

number of buildings during the visit to the country by the field survey team. The national flag was also displayed at all kinds of facilities, giving expression to the patriotic feeling of the Malawian people.

The Malawian people like to keep their surroundings neat and clean. Flower beds and trees are found along roads, in parks and public facilities and are carefully looked after and well watered. Greenery is also well maintained at the Mzuzu Dépôt.

At the project site too, there will be a flagpole as well as a garden equipped with sprinklers, to create a landscape suitable for Malawi.

2) On-Site Roads

The project site is used at present as an outdoor storage space. The ground conditions of the project site and the surrounding area are generally satisfactory but the ground is likely to turn muddy during the rainy season. Since the grain is transported by lorries, the roads within the site will be provided with low-cost concrete pavement approximately 15 cm in thickness and containing welded wire meshes. These are specifications commonly adopted in Malawi and are the same as those under the Yard Pavement Design Standards of the Japanese Ministry of Construction. The road width will be set at approximately 8 m, taking into account the width of the existing gate and allowing for shuttle traffic of lorries. No special treatment will be given to road shoulders such as installation of curbstones and gutters.

3) Stormwater Drainage

U-shaped concrete gutters will be installed around the warehouse building and the stormwater in the gutters will be led to the seepage tank through culverts. No special drainage facilities will be provided for the newly-constructed ancillary buildings as is the case with the existing building.

4-3-2 Architectural Design

(1) Floor Plan

1) Warehouse

The floor plan for the warehouse will be made in accordance with the

criteria given in 4-2. Due to structural considerations and for the purpose of facilitating handling, the spans along the beams and those along the ridge direction should desirably be around 24 m and 6 to 7 m, respectively, these being the most economical spans. In view of the stacking layout determined taking into account the sizes of fumigation sheets, the beam span will be 23 m, while the ridge direction span will be 6.8 m (x 15 spans = 102.0 m), as shown in the drawing below. The capacity of the warehouse will be: 902 units x 0.27 tons/unit x 23 layers = 5,601 tons. The entrances will be located on every second span. Their width will be the same as that of the main passageway, while their height will be 4 m, facilitating stacking around the entrances by stackers.

2) Ancillary Buildings

The administration block will accommodate the offices of the dépôt supervisor, his assistant, accountants, etc., and pest control staff room, as well as a boiler room and a lavatory. The canteen, lavatory, shower room and changing room will be designed for a maximum labour force of 60. Other facilities required include the instrument house for the weighbridge, a chemicals store for fumigation equipment and chemicals and the guard house.

(2) Section Plan

1) Warehouse

The project site being on raised ground and there being little humidity, the floor will not be raised off the ground. The floor will be raised only a little above the level of the outside pavement to facilitate the use of stackers both inside and outside the building. A concrete steel trowelled finish will be applied to the floor. An ordinary, simple gabled roof will be used for economic reasons and to prevent leakage. The eaves will be given adequate depths to cover lorries in order to allow handling work underneath them even in rainy weather. Although ADMARC's usual practice for lighting in warehouses is to install sky lights on the roof, they may not be adopted for the project, since there is no need for warehouses to be particularly light, while adoption of sky lights will create problems in the prevention of radiation heat and durability of the sky light materials.

The height of the building will be set so as to ensure there is ample

room underneath the roof beams for work on the maximum 23 layers of grain bags (5 m). The space between the ceiling and the top of the exterior wall along the ridge direction will be given an adequate height for use as a continuous opening for ventilation and nets will be installed to prevent intrusion by birds and mice. A continuous ventilator will be installed on top of the roof for natural ventilation.

2) Ancillary Buildings

The buildings will be of the same grade as the existing ADMARC office, with terrazzo flooring and brick-masonry exterior walls. For the roof, wooden trusses will be covered with corrugated sheets and roof tiles will be laid on top of them. The height of the tops of the pole plates will be approximately 3 m, the same as the existing office building. All the doors will be wooden flush doors produced in Malawi.

(3) Structural Design

1) Design Standards, External Force, etc.

In the structural design for the warehouse, adequate provision must be made for wind forces, since the project site is situated on raised ground with nothing to shield the buildings from winds and in view of the use of long eaves on the warehouse.

The British Standards (BS) are normally used for design in Malawi. The design under this project will also, in principle, be based on BS. Since there is no record at the meteorological station for the maximum instantaneous wind speed at the project site, the maximum value of 33.3 m/s, given in the specifications for a pylon construction project in Malawi, will be adopted. This is a sufficiently safe value to use judging from the natural conditions and the existing buildings on the project site. There also being no observation data as regards seismic loads, the lateral seismic factor has been set at $R = 0.05$ from the 50-year probability value of 25 gal given in the maximum expected seismicity distribution map of the world published by the Building Research Institute (Ministry of Construction, Japan).

2) Roof Frames

In view of the handling work, it is best not to have any columns

inside the warehouse. Large-span steel frames will be used. In order to simplify the transportation plan and to facilitate work by local labourers, truss frames with L-shaped steel bars generally used in Malawi will be adopted. In view of the materials procurement plan and the construction schedule, columns will be of reinforced concrete which can be constructed out of materials available in Malawi and which are easy to construct.

3) Foundation and Flooring

It is assumed that the bearing capacity of the soil at the project site is at least 10 tons/m². A direct reinforced-concrete foundation will be adopted for the foundation and reinforced concrete slabs will be laid on grade for the floor.

4) Structural Materials

BS specification products from neighbouring countries will be used for the steel frames and reinforcement bars. Ordinary Portland cement in conformity with the Malawian or Zambian specifications will be used for the concrete.

(4) Building Equipment Plan

1) Power Installation

[Power Source] Power will be supplied from the pole transformer near the RDP Office on the Mzimba Boma side of the project site.

For motor power: 3 ϕ x 3 W x 380 W x 50 Hz (100 kVA)

For lighting: 1 ϕ x 2 W x 230 W x 50 Hz (100 kVA)

[Motor Power] The main power distribution board will be located in the Office Block and power supplied from there to each board in the warehouse and ancillary buildings.

[Lighting Fixtures, Switches and Socket Outlets] Fluorescent lights will be used in the main for lighting. The lighting fixtures in the warehouse will be covered with protection nets. Switches will be placed near the entrances with separate systems for the lighting for the passages and for other parts. Lighting fixtures will also be installed under the eaves on the outside of the entrances and socket outlets will be installed near the entrances. Lighting fixtures, switches and socket outlets will be installed at appropriate locations in the ancillary buildings as well.

2) Sanitary Work

[Water Supply] Pumps will be installed beside the RDP office building and pipes laid on to the project site. Raised water tanks will be constructed within the project site and water will be supplied by the gravity method to various sanitary equipment, the boiler room, showers and outdoor potable water taps.

[Fixtures] Western-style low-tank closet bowls and urinal stalls will be installed. Besides these, there will be wash basins and basins used for cleaning. Shower heads will be of a fixed type.

[Drainage] Soil water and waste water will be stored in a settling and septic tank and the water at the top percolated into the ground through a seepage pit.

3) Ventilation Work

[Ventilation] Ventilation fans will be installed in the lavatory, boiler room and equipment and chemicals store.

(5) Building Materials Plan

Materials of the same type as the finishing materials used in ADMARC's existing warehouses will, in principle, be chosen for the new building, paying adequate attention to their heat-resistance, watertightness, dustproof nature and durability. The outlines of the specifications for the main items in the finishing work for the warehouse are given below;

[Roof] Corrugated metal sheets, generally used as warehouse roof materials in Malawi, will be adopted, choosing sheets with high heat-resistance and weatherproof qualities. Metal sheets of the same manufacturer will be used for the edges and gable ends of the eaves.

[Exterior Walls] Brick masonry, which has high heat-resistance and is commonly used in Malawi, will be adopted. The inside of the walls will be given a plaster and paint finish to prevent generation of dust from the bricks as well as to prevent adhesion of dust to the walls. With the aim also of enhancing the visual effect, face brick masonry will be adopted for the exterior wall along the ridge direction, while the columns and both the outside and the inside of the gable walls will be given a plaster and paint

finish.

[Floor] The surface of the concrete floor will be given a trowelled finish.

[Others] Entrances: steel hanger doors, 2,600 (W) x 4,000 (H), with mouse stoppers

Bird Nets: The meshes on the nets generally used at the existing warehouses are too large to prevent intrusion by birds. Highly-weatherproof steel nets with 25 mm meshes will be used.

Ridge Ventilation Opening: Metal, continuous ventilators will be used for natural ventilation. The height of the opening should be around 500 mm.

(6) Outline of Facilities

The scales and the details of the facilities described above are summarised in the table below;

Building	Details, Function	Floor Area
1. Warehouse	Storage capacity (in terms of maize): 5,600 tons (Bags stacked in 23 layers, Allowance below beams: 6.0 m) (23 m x 102m)	2,346m ²
2. Admin. Block	Office rooms, Boiler room, Lavatory (9 m x 15 m)	135m ²
3. Canteen	Kitchen, Canteen (5 m x 20 m)	100m ²
4. Ablution	Lavatory, Shower room, Changing room (5 m x 20 m)	104m ²
5. Weighbridge	Weighbridge weighing room (3 m x 5 m)	15m ²
6. Chemicals Store	(5 m x 5.5m)	27.5m ²
7. Guard House		6.25m ²
8. Pump Station		6.25m ²
9. Raised Water Tank	8m ³ , Height: 12m	

4-3-3 Warehousing Equipment Plan

The main items to be handled in the warehouse under the project are bags of grain (mainly maize). Equipment normally required at warehouses for grain include those for handling, weighing, inspection and fumigation. The equipment will be selected on the basis of the list of equipment requested by the Government of Malawi, also taking into account the equipment used at the principal existing warehouses.

