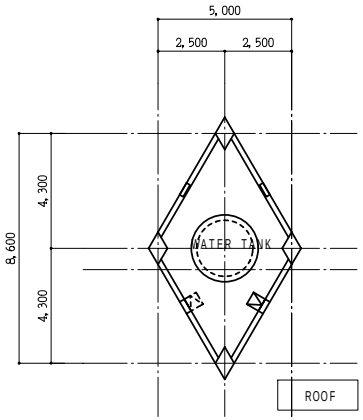
ELEVATED TANK



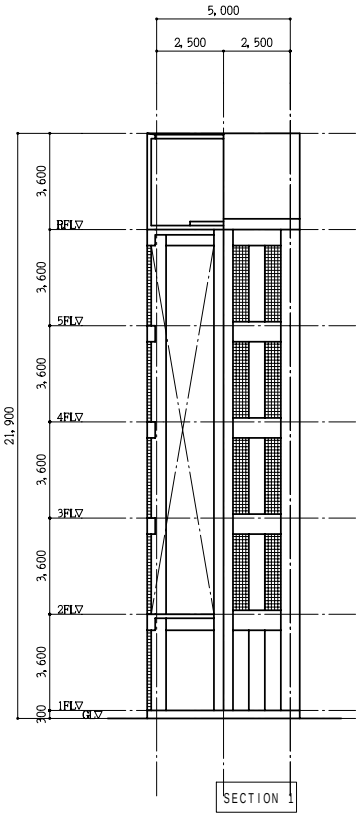
FIRST FLOOR PLAN



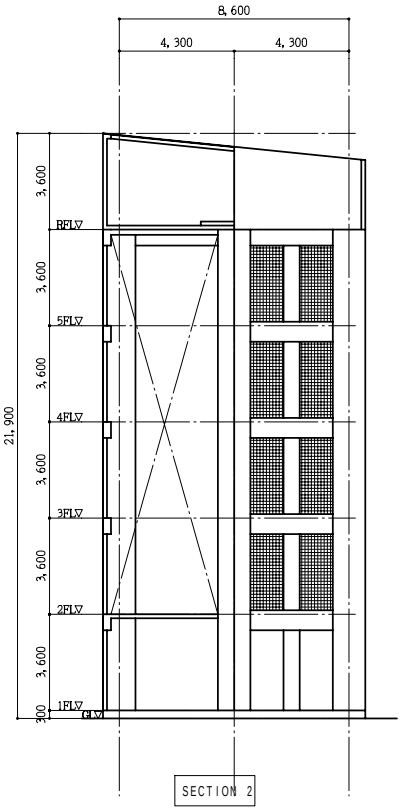
SECOND FLOOR PLAN



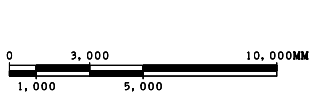
ROOF



SECTION 1



SECTION 2



2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

This project is to be implemented after the conclusion of the Exchange of Notes between the governments of the two countries, subject to the Government of Japan's approval through Cabinet decision. Basic matters relative to the construction of the planned facilities and the procurement and installation of the planned equipment are as stated below.

(1) Term of Work

This project is to consist mainly of the work to construct new buildings with a combined total floor area of approximately 6,300 square meters and the work to procure and install medical equipment for educational use. In light of the details and size of the project, the present conditions of the project site, and the availability of building materials in Mozambique, an estimated 12 months will be required to complete the construction, after which another seven months will be required to complete the equipment procurement and installation work.

(2) Order Placement System

Working tables for the use of students, cabinets for the dormitories, furniture for the canteen, and locally made furniture account for the greater part of the equipment procurement and installation work. As such, it will be necessary to manage local production of these pieces of furniture to ensure quality. Since furniture and other large-size equipment are to be transported to the project site, it will be essential to secure close coordination between the equipment work and construction work.

(3) Project Implementing System

This project is to be implemented under the control of the Ministry of Health of Mozambique. The Ministry's "Human Resources Development Directorate" is to serve as the Mozambique organization responsible for the implementation of this project. The directorate is to act on the consultant agreement, the construction contract, and the banking arrangement, to pay value-added taxes on building materials and medical equipment, to pay import duties, and to make necessary budgetary appropriations for customs clearance. The directorate is to provide other information necessary for the implementation of this project and assign technical persons to carry out the work for which the Mozambique side is responsible. The Ministry's Planning and Coordination Office

(GACOPI), an entity that issues building permits for the construction of facilities to be constructed by the Ministry, is to give guidance and advice on the construction work for this project.

(4) Execution System

1) Consultant

Upon conclusion of the Exchange of Notes, the Human Resources Development Directorate of the Ministry of Health is to conclude a consultant agreement with the Japanese consultant with approval by the Government of Japan. The consultant is to prepare detailed design drawings based on the contents of this basic design study report, follow the tender procedures, and station a supervisor at the project site to supervise the construction work.

2) Contractor

The contractor to take charge of the construction work and equipment work is to be selected from among qualified tenderers (Japanese contractors) through competitive tender. The orders for the construction work and equipment work are to be made separately. In principle, the Ministry of Health is to conclude a construction work and equipment work contract approved by the Government of Japan. The Japanese contractor may use the services of local contractors for appropriate portions of the construction work as subcontractors. Local contractors are to take charge mainly of labor, procurement of locally made materials, and customs clearance.

2-2-4-2 Implementation Conditions

In the course of implementing this project, the implementing organizations must pay especially careful attention to the following points.

(1) Materials to Be Procured in Third Countries

Building materials that can be procured in Mozambique are limited to basic materials such as sand, gravel, bricks, cement, and concrete blocks. Sashes, glass, steel frames and ceiling materials are also available in the country, but most of them are imports. It is difficult to procure these materials in large quantities at a time.

Under these circumstances, the percentage of procurement of reinforcing bars, steel frames, roofing materials and medical equipment for educational use will be high in this project. For this

reason, it is necessary to work out the procurement plan for this project taking into consideration the present conditions of material procurement in third countries, the means of transportation available in Mozambique, the method of packaging widely used in the country, and the days required to reach Mozambique

(2) Customs Clearance of Imported Materials/ Equipment and Duty Exemption Procedures

This project is to be implemented within the framework of grant aid cooperation of the Government of Japan. As such, the implementation of this project is assumed to be exempt from valued-added taxes and customs duties. When this project is implemented as a grant aid project, the project implementing organization in Mozambique is required to make budgetary appropriations for taxes and duties with the approval of the Ministry of Finance of Mozambique and pay such taxes and duties to the local customs authorities. In implementing this project, it will be important to draw up a procurement plan that closely links with the Mozambique side's budgeting procedures in order to avoid delays in the construction/equipment work attributable to delays in customs procedures.