The equipment suited to the functions and the scale of the warehouse will be selected in accordance with the following work plans.

(1) Handling Plan

Transportation vehicles such as lorries will not in principle be used inside the warehouse. Use of vehicles inside the warehouse not only reduces the effective area of the warehouse but the mud adhering to the wheels of the vehicles and entering the warehouse will lead to deterioration of the storage conditions. For the transportation of grain to and from the warehouse, vehicles will be parked with their backs or sides to the entrances and the grain taken off or loaded on to them. In this case, there are the following three possibilities for methods of transporting the grain bags from the vehicles to the stacking position or vice versa;

- two-wheeled sack barrows
- horizontal conveyers
- rain bags loaded on to pallets and transported by folk lifts

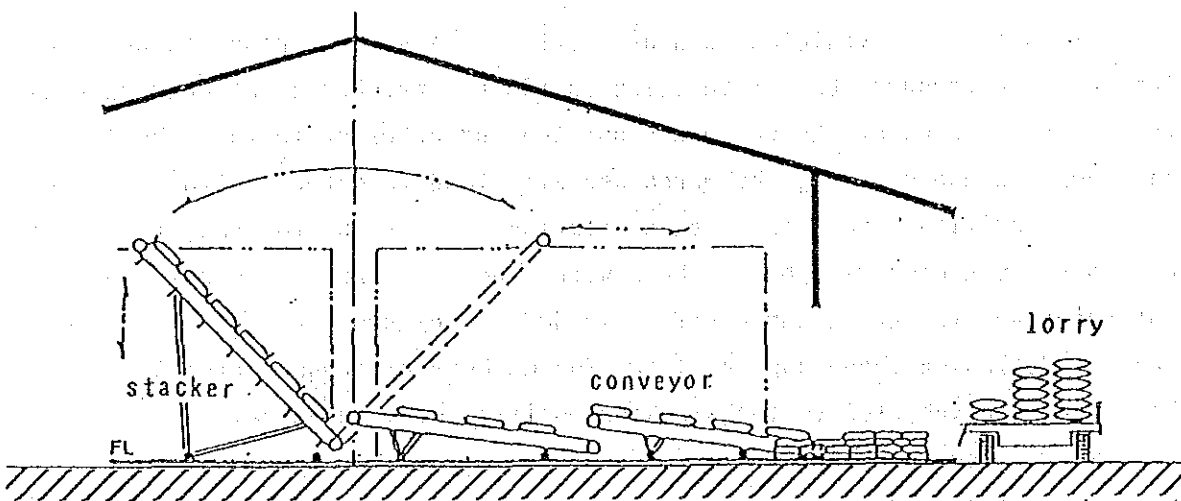
Although sack barrows are used at present at most of ADMARC's warehouses, horizontal conveyers have been introduced at one of the warehouses constructed under aid from Japan (Bangula Dépôt) to raise the efficiency of this work of transportation within the warehouse. The introduction of these conveyers, together with the use of pallets as mentioned below, has received favourable appraisal from the Government of Malawi for efficiency.

The combined use of pallets and folk lifts has been adopted at warehouses where the palletising system has been established and where objects which are too heavy for transportation by conveyers are handled but is rarely seen at ADMARC's grain warehouses. Although log dunnages are normally used instead of pallets at most of ADMARC's grain warehouses,

pallets will be adopted under the project as at Bangula Dépôt. The purpose of using the pallets, however, is not for handling but for quality control of the grain and the combination of pallets and folk lifts will not be used for handling of the grain.

Horizontal conveyers will be used in the main for horizontal transportation of the grain within the warehouse, while sack barrows will be used for extraction of bags for inspection and work for dealing with broken bags. For handling work involving vertical movement of the bags, such as stacking of the bags and loading on to lorries, stackers generally used at warehouses in Malawi will be used.

A conceptual drawing of the handling work in the warehouse is given below.



Conceptual Drawing of Handling Work in the Warehouse

The handling equipment required for the work described above is as follows.

① Conveyor-Stackers

These will be used for transportation of the grain bags from vehicles parked by the entrances to the warehouse to their stacking positions inside the warehouse. Efficient handling of the bags can be ensured by combining a plural number of conveyers in accordance with the transportation distance. When transporting the bags out of the warehouse, the direction is reversed. The conveyor-stackers will be of the type capable of transporting 90 kg bags of maize and stacking them to a height of 5 m.

② Sack Barrows

Since lorries will not be allowed to enter the warehouse under the project, horizontal conveyers will be used in principle for the transportation of grain bags in and out of the warehouse. It becomes necessary at times, however, to extract the bags for inspection or deal with torn bags. Sack barrows will be of use in such cases. The sack barrows will be of a type which can easily transport a 90 kg bag of maize.

(2) Weighing Plan

Most of the grain handled by ADMARC is packed in bags and is purchased and sold by weight. Measurement of the weight of the grain entering and exiting the warehouse will normally be implemented by measuring the total weight of the lorries on lorry scales. The weight of the lorry is subtracted from the total to obtain the weight of the grain. The equipment required for this work is described below.

① Weighbridge

The weighbridge is required to raise the efficiency of the weighing work when large quantities of the same item are loaded on to transportation vehicles. Platform scales, as mentioned below, are used for weighing involving small quantities of different items. A request has been made by the Malawian Government for two weighbridges for a 10,000 ton warehouse. The capacity of the project warehouse being 5,600 tons, however, one weighbridge is considered adequate. The load-cell type normally used at new warehouses in Malawi will be adopted.

② Platform Scale

Although most of the weighing of the grain sold or purchased will be carried out on the lorry scale, a platform scale is required for work such as replacing grain from bags which have been torn and for when the weighbridge breaks down. The scale adopted will have a supporter for the bags to lean on.

(3) Inspection Plan

The quality of the grain in storage is greatly influenced by its water content. The water content in the grain not only has an adverse effect on the quality of the grain but also can be a cause of quantitative loss in selling and purchasing the grain. Dealers would suffer by buying grain with a high water content and selling dry grain with a low water content. It is important, therefore, to measure the water content of the grain at the time of purchase, during storage and at the time of sale and to dry the grain when necessary.

Apart from the water content, the grain also needs to be inspected for impurities. Purchased grain often contains impurities such as small stones and straw. It is of importance, from the point of view of commercial considerations, to assess the admixture of the impurities in the grain purchased and so check the quality of the grain.

As regards quality control during storage, the grain must be checked regularly for insect pests and fumigation implemented immediately if insect pests are found.

The equipment required for the above is as follows.

① Moisture Meter

Although maize with a water content of over 13% is not to be handled according to the ADMARC standards, in reality the lack of moisture meters results in inaccurate assessment and maize with a high water content is often found among the grain purchased. Quality control will be implemented by checking the water content at the time of delivery and during storage. The moisture meter will be of the high-frequency capacity type capable of measuring moisture in short periods of time without damaging the samples and of the type suited for use with maize, groundnuts, sunflower seeds and beans, the crops handled by ADMARC in Mzimba District.

② Table Scales

These are used for weighing the samples at the time of analysis. Plates larger than normal will be adopted for the weighing of grain.

③ Grain Triers

These are used for taking grain samples from the bags for inspection.

The type suitable for the materials and sizes of the grain bags, as well as the types of grain to be sampled is selected.

④ Sample Trays (Large and Small)

The small sample trays are used as sample containers for visual inspection, while the large trays are used when returning the inspected samples to the bags.

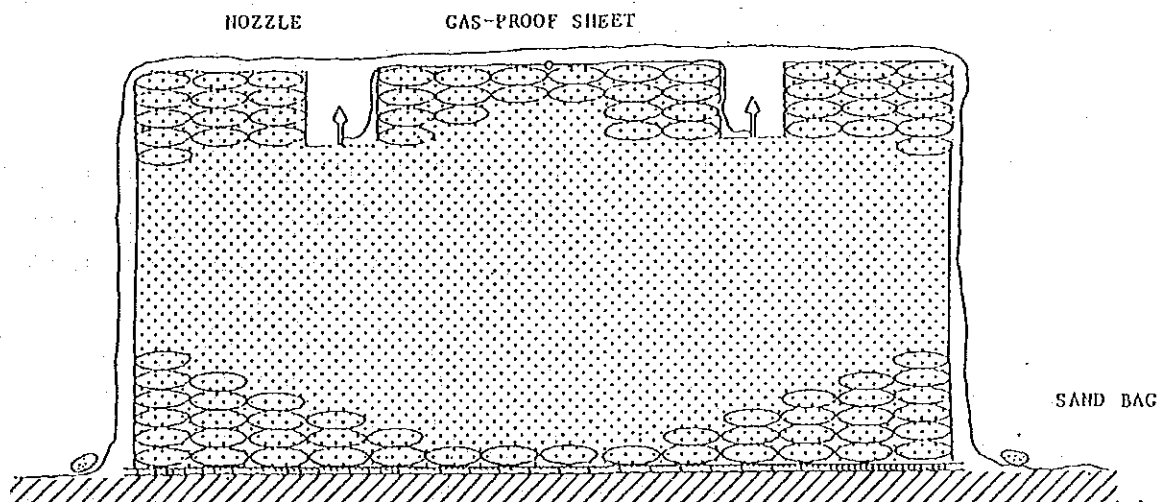
⑤ Sieves

Sieves are used for grading impurities mixed in the grain samples according to their sizes. Four sieves with different mesh sizes are used as a set.