(3) Completion of the Construction Work within the Term of Work

If this project is implemented during a single-year period, it will take up to 12 months to complete the construction work. When the services of local contractors are to be used, the Japanese contractor should carefully control the construction work so that it may be completed within the term of work.

(4) Quality Control

Compared with contractors in other countries, Mozambican contractors have somewhat limited technical abilities. Moreover, they seem reluctant to improve the quality of their workmanship. This project is required to meet quality standards applicable to projects implemented with the grant aid cooperation of the Government of Japan. It will be necessary, therefore, that the Japanese consultant and Japanese contractor cooperate to establish an effective quality control system.

2-2-4-3 Scope of Works

The construction work for this project is to be implemented through cooperation between the Government of Japan and the Government of Mozambique within the framework of the grant aid cooperation of the Government of Japan. An outline of the scope of work in this project is given below.

(1) Work to Be Carried Out by the Government of the Japan within the Framework of Its Grant Aid Cooperation

1. Facilities
   - Construction of the new facilities specified in this basic design study report
   - Installation of electrical, ventilating and plumbing equipment in such new facilities
   - Installation of telephone exchange equipment

2. Equipment
   - Procurement of equipment
   - Installation of equipment

3. Utilities
   - Power substation
   - Plumbing system

4. Exterior structures
   - Road in the site
   - Septic tanks and soak pit

5. Related procedures
   - Transportation of materials and equipment from third countries to Mozambique
   - Transportation of materials and equipment from Japan to Mozambique
   - Inland transportation of materials and equipment in Mozambique
   - Procedures for transportation of materials and equipment

(2) Work to Be Carried Out by the Government of Mozambique

1. Project Site Preparation Work and Exterior Work

- Securing the project site and evacuating the project site during the construction work
- Preparing the project site for construction
- Securing an approach to the project site
- Constructing fences and other exterior structures
- Planting and gardening

2. Utilities work
   - Installation of power line to the site
   - Installation of telephone line to the site
   - Installation of city main water

3. Preparation for construction
   - Provision of temporary office building, workshop, and materials yard
   - Installation of temporary electrical equipment and telephones

4. Furniture and fixtures
   - Procurement and installation of furniture and fixtures not included in the work to be carried out by the Government of Japan

5. Conducting Formalities and Bearing Expenses
   - Bearing banking arrangement expenses
   - Bearing duty exemption expenses
   - Taking prompt measures for customs clearance and inland transportation
   - Exempting Japanese nationals who take part in the implementation of this project in accordance with the agreement and contracts from customs duties, taxes, and other financial duties
   - Providing facilities to the aforesaid Japanese nationals when they enter and stay in Mozambique to carry out their respective duties
   - Bearing costs of maintenance and management for proper and effective operation of the procured facilities and equipment
   - Bearing costs of conducting formalities concerning the construction work

2-2-4-4 Consultant Supervision

Under the conditions of the grant aid cooperation system of the Government of Japan, the Japanese consultant is to conclude a consultant agreement with the project implementing organization in Mozambique and conduct the detailed design work and construction supervision work. The objective of the construction supervision work is to verify whether the construction work is carried out as specified in the tender documents, give guidance, advice, and coordination during the term of work from a fair standpoint in order to ensure proper fulfillment of the provisions of the construction contract, and thereby maintain quality of work. The construction work consists mainly of the following activities.

1. Cooperation in Tender Activity and Conclusion of Construction Contract

   The consultant is to prepare the tender documents necessary for inviting tender when selecting the Japanese corporations to take charge of the construction and equipment work, make a tender announcement, accept applications, examine applicants, distribute the tender documents, accept tenders, evaluate the results of the tenders, and provide advice about the conclusion of the contract between the Mozambique project implementing organization and the Japanese corporations.

2. Guidance, Advice, and Coordination for the Contractor

   The consultant is to give guidance, advice and coordination about the execution schedule, the execution plan, the building materials/equipment procurement plan, the equipment procurement/ installation plan, the quality control plan, and safety measures to the contractor.

3. Examination and Approval of Working Drawings and Production Drawings

   The consultant is to examine working drawings, production drawings, etc. submitted by the contractor, provide guidance on them, and finally approve them.

4. Examination and Approval of Building Materials/Equipment and Medical Equipment

   The consultant is to approve the contractor's plan to procure building materials/equipment and medical equipment after carefully examining them to ensure that they conform with the contract documents.

5. Inspection of the Equipment Work

   The consultant is to witness the inspection of the processes of manufacturing of building

component parts and medical equipment to ensure quality and performance.

6. Reporting on the Progress of the Construction Work

The consultant is to report on the progress of the construction work after investigating the current state of the execution schedule and construction site.

7. Inspection of Facilities/Equipment at the Completion of Work

The consultant is to inspect the facilities/equipment and make a trial run of each item of equipment upon completion of the work to ensure that all of the facilities/equipment are consistent with the contract documents. Upon completing the aforesaid inspection, the consultant is to submit a certification of completion of the work to the Mozambique side.

8. Training in Operation of Building Machinery and Medical Equipment

The building machinery/equipment and medical equipment to be procured under this project include substations, generators, and other equipment requiring a certain degree of proficiency to operate, maintain, and manage. It will be necessary, therefore, to train the Mozambique engineers in the basics of operation and troubleshooting when the equipment is installed, adjusted, and tested in trial runs at the project site. The consultant is to give guidance and advice on the training program.

Judging from the size of this project, it is reasonable that in carrying out the above-mentioned activities, the consultant should have one of its engineers stationed at the project site throughout the term of work to conduct necessary examinations and provide guidance and coordination service. In addition, the consultant is to appoint another engineer to serve as the contact man and a backup system. The consultant is also to establish a backup plan and appoint another engineer to serve as the contact man. The consultant is also to report to the relevant officials from the Government of Japan on the progress of this project, the payment procedures, the completion of the delivery of the facilities and equipment, etc.

2-2-4-5 Quality Control Plan

Prior to the start of the construction work, the consultant is to implement the quality control plan by having the Japanese contractor submit a list of matters that require examination and values, the details to be examined, the testing method, the curing method, the method of construction, the applicable building standards, etc., in advance.

Table 2-9 Quality Control Schedule

Work	Item	Required value	Method of examination	Quality standard	Frequency of measurement	Method of presentation of results
Earthwork	Angle of slope	Within desired values	Gauge, visual inspection	JIS	As appropriate	Photograph, document
	Accuracy of the level	within +0-5 cm	Level, visual inspection		〃	〃
	Height of foundation	within +0-3 cm	〃		〃	〃
	Thickness of replacement soil	+5 cm -0	〃		〃	〃
Steel work	Thickness of cover concrete	30 m/m Portion which comes into contact with soil Point of contact with soil Foundation: 60 m/m Other: 40m/m	Visual inspection, measurement	SABS Specifications	As appropriate	Photograph, document
	Processing precision	Stirrup/hoop ±5m/m Other: ±10 m/m	〃		〃	〃
	Tensile test	Design strength: 295 N/mm^2 or over	On-site sampling or sampling at time of shipment		Once per 300 tons of each type of reinforcing bar (3 samples)	Report on test results
Concrete work (field mixing)	Compressive strength	Design strength: 25 N/mm^2 or over	Witnessing of tests (as required)	SABS	3 samples and 2 types for each application and for every 50 m^3	The result of test
	Slump value	15 cm±2.5 cm	Witnessing of field test		For each application	Phoyod, Fovumrny
	Quantity of chloride	0.3 kg/m^3 or less	Test specimen, witnessing of field test		〃	〃
Masonry work	Concrete block compressive strength	40～70kg/cm^2	Test after selection of material		Before leaving the factory	The result of test report
Plaster Paint Waterproof work	Material management, method of construction	Specifications	Specifications	Specifications	As appropriate	Photos, document
Plumbing work	Supply/Drain pipe	Supply/Drain pipe	Pressure test Filling test	SABS	Completion of pipe work	The result of test report
Electric work	Electric wire	〃	Insulation test Live wire test	SABS	〃	〃

2-2-4-6 Building Materials/Equipment Procurement Plan

(1) Building Materials/Equipment

1) Methods of procurement

The following methods of procurement are to be used in procuring building materials/equipment for this project.

Table 2-10 Methods of Procurement

Method of procurement		Main materials	Special remarks
Classification	Method		
Procurement in Mozambique	1. Products manufactured in Mozambique are to be purchased.	Brick, concrete block, cement, wooden furniture, sand, gravel	To be purchased after the item is exempted from value-added tax.
	2. Imports materials in Mozambique are to be purchased.	Cement, paint, sash, reinforcing bar, steel frame	It will be advantageous to use this method for the procurement of materials that require the use of maintenance service (because such materials are to be procured via local distributors).
Importation	3. Materials are imported from South Africa and then transported by road in Mozambique.	Steel frame, glass, paint, cement, materials for equipment	This method is used widely in the country.
	4. Manufactured products are imported from South Africa and then transported by road in Mozambique.	Steel frame, sash	This method is used widely in the country.
	5. Manufactured products are imported directly from third countries other than South Africa and Japan.	Reinforcing board, sash, builders' fittings, generators, materials for equipment	This method is to be used in two cases: 1. when materials or products required to meet Mozambique and/or South African quality standards are unavailable in Mozambique; 2 when such materials or products are available in Mozambique, but can be procured at much lower prices in third countries other than South Africa and Japan.

2) Procurement Policy and Important Points to Note

Materials and equipment are to be procured in accordance with the following policies.

① Procurement in Mozambique

As a rule, materials and equipment are to be procured in Mozambique for ease of repair and management. Bricks, concrete blocks, sand and gravel, in particular, are to be procured in the country because there is no problem with their quality and because they can be procured in large quantities at a time and transported easily and quickly. In the case of medical equipment for educational use, photocopy machines, vehicles, and electrical home appliances, imports that can be procured in Mozambique are to be chosen.

② Importation

Materials and equipments that can be procured in Mozambique but are of poor quality, in short supply, or expensive within the country are to be procured mainly in South Africa and other third countries. When importing such materials and equipment, the contractor must see to it that the importation and customs clearance procedures are followed smoothly.

3) Procurement Plan

The main materials and equipment are to be procured from the following procurement sources.

Table 2-11 Procurement Sources (countries)

Work	Material/equipment	Procurement source (country)			Remarks
		Mozambique	Japan	Third country	
Constructi on work	Cement	○			No problem with quality / easily procurable
	Sand	○			No problem with quality / easily procurable
	Gravel	○			Granite is mined in a place 150 kilometers inland from the coast.
	Reinforicing bar		○		Lowest cost in Japan
	Steel frame		○		Lowest cost in Japan
	Formwork (Plywood)			South Africa	Plywood is not produced in the country.
	Brick	○			Produced in the country.
	Concrete block	○			Can be used as partition wall. Mass-produced in the country.
	Ceramic tile	○			Portuguese-made and South African-made products imported.
	Glass	○			Glass of a type produced and used widely in the country is to be procured for ease of maintenance and management.
	Metal roofing maetrial			South Africa	Not produced in the country.
	Lumber	○			Can be procured in the country.
	Metal furniture			South Africa	Not produced in the country.
	Wooden furniture	○			Wooden doors are produced in the country.
	Furnituire fittings			South Africa	Not produced in the country.
	Paint	○			Paint that can be procured easily in the country is to be used for ease of maintenance and management.
Equipment work	Pump			South Africa	Not produced in the country.
	Fan			South Africa	Same as above
	Plumbing equipment			South Africa	Same as above
	PVC pipe			South Africa	Same as above
	White damp pipe			South Africa	Same as above
	Water tank			South Africa	Same as above
	Fire extinguisher			South Africa	Same as above
Electric work	Receiving board/power switchboard		○		Not produced in the country.
	Power transfer/lighting board			South Africa	Same as above
	Generator			South Africa	Same as above
	Lighting fixture			South Africa	Same as above
	Telephone switchboard			South Africa	Same as above
	PA sysetm			South Africa	Same as above
	Electrical conduit (PVC pipe)			South Africa	Same as above
	Electric wire			South Africa	Same as above

(2) Medical Equipment for Educational Use

1) Procurement Plan

Most equipment for educational/training now in widespread use in Mozambique is of European or American make, and most metal furniture (desks, shelves, and chairs) is of South

African make. Only some of the wooden furniture (school desks, chairs, and shelves) is of Mozambique make, and this furniture varies widely in quality (in measurements and workmanship). It will be difficult to procure Mozambique-made products that meet the quality requirements of this project.