(4) Pest Control Plan

The grain delivered to the warehouse may well be infested with insect pests and the eggs laid on the grain may hatch and turn into imagoes during storage. Regular pest control is required.

An effective method for removing pests during storage is to implement fumigation in a sealed warehouse which is a common practice in Japan. Because the warehouses in Malawi are not sealed, however, fumigation sheets illustrated in the drawing below are used for pest control. This is the method generally used at ADMARC's dépôts. Methyl bromide used for



Fumigation Using Fumigation Sheets

fumigation is extremely harmful to the human body and the utmost care is required in handling it.

Pests which cannot be removed by fumigation, such as those inhabiting the corners of the warehouse and the pallets are removed by spraying pesticides such as actellic and malathion.

The equipment required for the above is described below.

① Sprayers

These are used for disinfecting inside and outside of the warehouse and pallets, as well as for exterminating bacteria and insects harmful to the grain. Manually-operated sprayers will be adopted to reduce maintenance costs.

② Fog Machines

These are used for spraying chemicals (solution and emulsion type) in aerosol form to kill off pests throughout the warehouse. Small, gasoline-engine type machines used at other ADMARC dépôts will be adopted.

③ Fumigation Sheets

These are used to cover the grain bags when fumigating the bags to exterminate pests inside them. The sheets will be of the normal size (18 m x 12 m), as at Bangula Dépôt, but their thickness will be increased to 0.3 mm to ensure durability. Clips and sand bags will be provided with them for preventing leakage of poisonous gas from the joints between sheets and between the sheets and the floor.

④ Ladders

Ladders are used when covering the bags with fumigation sheets and removing the sheets after fumigation. They are also used for taking samples of the stored grain for inspection. Easily transportable aluminium ladders will be adopted.

(5) Warehouse Management Plan

Besides the equipment described above, the following will be required in order to minimise the deterioration of the grain quality and to ensure efficiency in the work in the warehouse.

① Hand-Driven Winnowers

The jute grain bags are used repeatedly since they are all imported and are relatively expensive. As a result, they often burst during handling and there is a need to clean and grade the spilled grain efficiently. Portable hand-driven winnowers which can be taken anywhere will be used for this purpose.

② Bag Closers

Two bag closers will be provided for ensuring efficiency in the work of transferring the maize into new bags. Although four closers were requested by the Government of Malawi, two are thought to be adequate since they are used mainly for putting the grain from bags which have been torn into new bags and the frequency of their use is not high.

③ Hydro-Thermometers

The temperature and humidity inside the warehouse are of importance as items of storage conditions. Four wall-hung hydro-thermometers will be provided for measuring these conditions.

④ Pallets

When the grain bags are placed directly on the concrete floor, this may result in damage to the parts of the grain and the bags touching the floor. The humidity will also be relatively high in the air near the floor surface and this will lead to excess water injury to the grain at the bottom of the stacks. Pallets are normally placed on the floors underneath the bags in grain warehouses to counter these effects. Although log dunnages have traditionally been used in Malawi instead of pallets, these require large amounts of labour to handle and are not desirable from the point of view of ensuring safety during work. Pallets made of local wood were adopted at Bangula Dépôt and have received favourable appraisal for their efficiency and safety. Pallets will also be adopted at the warehouse under this project.

⑤ Fire Extinguishers

These will be used to extinguish fires occurring in the warehouse at an early stage. The extinguishant to be selected will be effective against normal, oil and electrical fires.

The foregoing may be summarised in a table as follows.

List and Outline Specifications for Warehousing Equipment

Equipment	Outline of Specifications	Number
(1) Handling Equipment		
① Stackers	for 100 kg bags, elevation angle type, electrically operated, approx. 8 m in length, with steel strip	2
② Horizontal Conveyers	for 100 kg bags, horizontal type electrically operated, 7 to 8 m in length, steel strip	4
③ Sack Barrows	max. load: 250 kg, with rubber tyres	10
(2) Weighing Equipment		
① Weighbridge	max. load: 50 tons, loading surface: 3 m x 18 m, load-cell type, with printers, approved under measurement regulations in Malawi	1
② Platform Scales	max. load: 300 to 400 kg, dial type, approved under measurement regulations in Malawi	2
(3) Inspection Equipment		
① Moisture Meter	ordinary dry battery type, high-frequency capacity type	2
② Table Scales	max. load: 1 kg, sensitivity: 500 mg plate capacity: approx. 1 kg (maize)	2
③ Grain Triers	single, for large and small grains	2 each
④ Sample Trays	large and small types	L x 3 S x 50
⑤ Sieves	30 to 50 cm ϕ x D 50 cm, 4 mesh sizes, with receptacles	4

(4) Fumigation Equipment

① Sprayers	carried on backs, manual type, tank capacity: approx. 10 l	2
② Fog Machines	portable, tank capacity: 5 to 10 l, high or normal temperature type	2
③ Fumigation Sheets	21.5 m x 12.5 m x 0.3 mm, transparent vinyl chloride with threads, with clips and sand bags	15

(5) Warehouse Management Equipment

① Hand-Driven Winnowers	manual and portable type, steel, with feeding rollers	2
② Bag Closers	electrically operated, portable type	2
③ Hydro-meters	-20° C to +50° C, wall-hung type, with humidity conversion table	4
④ Pallets	wooden, 1.58 m x 1.1 m x 0.15 m	902
⑤ Ladders	aluminium, approx. 7 m in length, double	2
⑥ Fire Extinguishers	for normal, oil and electric fires extinguishant weight: 5 to 6 kg	12

Some of the equipment listed above were not mentioned in the request from the Government of Malawi but have been included in the Warehouse Equipment Plan as being equipment indispensable to grain warehouses.

Fork lifts, which were requested, on the other hand, are useful at warehouses where objects too heavy for men to carry are handled. However, they are not necessary at grain warehouses such as that under the project where the goods are transported by horizontal conveyers and sack barrows.

Tractors and trailers, which were requested as vehicles for the transportation of grain are useful for the transportation of goods between warehouses. However, there is only one warehouse constructed under the project and the warehouse is not very deep. These too, therefore, will be omitted

These are the reasons behind the selection of the warehouse equipment.

The relationship between the equipment requested and the equipment to be provided in the Basic Design is shown in the table below, together with

comparative lists of equipment at Bangula and Mzuzu Dépôts, which have recently been constructed, and Kazomba Dépôt at present.

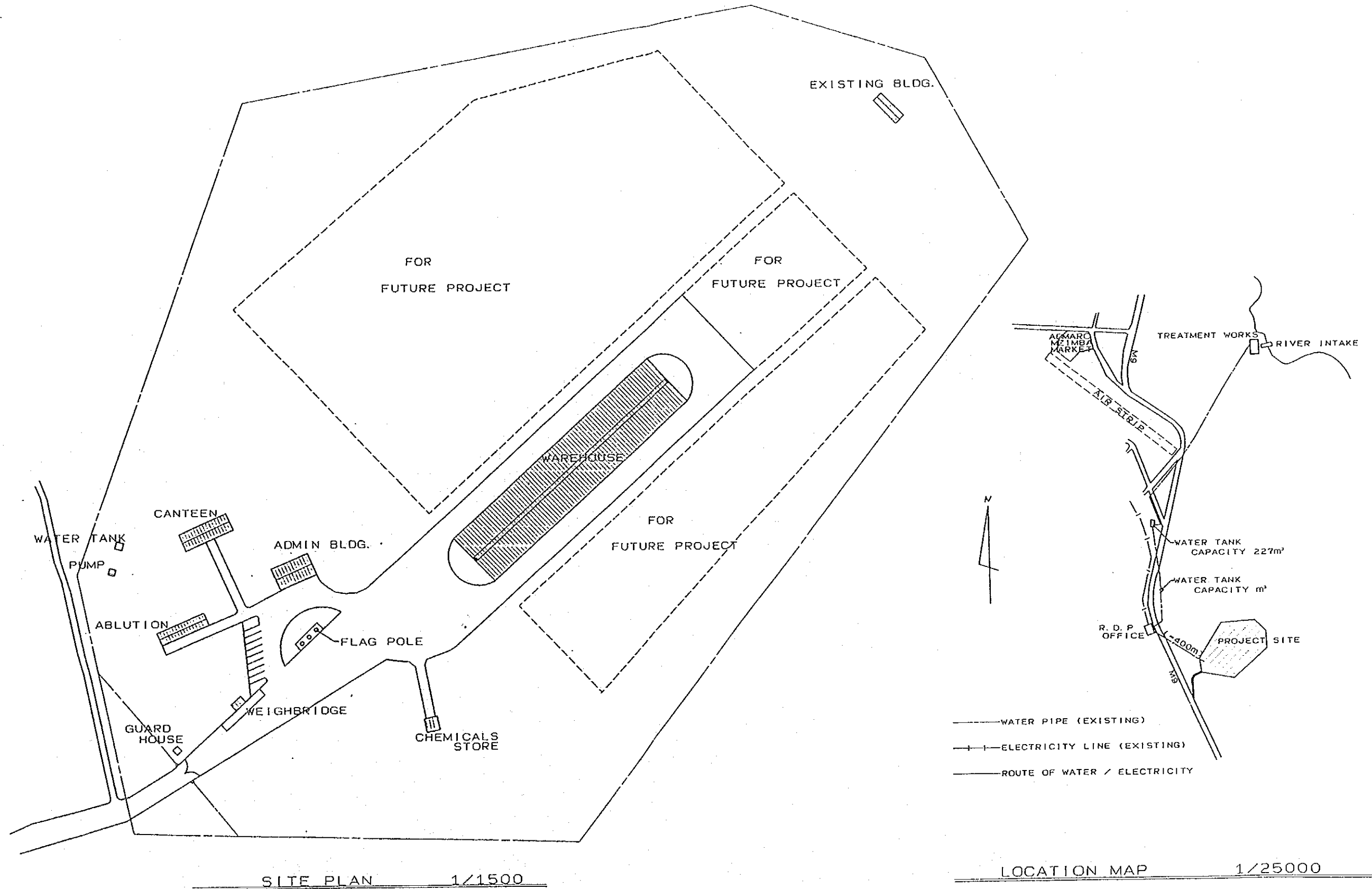
List of Requested Equipment and Equipment
at Principal Warehouses