In principle, equipment and materials selected for this project are to be procured in Japan or Mozambique. When it is judged to be advantageous to procure some of them in South Africa or other third countries (DAC member countries, etc.) in light of the following conditions, however, this alternative may be considered with the approval of the Government of Japan.

- Not manufactured in Japan
- Manufactured in Japan, but procurement limited to Japan would be likely to hamper fair tender
- Likely to lead to higher transportation costs, lessen cooperation effect, or cause difficulty in maintenance and management (due to lack of local distributors, for example)

Equipment that falls under the category of product manufactured in a third country or that must be maintained by local branches of the manufacturer are shown in Annex 3 "List of the Planned Equipment."

2) Term of Work

As a rule, the materials/equipment plan is to be implemented in keeping with the pace of the construction work and the equipment installation and training program are to start upon completion of the construction work.

2-2-4-7 Implementation Schedule

When the Exchange of Notes is concluded between the governments of the two countries, the construction work and equipment procurement/installation plan are to be implemented as follows.

1. Preparation of Working Drawings

After the conclusion of the design and supervision agreement, the consultant is to prepare detailed drawings, specifications, and tender documents on the basis of the contents of this basic design study report. In the meantime, the consultant is to have these design documents approved after due consultation with the officials concerned in the Government of Mozambique. It will take two and a half months to complete this process.

2. Tender

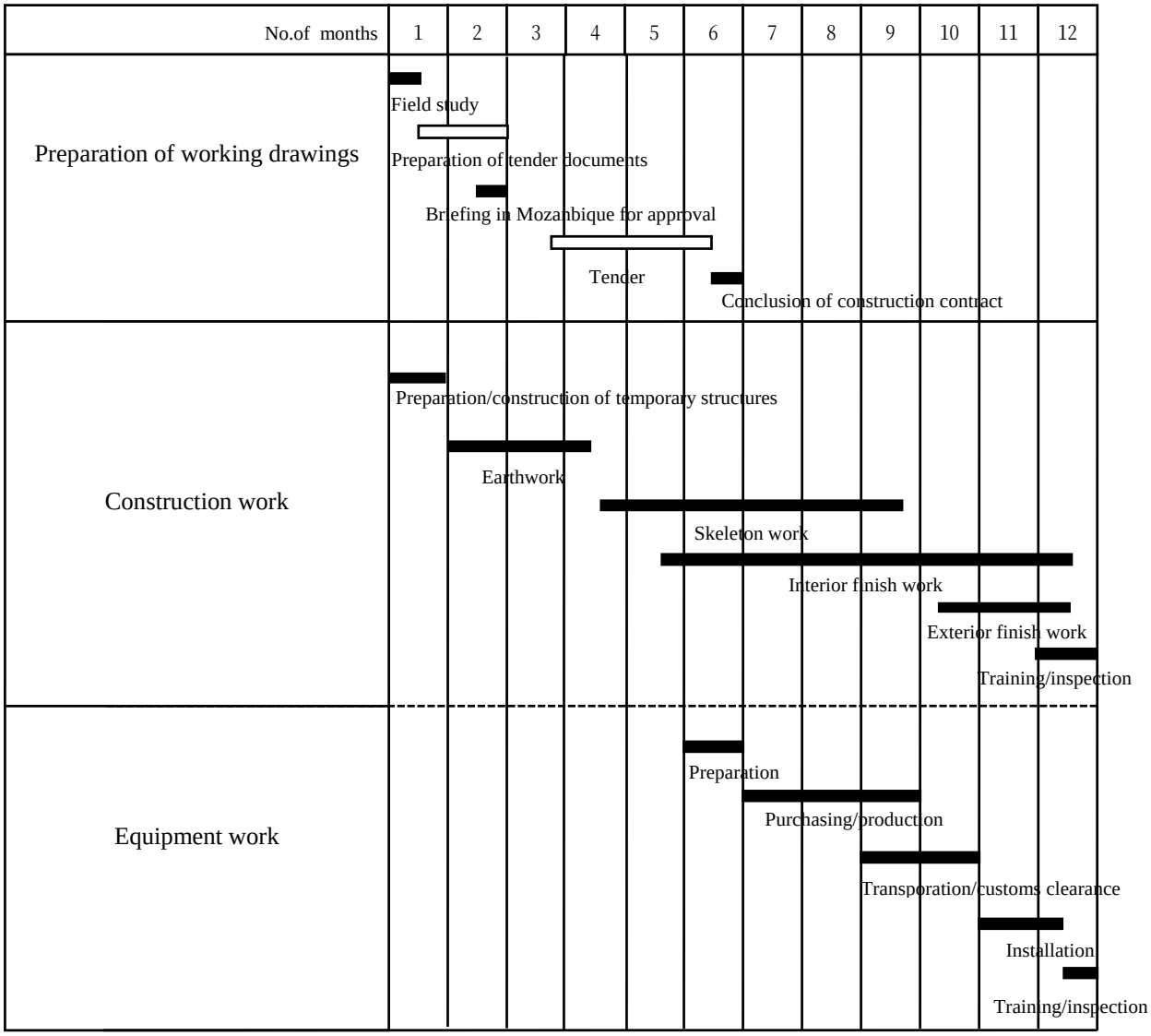
The contractor to take charge of the construction work and the equipment work is to selected through competitive tender. The sequence of activities in this process is: tender announcement, review of details of tender, review of tender, selection of the contractor, and conclusion of the construction contract. It will take approximately two and a half months to complete this process.

3. Construction Work /Equipment Work

Judging from the details and the size of each of the planned facilities and the present state of the local construction industry, this project is expected to completed in 12 months, provided that the procurement of building materials and customs clearance proceed smoothly.

An execution schedule (from conclusion of the Exchange of Notes till completion of the project) with all of the above considerations taken into account is shown in Table 2-12.