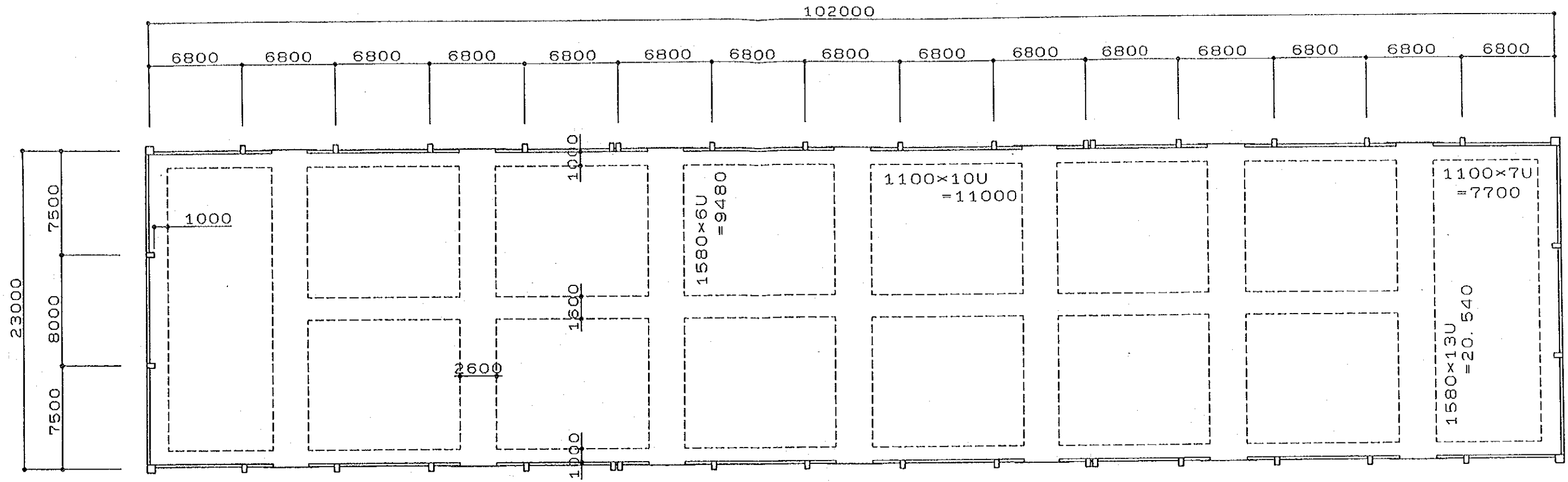
Dépôt	Bangula (3,700t)	Mzuzu (10,000t)	Kazomba (at pres.) (2,844t)	New Kazomba (for the project) Request Basic Design (10,000t) (5,600t)	
(1) Handling Equipment					
① Stackers	2	4	-	4	2
② Horizontal Conveyers	4	-	-	-	4
③ Tractors (with Trailers)	-	1(?)	-	1(2)	-
④ Fork Lifts	-	1	-	1	-
⑤ Sack Barrows	5	30	20	30	10
(2) Weighing Equipment					
① Weighbridge	1(railway carriage)	2	-	2	1
② Platform Scales	2	4	2	4	2
(3) Inspection Equipment					
① Moisture Meter	2	1	1	2	2
② Table Scales	2	-	1	1	2
③ Grain Triers	4	-	1	as required	4
④ Sample Trays	3 L 20 S	-	-	as required	3 L 50 S
⑤ Sieves	-	-	-	as required	4
(4) Fumigation Equipment					
① Sprayers	2	-	2	as required	2
② Fog Machines	2	-	-	1	2
③ Fumigation Sheets	12	12	tarpaulin sheets (substitute)	12	15

(5) Warehouse Management Equipment

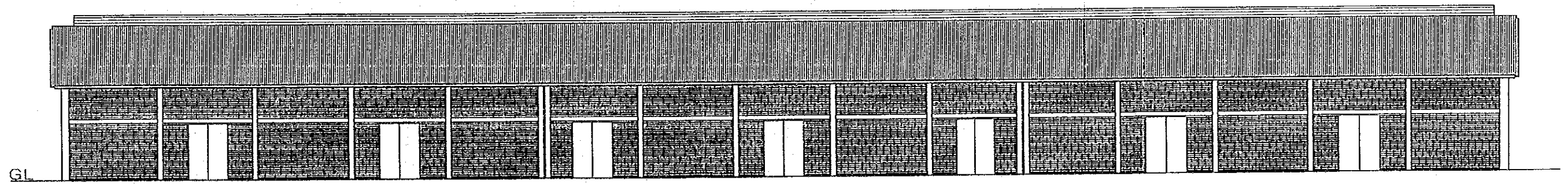
① Hand-Driven Winnowers	-	-	-	-	2
② Bag Closers Closers	-	4	-	4	2
③ Hydrometers	2 (thermometers)	-	-	as required	4
④ Pallets	614	log dunnage	log dunnage	as required	902
⑤ Ladders	1	-	-	as required	2
⑥ Fire Extinguishers	6	(*)10	(*)3	as required	12