Table 2-12 Execution Schedule



2-3 Obligation of the Government of Mozambique

It is agreed in the minutes of consultations that when this project is implemented, the Government of Mozambique shall be responsible for carrying out the following activities.

① Securing the project site and evacuating it throughout the term of work

② Allocating necessary financial and human resources for the project

③ Providing power supply facility, water supply facility, telephone facility, drainage, and other utilities to the project site

④ Clearing the project site prior to the start of the project

⑤ Planting trees, constructing fences, installing exterior lighting fixtures, and constructing other exterior structures

⑥ Procuring furniture and fittings

⑦ Promptly exempting the materials and equipment to be procured for this project within the framework of grant aid cooperation of the Government of Japan from taxation, clearing them through customs, and securing their land transportation within Mozambique

⑧ Exempting Japanese nationals entering Mozambique to take part in operations concerning materials and equipment procured in accordance with the agreement and contract from customs duties, taxes, and other financial surcharges

⑨ Providing Japanese nationals taking part in this project with facilities for their entry into and stay in Mozambique in accordance with the agreement and contract

⑩ Paying commissions to the foreign exchange bank in Japan and other charges

⑪ Issuing permits, licenses, and certificates of official recognition necessary for the implementation of this project

⑫ Operating and maintaining the facilities and equipment procured for this project properly and effectively

⑬ Defraying all of the costs other than those covered within the framework of grant aid cooperation of the Government of Japan concerning this project

2-4 Project Operation Plan

(1) Personnel Plan

As Quelimane Institute of Health Science is to offer renewed training courses upon completion of this project, the Ministry of Health of Mozambique has come up with the following multifaceted personnel plan.

1) Instructors

① The institute's educational affairs section is to have a senior-level staff comprising four advisors a curriculum advisor, a nursing course advisor, a General medical technician course advisor, and a pharmacist course advisor. The institute's principal is also to hold one of these posts.

② The educational affairs section is to have a middle-level staff comprising six course managers a curriculum manager and five course manager.

③ The institute is to have a teaching staff comprising 23 medical education course instructors: 6 general medical course instructors (5 medical technician course instructors and 1 clinical course instructor), 6 mother/child healthcare nursing course instructors (4 mother/child healthcare nursing course instructors and 2 other mother/child healthcare course instructors who have graduated from college.), 4 pharmacist course instructors (3 intermediate-level pharmacist course instructors and 1 advanced pharmacist course instructor), 5 laboratory technician course instructors (4 intermediate-level laboratory technician course instructors and 1 advanced laboratory technician course instructor), and 2 general medical nursing course instructors.

④ The institute is to have the total of 6 instructors 1 mathematics instructor, 1 physics instructor, 1 chemistry/biology instructor, 1 psychology instructor, 1 anthropology instructor, and 1 preventive medical technician.

2) Technical Staff

The institute's technical staff is to consist of 2 middle-level managers, 2 accountants, 4 low-level managers, 20 assistants, 4 chauffeurs, 4 guards, 1 electrician, 1 plumber, 1 gardener, 1 dormitory superintendent, and 8 cooks.

(2) The Institute's Facility/Equipment Operation, Maintenance and Management System

The Ministry of Health of Mozambique is to ensure that the provincial government's health directorate applies for necessary budgetary appropriations for the personnel recruitment plan and the facility/equipment operation, maintenance, and management plan prior to the opening of the institute and follows the necessary procedures in keeping with the procedure of the project.

1) Employment of Instructors and Their Salaries

Every year the health departments of the provincial governments where institutes of health science are located calculate the necessary number of instructors for their institutes. Then, the Human Resources Directorate of the Ministry of Health of Mozambique files an application for total annual budgetary appropriations for the institutes of health science with the central government. After the application is approved, the health department of the government of each province makes annual budgetary appropriations for the personnel plan of its institute within the limits of the funds provided. The posting to be chosen for each of the newly employed instructors are left to the discretion of the health department of the government of each province, the body with the clearest grasp of the demand for instructors in individual districts and schools.

The following table shows the salaries for the instructors that Quelimane Institute of Health Science is to employ in accordance with the personnel plan worked out by the Ministry of Health of Mozambique. The institute's annual payroll is expected to reach 4,067,000,000 meticals (approximately / yen 19,000,000), a sum more than 1.5 times greater than the institute's payroll in 2003 (2,587,000,000 meticals: for full-time and part-time instructors).

The Human Resources Directorate of the Ministry of Health says that the training of intermediate-level medical professionals is consistent with the objective of the country's human resources development plan and that the Ministry will have no problem bearing the necessary personnel and facility/equipment operation costs.

It will be imperative for the Province of Zambezia's Health Directorate to lobby the central government for necessary budgetary appropriations after completion of this project.

2) Facility/Equipment Operation, Maintenance and Management Costs

The estimated costs of operation, maintenance and management of the new facility/equipment are as stated in "2 Maintenance and Management Plan" in Chapter 5. The estimated amount is for the 10-year period following the completion of this project. Facility/equipment maintenance and management costs generally tend to increase over time. The rate of increase is usually

difficult to forecast, however, as it is greatly affected by the details of the maintenance and management work, natural conditions in and around the project site, the conditions of infrastructure development, and the patterns of usage of facilities/equipment. It will be necessary, therefore, to review the maintenance and management costs for each current year based on the results for the preceding year. On the other hand, the Ministry of Health of Mozambique will be pressed to secure sufficient budgetary appropriations for facility/equipment maintenance and management.

Table 2-13 Salaries of Instructors That Quelimane Institute of Health Science Is to Newly Employ

Full-time

Category	Level	No. of person	Base pay	Technical allowance	Chief's allowance	Contingency	Annual salary
Advisor	Senior	4	5.874.772,00	3.524.863,00		587.477,00	479.381.376,00
Health technician	Intermediate	1	2.918.809,00	875.642,00		291.880,00	49.035.972,00
Health technician	Intermediate	5	2.918.809,00	875.642,00	25%	291.880,00	288.961.980,00
Health technician	Intermediate	5	3.038.355,00	911.506,00		303.835,00	255.221.760,00
Senior-level expert	Expert	1	5.874.772,00	3.524.863,00	25%	587.477,00	137.469.660,00
General medical	Intermediate	4	2.488.101,00	746.430,00		248.810,00	167.200.368,00
Senior-level expert nurse	Expert	2	5.180.906,00	3.108.543,00		518.091,00	211.380.960,00
Pharmacy technician	Intermediate	4	2.918.809,00	875.642,00		291.880,00	196.143.888,00
Senior-level expert	Expert	1	5.874.772,00	3.524.863,00		587.477,00	119.845.344,00
Laboratory technician	Intermediate	4	2.918.809,00	875.642,00		291.880,00	196.143.888,00
Senior-level expert	Expert	2	5.874.772,00	3.524.863,00		587.477,00	274.939.320,00
Psychiatrist	Expert	1	6.106.068,00	3.663.640,00		610.606,00	124.563.768,00
Anthropologist	Expert	1	5.874.772,00	3.524.863,00		587.477,00	119.845.344,00
Preventive medical engineer	Intermediate	1	4.138.861,00	1.241.658,00		413.886,00	69.532.860,00
Professor	Expert	2	6.337.358,00	3.802.414,00		633.735,00	258.564.168,00
Professor	Expert	1	6.337.358,00	3.802.414,00		633.735,00	129.282.084,00
Librarian	Intermediate	1	3.038.355,00	911.506,00	25%	303.835,00	60.159.408,00
Health technician	Basic	2	1.902.357,00			190.235,00	50.222.208,00
Managing technician	Intermediate	1	3.540.760,00	1.062.228,00	25%	354.076,00	65.858.136,00
Managing technician	Intermediate	1	3.540.760,00	1.062.228,00		354.076,00	59.484.768,00
Accountant	Basic	2	1.831.899,00				43.965.576,00
Clerk	Basic	4	1.632.334,00				78.352.032,00
Assistant clerk	Junior	20	932.717,00			93.271,00	246.237.120,00
Chauffeur	Basic	4	1.169.434,00				56.132.832,00
Guard	Junior	4	1.022.026,00			102.202,00	53.962.944,00
Electrician	Basic	1	1.599.696,00				19.196.352,00
Carpenter	Basic	1	1.599.696,00				19.196.352,00
Plumber	Basic	1	1.599.696,00				19.196.352,00
Gardener	Junior	4	1.022.026,00				49.057.248,00
Dormitory superintendent	Intermediate	1	2.392.405,00	717.721,00		239.240,00	31.579.740,00
Cook	Basic	8	1.296.696,00			129.669,00	136.931.040,00
Total		94				Total	4.067.044.848,00

Note: Diffepence in salary between idertical categories / levels is explained by the length of services.

The chart below outlines organization of Quelimane Institute of Health Science after completion of this project. The major change is the high priority given to maintenance and management, with the addition of the "Maintenance Section".

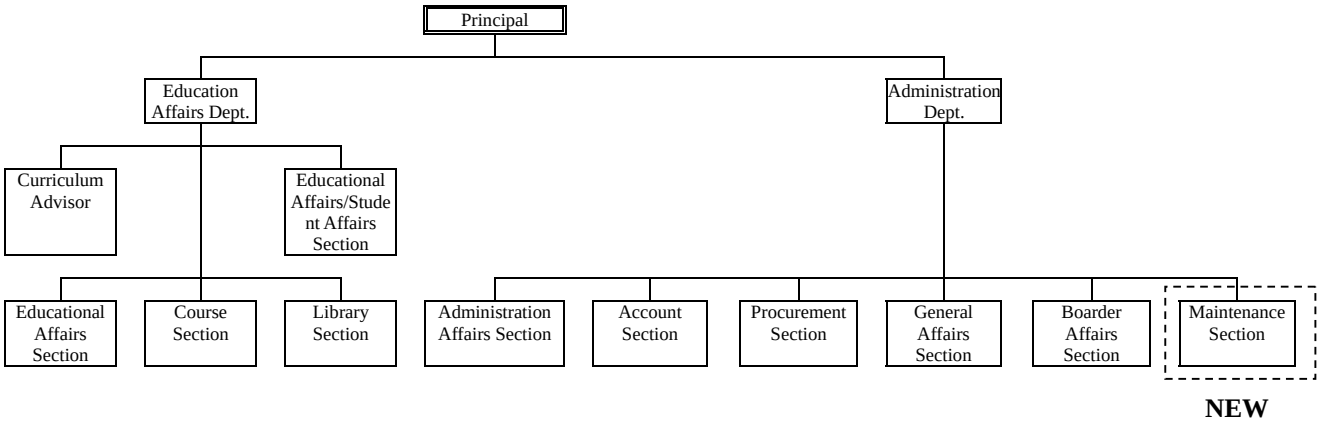


Fig. 2-3 Organization Chart of Quelimane Institute of Health Science

Electricity charges, telephone charges and water charges comprise a very large percentage of the total facility/equipment operation cost. Although the planned facilities are designed to minimize these costs, it will be necessary to continuously monitor the unnecessary use of electricity, telephones, and water. Both instructors and students will also have to be thoroughly instructed in preventing unnecessary use of these resources in their daily routines.

(3) Appointment of Staffers in Charge of Maintenance and Management

The planned facilities are not to be provided with special equipment. It should be noted, however, that routine maintenance and inspection of the generator and plumbing equipment, including the pump and water tank, will be essential to keeping the facilities in good condition. Well aware of this, the Ministry of Health of Mozambique plans to appoint a staffer in charge of maintenance and management of plumbing equipment and a staffer in charge of maintenance of electric equipment.

An explanation about each facility/equipment is to be given at the time of its delivery. For this reason, the Government of Mozambique plans to appoint the abovementioned two staff members in charge of maintenance and management upon conclusion of the Exchange of Notes. As soon as the construction work is started, the two staff members in charge of maintenance and management will be stationed at the project site to continuously study the progress of the project from start to finish.

The two staff members in charge of maintenance and management need not possess advanced inspection/repair skills. On the other hand, both should acquire sufficient skills to conduct routine inspection/repair operations by learning the proper usage of each piece of equipment.

2-5 Estimated Project Cost

2-5-1 Estimated Cost of the Project

(1) Project Cost borne by Japan

Total Amount : 926 (Million Yen)

Total floor area : 6,350m^2

Project Cost borne by Japan

Item		Cost (Million Yen)		
Facility	Administration Building	38	735	
	Instructor Building	76		
	Classroom Building	97		
	Special Classroom Building	167		
	Dormitory	184		
	Instructor Accommodation	55		
	Others	118		
Equipment		75		
Consultant		116		
Total		926		

Note: This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

(2) Project Cost born by Mozambique

The items (and outline of each item) and total cost of the work to be carried out by the Government of Mozambique are as shown below.