(*) together with fire hydrant facilities

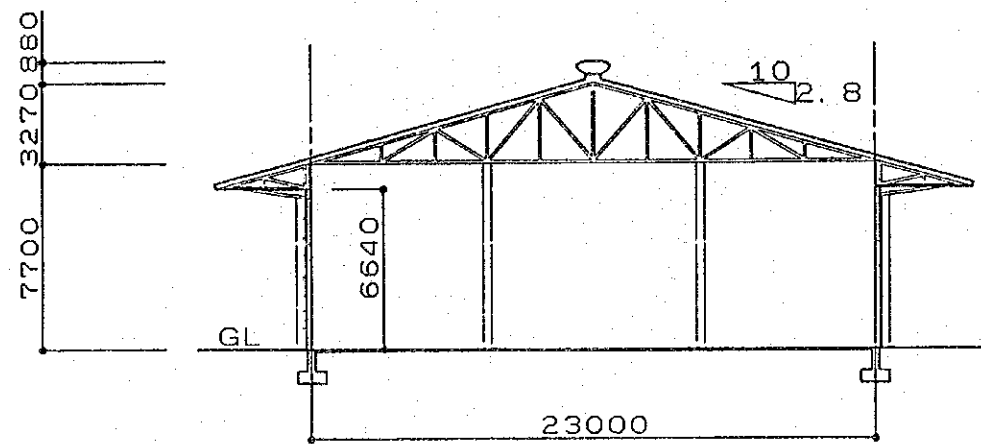




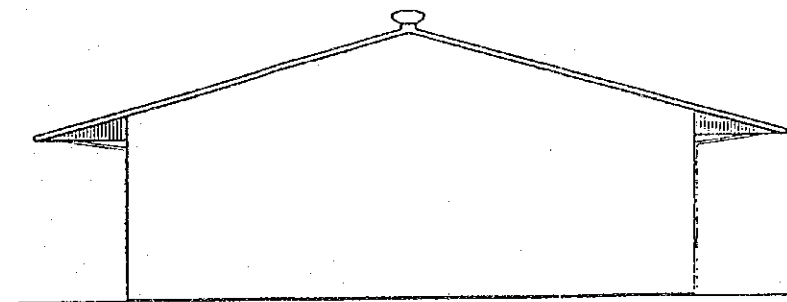
PLAN



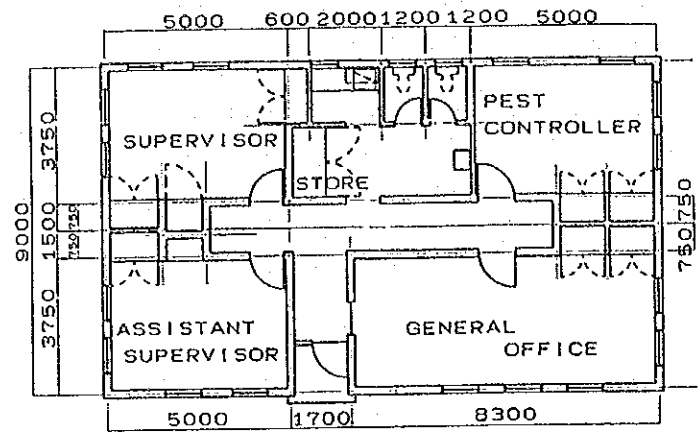
SOUTH/NORTH



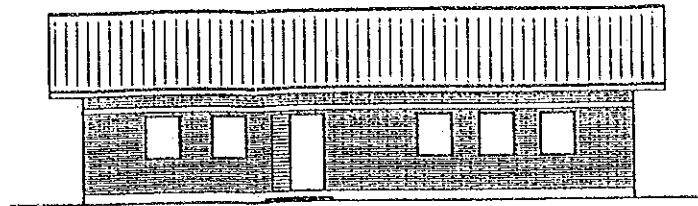
SECTION



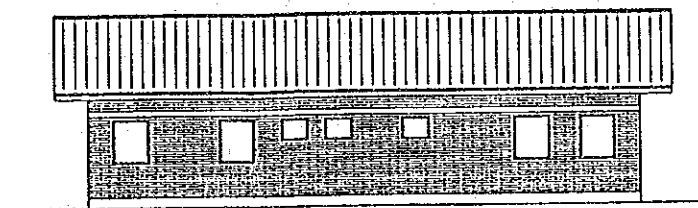
EAST/WEST



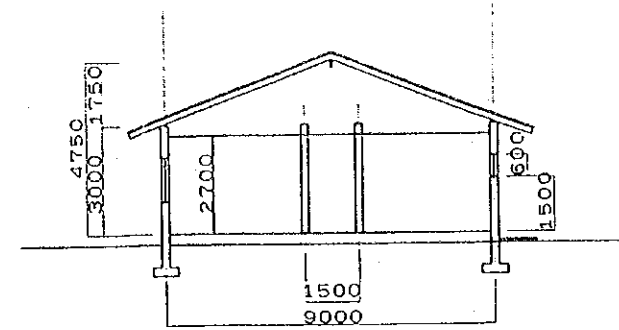
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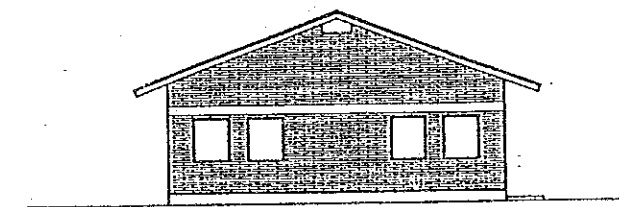
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NORTH

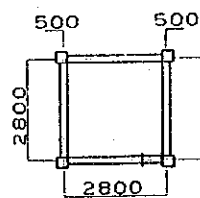
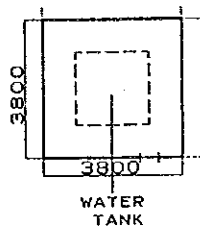


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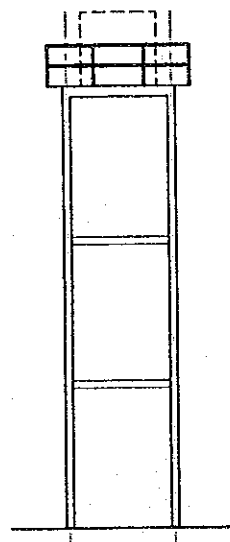


EAST/WEST

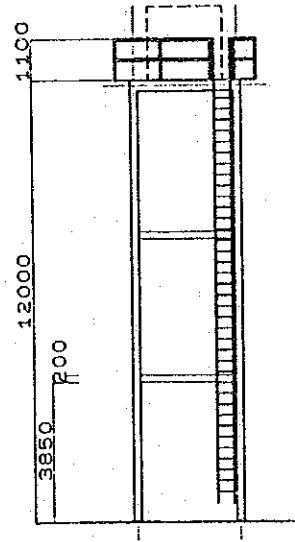
ADMINISTRATION BLDG. 1/200



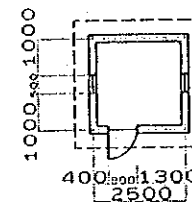
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EAST/WEST/NORTH



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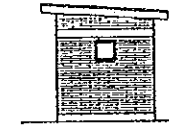
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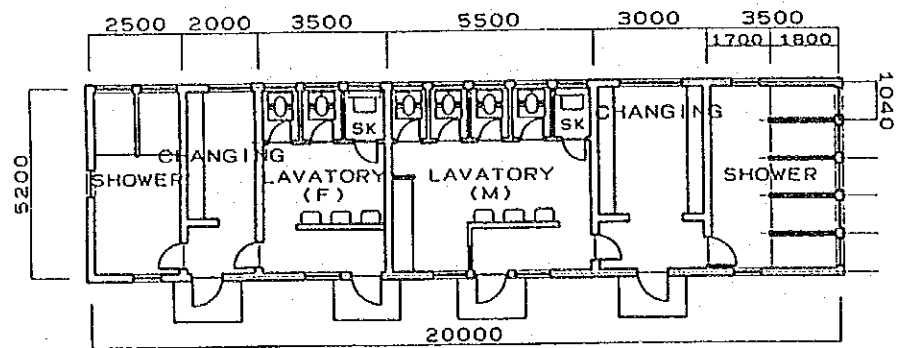
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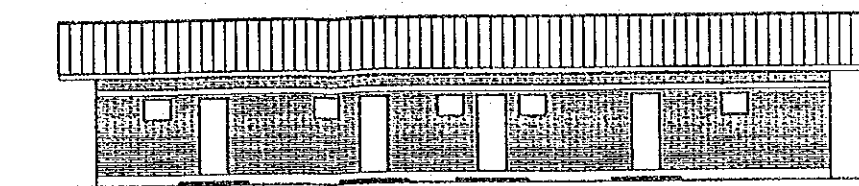
EAST/WEST

WATER TANK. 1/200

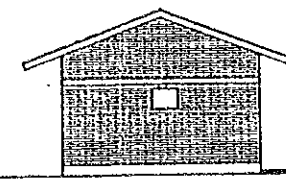
PUMP HOUSE. 1/200



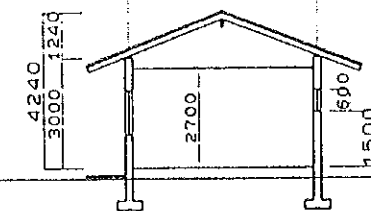
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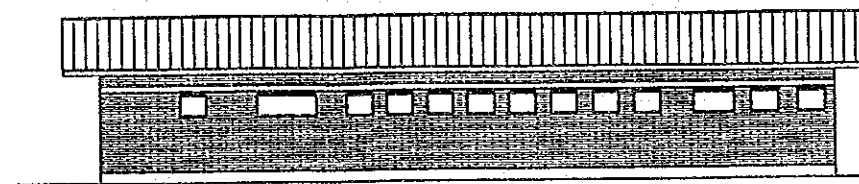
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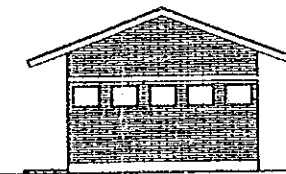
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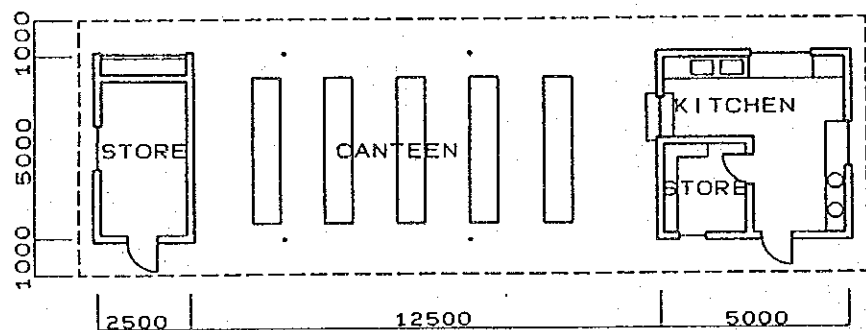


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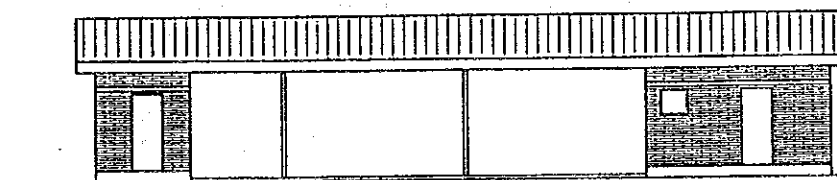