1. Cost of tree removal ····· 293,000,000MT
   (Removal of 120 coconut palm trees and backfilling)

2. Cost of transference ····· 47,000,000MT
   (5-ton truck, driver, workman, 2 round trips a day, 5 days)

3. Cost of installation of service wires ····· 586,000,000MT
   (Total length of wires: 1,000 meters)

4. Cost of installation of telephone circuit ····· 258,000,000MT
   (Installation work of micro wave antenna and cable)

5. Cost of water supply ····· 400,000,000MT
   (Total length of water pipes: 1,000 meters)

6. Cost of construction of fences ····· 2,860,000,000MT
(Total length: 820 meters; concrete block, RC post)

7. Cost of furniture and fixtures ····· 173,300,000MT
(Furniture and fixtures)

8. Cost of curtains ····· 13,800,000MT

9. Customs duties, IVA, banking arrangement charge, etc. ····· 21,550,000,000MT

Total 26,181,100,000MT
(JY131 million)

(3) Conditions of Estimation

1) Estimation date : June 2004

2) Exchange rate : 1US$=108.21Yen, 1MT=0.00466Yen

3) Construction Period : See the Implementation Schedule

4) Others : This Project will be implemented in accordance with the rules and regulations of Japan's grant aid.

2-5-2 Operation, Maintenance and Management Cost

When this project is implemented, the Government of Mozambique will be required to make the following budgetary appropriations for the operation, maintenance and management of the planned facilities.

Table 2-14 Operation, Maintenance and Management Cost

Item	Amount
1. Cost of facility operation	1,531,000,000 MT
1) Electricity charges	497,000,000 MT
2) Telephone charges	566,000,000 MT
3) Water charges	157,000,000 MT
4) Cost of meals for boarders	162,000,000 MT
5) Cost of facility maintenance	149,000,000 MT
2. Cost of facility maintenance	327,800,000 MT
1) Cost of facility maintenance	189,000,000 MT
2) Cost of maintenance of equipment attached to facility	37,800,000 MT
3) Cost of equipment maintenance	101,000,000 MT
(Subtotal	1,858,800,000 MT
3. Cost of teaching material	81,000,000 MT
Total	1,939,800,000 MT (JY10 million)

(1) Cost of Facility Operation

1) Electricity charges ····· 497,000,000MT/year

Equipment	Assumed installed capacity
Electric lamp, wall outlet	150kVA
Air-conditioning/plumbing power plant	154kVA
Other	26kVA
Total	330kVA

Based on these figures, the capacity of the substation is estimated at 315 kVA.

- Assumed contract demand

Table 2-15 Calculation of Electricity Demand

Facility/equipment	Assumed installed capacity	Assumed demand factor	Maximum demand	Remarks
Administration building	5.78kVA	60%	3.46kVA	
Instructors buildings 1～3	11.28kVA	40%	4.51kVA	
Classroom buildings 1～3	12.73kVA	60%	7.63kVA	
Special classroom buildings 1&2	21.38kVA	30%	6.41kVA	
Auditorium	11.12kVA	20%	2.22kVA	
Canteen/kitchen	11.52kVA	20%	3.45kVA	
Dormitories for male students 1&2	28.50kVA	20%	5.70kVA	
Dormitories for female students 1&2	28.80kVA	20%	5.76kVA	
Instructor accommodations 1～2	16.38kVA	30%	4.91kVA	
Guardroom	0.22kVA	60%	0.13kVA	
Electric room	1.42kVA	50%	0.71kVA	
Other structures	1.41kVA	50%	0.70kVA	
Single-phase power plant	146.23kVA	85%	124.29kVA	
Three-phase power plant	33.87kVA	30%	10.16kVA	
Total	330.64kVA		180.04kVA	

As shown in the above table, the total maximum demand for power is 180 kVA. If it is assumed that contract demand accounts for approximately 60 percent of the capacity of the substation, the value of contract demand is: 180 kW※

- Assumed electric power consumption:

Based on the values of maximum demand as shown in Table 2-10, the values of demand for the planned facilities can be calculated as follows.

Total maximum demand in dormitories, instructor accommodations, canteen/kitchen: 40kW

Total maximum demand in administration, building, instructors buildings, other buildings: 140kW

Based on the above-mentioned values of maximum demand, the values of electric power consumption for the planned facilities (in kWh/month) can be calculated as follows.

ａ: Dormitories/instructor accommodations: 3,920 kWh/month

※ Contract basic electrical fee is depend on the transformer capacity. (Follow the Japanese standard of 60%.)

Weekdays: {(40 kW x 0.2 x 2 hours) + (40 kW x 0.6 x 5 hours)} = 2,720 kWh/month

Holidays: 40 k" x 0.3 x 10 hours x 10 days = 1,200 kWh/month

b: Office, classroom, other buildings: 12,600 kWh/month

Weekdays: 140 kW x 0.4 x 10 hours x 20 days = 11,200 kWh/month

Holidays: 140 kW x 0.1 x 10 hours x 10 days = 1,400 kWh/month

∴ Total electric power consumption = a + b = 16,520 kWh/month

- Annual total electricity charges:

Basic charge: 180kW×12months×138,417MT×1.17(IVA)= 349,807,442MT/year

Electricity charge: 16,520kWh/month×12months×633MT×1.17(IVA)=

146,818,526MT/year

Total 496,625,968MT/year

497,000,000MT/year

2) Telephone Charges 566,000,000MT/year

- Number of subscriber lines: 8 (to be newly installed)
- Used amount of subscriber lines: 8 lines x 230,000MT/line・year x 12 months x 1.17 (IVA) = 25,833,600MT/year…①
- Assumed charges for calls: assumed number of outbound calls: 10/line・day

Average length of call: 5 minutes/call

Therefore, the annual total length of call is estimated at:

8 lines x 10 times/line x 5 minutes x 365 days = 146,000 minutes/year

If it is assumed that long-distance calls (distance: 50 kilometers and more) account for the annual total length of call, charges for calls are as follows.