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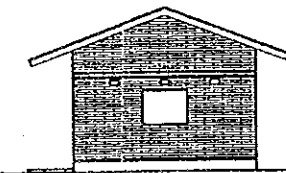
ABLUTION. 1/200



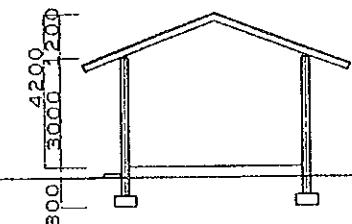
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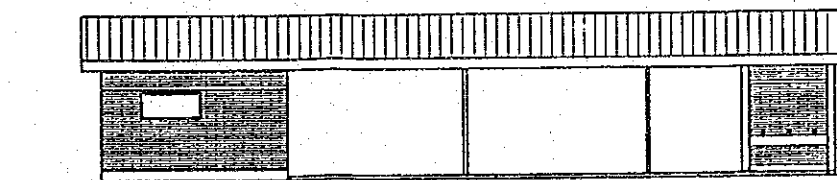
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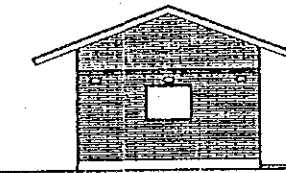
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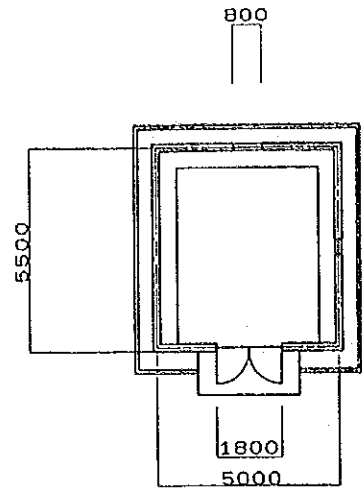


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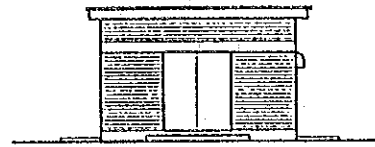


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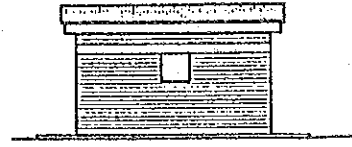
CANTEEN. 1/200



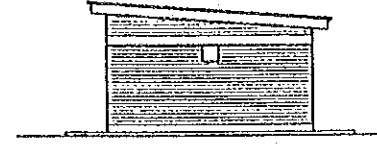
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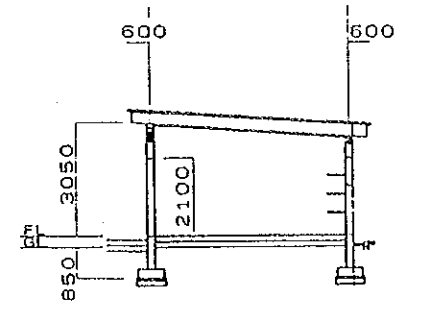
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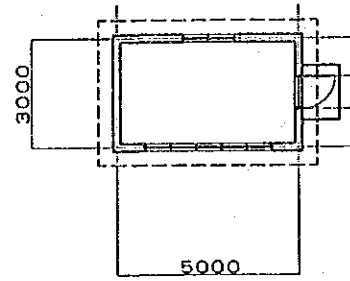


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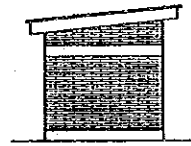


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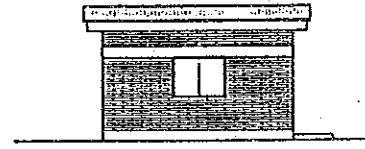
CHEMICALS STORE 1/200



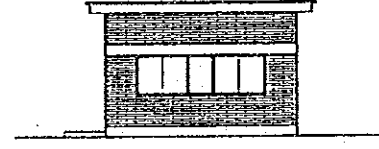
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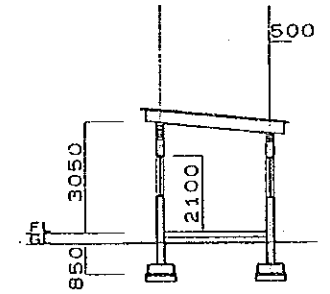
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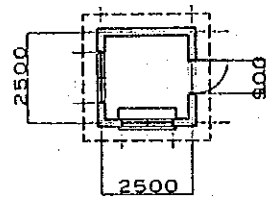


EAST



SECTION

WEIGHBRIDGE HOUSE 1/200



PLAN.



WEST



NORTH



SOUTH



EAST

GUARD HOUSE 1/200

4-4 Project Implementation Plan

4-4-1 Implementation Method

The construction work under the project must be commissioned to a Japanese construction firm with ample experience in construction work abroad and with sufficient capacity to ensure completion of the work. An open tender will be held for pre-qualification and the contractor will be selected by bidding from among the qualified bidders.

Local construction firms may participate in the project as subcontractors but may not be responsible for the whole or the main part of the construction work.

All construction consultants and contractors in Malawi are registered with the Ministry of Construction. The grades and the limits on orders they may receive are set for each firm by law and firms cannot receive orders in excess of these amounts. There are lists also of qualified architects, structural engineers and quantity surveyers.

A large number of warehouses and factories, including that at Mzuzu, have been built by SFFRFM and ADMARC, at the same time as and since the construction of Bangula Dépôt under grant aid from the Government of Japan. Most of these were implemented by local consultants and contractors and the level of experience and technical reliability of these local firms have risen considerably. If circumstances allow, therefore, it will be good to employ these firms as subcontractors. Among the consultants, L.S.C. Brunette and Partners have been responsible for the execution design of almost 90% of the warehouses constructed in Malawi, while as regards contractors, British firms, such as Wade Adams, Kier International and Fitzpatrick, have been engaged in large-scale construction in various parts of the country. There are fabricators of steel frames at Lilongwe and Blantyre.

Technically, the construction work to be undertaken under the project is not particularly difficult or complex. Two construction engineers (including the site manager) and one clerical staffer responsible for various clerical and accounting work, as well as procurement of materials, will be sent to Malawi by the contractor. In view of the circumstances in Malawi described above, it is thought unnecessary to dispatch specialist engineers for roof construction, earth work and equipment installation.

The Malawian counterpart for implementation of the grant aid (construction of the facilities and procurement of equipment) is the Ministry of Agriculture (Planning Division), while that for maintenance of the facilities after completion is ADMARC (Markets and Dépôts Controller at the Headquarters). During implementation of the construction work, close contact must be maintained with these organisations, as well as the local JICA office and various governmental agencies to ensure there are no delays or misunderstandings.

4-4-2 Construction Conditions

Mzimba Boma, the township nearest the project site, is a small town with few buildings even of two storeys. There are no construction or procurement firms or factories which could be subcontractors for the project. Apart from a few items which can be obtained at Mzuzu, most of the materials and equipment will have to be procured in Lilongwe or Blantyre. There are no problems as regard roads for the transportation of goods from these three cities, as Mzimba is connected with them by the national roads M1 and M9, but procurement of an adequate number of lorries for the transportation of goods is a must for ensuring smooth implementation of the construction work.

Although, as mentioned below, all the construction materials and equipment will, in principle, be procured in Malawi, it may be necessary to obtain some of them in Japan. In this case, one will need to allow around 5 months for manufacturing, packaging and transportation to the project site after the orders are placed, judging from past experience at Bangula Dépôt. If, therefore, construction materials are to be imported, in view of the work schedule, these will have to be limited to finishing materials from roofing work on and mechanical and electrical equipment. In order to complete the foundation work and the concrete building frame work before the imported materials reach the site, on the other hand, the most important factor will be swift procurement of steel reinforcements which are to be imported from neighbouring countries.

The rainy season in Mzimba lasts from November until April of the next year. Under the work schedule, excavation, embankment and concrete placement work is expected to take place during the rainy season, necessitating adequate consideration of such items as drainage during

excavation and prevention of rainwater permeation into the concrete. Utmost care needs to be taken in the embankment work as inadequate rolling will lead to sinking of the floor slabs.

Since the project site lies outside of the boundaries of Mzimba Boma, there are no restrictions under the regulations which apply to the Boma but the construction plan must be submitted to the OPC.

4-4-3 Construction Supervisory Plan

In view of the scale of the project, the consultant will station one permanent staffer at the project site throughout the project period to check and give directions on the progress of the work and on execution drawings and details of the work, to maintain contact with the counterpart organisations in Malawi and to make the regular and other reports as required. Besides this, a structural engineer, an equipment specialist and a senior supervisor and an equipment specialist each will be sent to Malawi for short periods of time to carry out the necessary inspections at the time of the factory inspection and installation of steel-frame trusses, selection, meetings for design and fabrication of equipment and final inspection after completion.

4-4-4 Procurement Plan

(1) Construction Materials

Construction materials available in Malawi are limited to primary products such as concrete aggregate, cement, bricks, concrete blocks and wood. Materials such as steel bars, reinforcements, various finishing materials and mechanical and electrical equipment need to be imported from either the neighbouring countries or Europe and Japan. Because of the instability of the supply from the neighbouring countries and the difficulties of securing hard currency for purchase in Malawi, they are liable to run out of stock for imported materials. Most of the warehouses constructed so far in Malawi have, however, been built using materials procured in Malawi. The policy under the present project will also be to procure the materials in Malawi as much as possible, preventing delays by planning delivery of the materials early. When it is expected at the time

of the execution design, however, that either the materials will not be available on time or materials of sufficiently high quality will not be available, a part of the materials may be procured either from Japan or third countries. If the materials are transported by sea, they will be unloaded at Dar es Salaam in Tanzania and transported overland by lorries.

A list of the principal construction materials is given below.

Material	Remarks
(Building Materials)	
* Cement	Malawian product or imported from Zambia
* Sand, Gravel	
* Steel Reinforcement	Imported from Zimbabwe
* Structural Steel	Imported from Zimbabwe
* Roof Materials	Steel materials imported from Zimbabwe
* Bricks,	
Concrete Blocks	
* Tiles, Terrazzo	
* Ceiling Materials	
* Wooden Fixtures,	
Louver Windows	
* Plaster Materials	
* Paint	
* Culverts	
(Equipment Materials)	
* Distribution Boards	
* Electric Wire	Trunk cables and appurtenances unavaliabile
& Cables	in Malawi imported from Japan
* Conduits	Imported from Zimbabwe
* Lighting Fixtures	Imported from U.K.
* Switches,	
Plug Sockets	Imported from U.K.
* Vinyl Chloride	Vinyl choride lining steel pipes only
Pipes	from Malawi
* Steel Pipes	Imported from neighbouring countries
* Manhole Covers	
* Ventilation Fans	
* Sanitary Fixtures	

(2) Warehousing Equipment

Most of the equipment used in Malawi are European or South African products and the workers are generally unused to Japanese products. For this reason, simple mistakes by operators often lead to a breakdown of the equipment and, at the same time, the lack of available spare parts makes it difficult to repair them once they have broken down. In order to facilitate after-care and maintenance, the equipment will be procured in Malawi, imported through agents or imported directly from third countries other than South Africa.

Since the weighbridge and platform scales are used for commercial transactions, they must be approved by the Malawian Ministry of Trade, Industry and Tourism. In order to obtain the approval, they must conform to the standards given in the Weights and Measures Law in Malawi. Scales used for commercial transactions are subject to annual inspection by the authority.

For the scales, therefore, the types generally used for commercial transactions in Malawi will be selected. In view of the regular inspections and need for after-care service such as repairs, another condition will be that they be products of companies with agents in Malawi.

4-4-5 Implementation Schedule

(1) Allotment of Responsibilities

The following is thought to be an appropriate allotment of the responsibilities in the event of the project being implemented under grant aid from the Government of Japan. The construction power and water supply facilities to the project site and the levelling of the site which are to be implemented by the Government of Malawi must be completed before the commencement of the construction work.

(A) Responsibilities of the Government of Japan

- 1) Construction of warehouse and ancillary buildings (including equipment and external work)
- 2) Construction of new gate
- 3) Construction of internal roads

- 4) Stormwater drainage work for warehouse
- 5) Provision of warehouse equipment including installation of weighbridge
- 6) Gardening

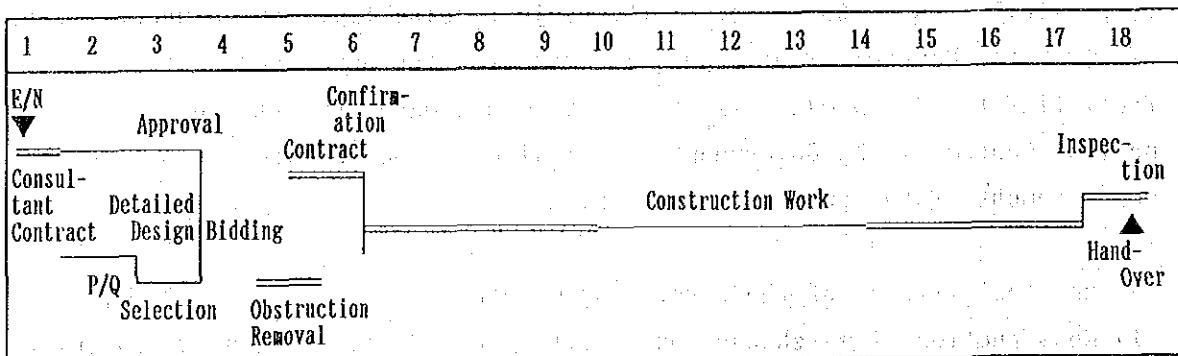
(B) Responsibilities of the Government of Malawi

- 1) Levelling of project site (including removal of obstructions)
- 2) Laying of power lines and water supply pipes to the project site
- 3) Laying of telephone lines (if required)
- 4) Provision of unfixed furniture and utensils
- 5) Planting of trees
- 6) Handling of legal procedures required for implementation of the project
- 7) Bank charges (commission for advising of authorisation to pay and payment of commission to Japanese foreign exchange banks under banking agreement)
- 8) Passage through customs and exemption from customs duty of the construction materials and equipment and the warehouse equipment
- 9) Appropriate and efficient maintenance and operation of facilities and equipment constructed and granted

(2) Implementation Schedule

An implementation schedule is given below. It is expected to take 18 months from the Exchange of Notes (E/N) to the completion of the construction work.

Implementation Schedule



4-4-6 Operation and Maintenance Plan

(1) Personnel Plan

Operation of the project warehouse will be possible without major alterations to the present personnel at Kazomba Dépôt and the increase in the number of staff should consequently be kept to a minimum. Since Kazomba Dépôt comes under the jurisdiction of the ADMARC's Mzimba Divisional Office and the new warehouse will only be 2.5 km away, backup for the personnel plan should be provided from the divisional office.

At present, there are 12 permanent staffers and 30 temporary workers at the dépôt. The staff composition required after the completion of the project warehouse is shown in the table below.

Project Warehouse Personnel Plan

Post	Present	New	Total	Remarks
Dépôt Supervisor	1	-	1	
Assistant Supervisor	1	-	1	
Cashier	1	-	1	
Dépôt Clerk	1	-	1	
Tally Clerk	2	-	2	
Messenger	1	-	1	
Capitao	1	-	1	
Security Guards	4	2	6	construction of new warehouse
Workers				
(Permanent)	-	10	10	handling throughout the year
(Temporary)	30	-10	20	May to Sep.
Pest Control				
Supervisor	-	-	-	covered by Pest Control
and Operator				Section of Mzimba Divisional
				Office
Weighbridge				
Operator	-	1	1	installation of weighbridge

Stacking Machine			
(Attendant)	-	1	1 introduction of stacker-conveyers
(Mechanics)	-	-	- covered by Workshop Section of Mzimba Divisional Office
<hr/>			
Total Staff	12	4	16
	+	+	+
Workers	(30)	(0)	(30)
<hr/>			

Promising candidates will be chosen and given the necessary training as the weighbridge operator and stacking machine attendant. The amount of training required will depend on the types of equipment selected. Careful training will be required in the case of Japanese equipment, which Malawian workers are generally unaccustomed to.

(2) Vital Points of Maintenance Work

[Building]

Besides sweeping the floor, daily maintenance and inspection will involve checking that there are no maize grains or other obstacles caught in the door rails, that the rat stoppers can be operated smoothly and are not deformed or otherwise damaged and that the eaves troughs, down pipes and trap basins are not blocked by leaves and rubbish. Change of light bulbs and periodical repainting will also be required.

[Equipment]

The weighbridge and platform scale must be subjected to regular annual inspections under the Weights and Measures Law in force in Malawi. In order to maintain their accuracy, therefore, after-care services by the manufacturer will be required in addition to maintenance by the operator.

Fumigation sheets tend to be expendables with short service lives. Use of damaged sheets is dangerous because of the use of toxic gases and care needs to be taken in their maintenance and inspection. This work will be entrusted to the specialists in the pest control section.

(3) Operation Cost

Operational funds for Kazomba Dépôt ultimately come from the ADMARC headquarters and expenditures are accounted for annually.

The records of the expenditure for operational costs at Kazomba Dépôt are given in 3-2-2.

ADMARC Regional Office North estimates the annual operation cost of the project facilities as follows.

Salaries & Emoluments	25,000 MK
Wages-Permanent	24,000
Wages-Temporary	20,000
Food & Accommodation	7,000
Maintenance-Building	6,000
Maintenance-Furniture	1,000
Maintenance-Plant & Machinery	10,000
Rents to Pay - Land	5,000
Water	2,000
Electricity + Power	9,000
Stationary	6,000
Telephone & Postage	2,000
Fuel	3,000
Sundry Expenses	5,000
Security Expenses	2,500
Cleaning Materials	1,500
Panel	1,000

Total	130,000 MK
-------	------------

The above figure is equivalent in total to 106% of the 1989/90 budget for existing Kazomba Dépôt, or 111% of its actual expenditure.

4-4-7 Approximate Budget Estimate

The project costs to be borne by the Malawi side are estimated as follows.