Local calls: 73,000 minutes/year x 720MT/minute x 1.17 (IVA) = 61,495,200MT/year

Long-distance calls: 73,000 minutes/year x 5,600MT/minute x 1.17 (IVA) =

478,296,000MT/year

Total 540,091,200MT/year…②

Annual total telephone charges:

①＋②＝25,833,600MT/year＋540,091,200MT/year ＝ 566,924,800MT/year

→ 566,000,000MT/year

3) Water charges 157,000,000MT/year

The daily total water consumption values referred to in "2-2-1 Facility Plan (5) Architectural Plan" are shown in the following table. Monthly total water consumption can be calculated on the basis of these figures.

- Calculation of water consumption

Students:	270 persons	100L/day・person	＝	27,000L/day
Instructors:	94 persons	100L/day・person	＝	9,400L/day
Instructor accommodations:	40 persons	100L/day・person	＝	4,000L/day
		Daily total water consumption:		40,400L/day
			→	$40m^3$/day

∴$40m^3$/day ×30day/month ＝$1,200m^3$/month

The water charges break down into the basic charge (273,000MT/month x 1.17 (IVA) for up to 25 m^3) and the charge proportional to the amount of use (10,900MT/m^3 x 1.17 (IVA)). The monthly total amount of water charges for the planned facilities is therefore calculated as follows.

{273,000＋10,900×(1,200-25)} × 1.17(IVA) ＝13,080,500MT/month

The annual total amount is calculated as follows.

13,080,500MT/month× 12 ＝156,966,000MT/year→157,000,000MT/year

4) Cost of meals for boarders・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・162,000,000 MT/year

The annual total amount per person of the cost of meals for boarders is 600,000MT/person • year.

- 600,000MT/person・year×270person＝162,000,000MT

5) Cost of fuel ・・・ 149,000,000MT/year

① Cost of fuel for emergency generator

- Capacity of emergency generator: 75 kVA; fuel consumption 18L/h

  It is assumed that power supply will be cut off for approximately two hours in total every week.

  Annual cost of fuel:

  18L/h×2hours×50weeks×15,000MT/L＝27,000,000MT/year

- Cost of fuel for microbus

  Fuel consumption: 5L/km, 7L/km※T

  Price of gas oil: 15,000MT

  Calculation of assumed annual total mileage: It is assumed that the annual total mileage is 22,000 km/year for middle-size bus and 26,000 km/year for microbus on the basis of the frequency of use in 2002 and 2003.

  Annual amount of the cost fuel:

  Middle-size bus: 22,000km÷5L/km×15,000MT＝66,000,000MT/year

  Microbus: 26,000km÷7L/km×15,000MT＝56,000,000MT/year

(2) Cost facility maintenance

1) Cost of facility maintenance ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・189,000,000MT/year

The cost of facility maintenance varies with the length of use of facility. For the first 10-year period, it is assumed that the cost of facility maintenance is 30,000MT/m^3・year.

6,300 ㎡×30,000MT/㎡・year＝189,000,000MT/year

2) Cost of maintenance of attached equipment ・・・・・・・・・・・・・・・・・・・・・・・・・37,800,000MT/year to Facility 37,800,000MT/year

For the first 10-year period, the annual average cost for repairs and maintenance (for parts replacement, etc.) for electric, plumbing, and air-conditioning equipment is expected to amount to 6,000MT/m^3・year.

6,300 ㎡×6,000MT/㎡・year＝37,800,000MT/year

3) Cost of maintenance of educational equipment ・・・・・・・・・・・・・・・・・・・・・・101,000,000MT/year (including cost of scheduled maintenance)

※ According to the specification by the Manufacturer

No.	Equipment	Q'ty	Unit	Annual required Q'ty (/unit)	Unit price (in meticals)	Annual maintenance cost (/unit)	Annual maintenance cost (/total)	Rationale for calculation of annual cost
L2-01	OVERHEAD PROJECTORS	2						
	Bulb		Piece	0.6	489,542.19	293,725.31	587,450.63	$260^{day/year} \times 4^{hour/day} = 1040^{hour/year} \div 2000^{hour/life\ time}$
L2-02	SLIDE PROJECTORS	2						
	Bulb		Piece	0.6	489,542.19	293,725.31	587,450.63	$260^{day/year} \times 4^{hour/day} = 1040^{hour/year} \div 2000^{hour/life\ time}$
L3-01	BINOCULAR EDUCATIONAL MICROSCOPE	30						
	Bulb		Piece	0.2	581,331.35	116,266.27	3,487,988.11	$260^{day/year} \times 2^{hour/day} = 520^{hour/year} \div 3000^{hour/Life\ time}$
	Immersion Oil		Set	1	611,927.74	611,927.74	18,357,832.18	$1^{set/year}$
L6-01	PHOTOCOPY MACHINE WITH SORTER	1						
	Toner		Piece	6.5	1,106,176.68	7,190,148.39	7,190,148.39	$260^{day/year} \div 40^{day/week}$
L6-02	PHOTOCOPY MACHINE, GENERAL	2						
	Toner		Piece	4.4	1,164,396.50	5,123,344.60	10,246,689.20	$260^{day/year} \div 60^{day/piece}$
L6-04	PRINTER (FOR TRAINING)	1						
	Toner		Piece	6.5	2,561,672.30	16,650,869.95	16,650,869.95	$260^{day/year} \div 40^{day/piece}$
L6-06	PRINTER (FOR OFFICE USE)	5						
	Toner		Piece	2.8	2,561,672.30	7,172,682.44	35,863,412.20	$260^{day/year} \div 90^{day/piece}$
L11-01	BUS, ,MIDDLE SIZE	1						
	Engine Oil		Liter	29	155,021.69	4,495,629.12	4,495,629.12	$28840^{km/year} \div 5000^{km} \times 5^{Liter}$
L11-02	BUS, SMALL SIZE	1						
	Engine Oil		Liter	23	155,021.69	3,565,498.96	3,565,498.96	$28840^{km/年} \div 5000^{km} \times 4^{リットル}$
			Total maintenance/ management cost (in meticals)				101,032,969.38	
							101,000,000	

(3) Cost of teaching materials····· 81,000,000MT/year

The annual total cost per student of teaching materials is assumed to be 300,000MT.

270 persons×300,000MT＝81,000,000MT