Site preparation	7,900 MK
Power and water supply and telephone installation	200,600
Furniture, vegetation, etc.	2,000
Banking charges	10,000
Total	220,500 MK

Chapter 5 PROJECT EVALUATION AND CONCLUSION

The objective of the project is to contribute to the establishment of a structure for the stable distribution and supply of food in Malawi through construction of a warehouse with a capacity of 5,600 tons and related facilities and provision of proper warehousing equipment at ADMARC Kazomba Dépôt near Mzimba Boma in northern Malawi. It is judged appropriate to implement the project under grant aid cooperation.

The warehouse to be constructed under the project will cover throughout the year the inventory stock of maize purchased by ADMARC in Central Mzimba, the northern half of the project area, and delivered to consumer areas. Since the main flow of surplus (commercial) food in Malawi is from north to south, it was judged more appropriate to consider separately the storage of food purchased in South Mzimba, the southern half of the project area. The measures to be taken here will be up to the Government of Malawi and are not included in this project. Fertilisers were also excluded from the calculations for the capacity of the warehouse, since they are expected to be delivered directly to the parent markets from the SFFRFM's exclusive warehouse at Mzuzu.

The present Kazomba Dépôt facilities were originally a part of the Mzimba (Parent) Market. It is as if the dépôt is renting facilities at the market. The construction of the new warehouse, besides ensuring free storage and transportation of maize even in the rainy season, will enable Mzimba Market to resume its original form with the return of its warehouses. The construction of the new warehouse will contribute greatly to ensuring smooth delivery of maize from Central Mzimba and to improved efficiency in transportation to consumer areas. The quantity of 9,122 tons of maize per year expected to be handled at Kazomba Dépôt is equivalent to the annual consumption of staple food by approximately 54,000 people and it may be said that the completion of the project will stabilise the supply of this amount of food.

In view of the fact that cooperation projects of this kind are expected to increase in future in Malawi, there is a need to take matters a step further and alter the approach in providing cooperation from that concerned merely with the construction of a single facility to a wider one concerned with improvement of the marketing structure and distribution system for agricultural produce over a wide area.

[APPENDIX] 1. Member List and Itinerary of the Field Survey Team

1) Member List

Mr. MATSUOKA, Kazuhisa	Team Leader Japan International Cooperation Agency (JICA)
Mr. MURATA, Yoshiki	Distribution System Planner The Food Agency, Ministry of Agriculture, Forestry & Fisheries (MAFF)
Mr. OZAWA, Shoji	Project Coordinator Japan International Cooperation Agency (JICA)
Mr. SHIRAI, Kazunari	Chief Engineer NISSOKEN Architects & Engineers (NSK)
Mr. UCHIDA, Yoshihisa	Architectural Designer NISSOKEN Architects & Engineers (NSK)
Mr. YAMAZAKI, Isamu	Post-harvest Planner NISSOKEN Architects & Engineers (NSK)

2) Itinerary of the Field survey Team

Field survey was carried out for the thirty one days from August 5th to September 4th, 1990.

<u>Date</u>	<u>Day</u>	<u>Activity</u>
Aug. 4	Sat.	Lv. Tokyo
5	Sun.	Ar. Lilongwe via Amsterdam
6	Mon.	Meeting at JICA Malawi office, courtesy call to Ministry of Agriculture (inception report, survey schedule, etc.) and Ministry of Finance

- 7 Tue. Move to Mzuzu, Technical visit to Kasungu Market, the Project Site and Mzimba Market on the way
- 8 Wed. Meeting with ADMARC Regional Office North, survey at Mzuzu Depot
- 9 Thu. Survey at Mzimba, Mbawa and other two Markets
- 10 Fri. Discussion with Mzuzu ADD Office and meeting with ADMARC Regional Office North
- 11 Sat. Meeting with ADMARC Regional Office North
- 12 Sun. Move to Lilongwe, survey at Emfeni Market on the way
- 13 Mon. Meeting with JICA and with Ministry of Agriculture, visit to ADMARC Regional Office Central
- 14 Tue. Data collection at local contractors, meeting with JICA
- 15 Wed. Review of collected data, meeting within the team [Matsuoka and Ozawa] Ar. Lilongwe
- 16 Tue. Courtesy call to Ministry of Finance
General Meeting at Ministry of Agriculture
- 17 Fri. Move to Mzuzu and Technical visit to Champhira Market and Mzuzu Depot on the way
Meeting and Data collection at ADMARC Regional Office North
- 18 Sat. Move to Salima and survey at Mzimba Market and the Project Site
- 19 Sun. Move to Blantyre
- 20 Mon. Meeting at ADMARC Hq., Blantyre
Survey at Charterland Depot and Bangula Depot
- 21 Tue. Technical visit to Smallholder Farmers' Fertilizer Revolving Fund of Malawi (SFFRFM) Hq., Blantyre and Chilimba SFFRFM warehouse
Move to Lilongwe
- 22 Wed. Meeting at Ministry of Agriculture
- 23 Thu. Ditto
- 24 Fri. Signing of Minutes of Discussions at Ministry of Agriculture
Technical visit to Kanengo Silo

25	Sat.	Preparation of the study report for submitting to JICA Hq. [Matsuoka] Lv. Lilongwe
26	Sun.	[Shirai, Uchida and Yamazaki] Move to Blantyre
27	Mon.	[Murata and Ozawa] Lv. Lilongwe
28	Tue.	Survey at Bangula Depot
29	Wed.	Data collection and survey on construction material cost Meeting at Ministry of Agriculture
30	Thu.	Technical visit to ADMARC Hq. Move to Lilongwe
31	Fri.	Data collection and survey on construction material
Sep. 1	Sat.	Holiday
2	Sun.	Holiday
3	Mon.	Data collection Report to JICA
4	Tue.	Lv. Lilongwe
5	Wed.	Ar. Paris
6	Thu.	Lv. Paris
7	Fri.	Ar. Tokyo

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR
THE MULTIPURPOSE AGRICULTURAL WAREHOUSE CONSTRUCTION IN
THE REPUBLIC OF MALAWI

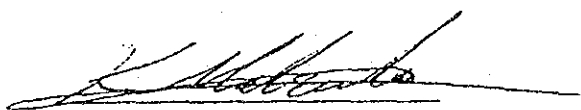
In response to the request of the Government of the Republic of Malawi (hereinafter referred to as "G.O.M."), the Government of Japan (hereinafter referred to as "G.O.J.") decided to conduct a Basic Design Study on the Project for the Multipurpose Agricultural Warehouse Construction (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Malawi the Study Team headed by Mr. Kazuhisa MATSUOKA, Director, First Basic Design Study Division, Grant Aid Study & Design Department, JICA, from August 5 to September 4, 1990.

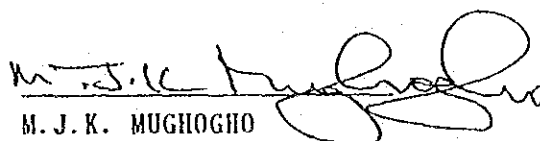
The Team had a series of discussions with the officials concerned of G.O.M. and conducted a field survey for the Project.

As a result of the field survey and discussions, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them, as attached herewith, should be examined towards the realization of the Project.

Lilongwe, August 24, 1990



Kazuhisa MATSUOKA
Team Leader
Basic Design Study Team
JICA



M. J. K. MUGHOGHO
for Secretary for Agriculture
Ministry of Agriculture



A. MZOMA
for Secretary to the Treasury
Ministry of Finance

Major Points of Understanding

1. Background of the Project

The G.O.M. has shortages of storage facilities for agricultural produce and inputs especially in the Northern Region. The total depot storage capacity required for the Northern Region is approximately 50,000 metric tonnes. The shortages are particularly high in Mzimba which is the most agriculturally productive area in the region. Agricultural Development and Marketing Corporation (hereinafter referred to as "ADMARC"), a major buyer of crop produce from smallholder farmers absorbs 95% of the marketable produce in the area and also delivers fertilizer to the farmers being entrusted by the Smallholder Farmers' Fertilizer Revolving Fund of Malawi (SFFRFM). Out of the total requirement of 50,000 metric tonnes, 40,000 metric tonnes is for Mzimba and 10,000 metric tonnes is for Karonga.

From this point of view, G.O.M. has plans to construct new storage facilities at Mzimba with a capacity of 20,000 metric tonnes as a first phase, and at Karonga with a capacity of 10,000 metric tonnes. Additional depot storage facilities are also required in some areas in other regions as follows: Kasungu (10,000 metric tonnes) in Central region; Luchenza (10,000 metric tonnes) and Zalewa (10,000 metric tonnes) in Southern region. All these required projects except Zalewa are included in the Development Plan of the Ministry of Agriculture as well as the Public Sector Investment Program (1988/89-1992/93).

2. Objective of the Project

The objective of the Project is to construct a Multipurpose Agricultural Warehouse with appropriate storage capacity and to provide necessary equipment related to the Project, thus contributing to a stable supply of food to the people and reduction of post-harvest losses.

3. Project Site

The proposed Project site is owned by G.O.M. and located at Kazomba about 2.5km to the south of Mzimba Boma. The land area is approximately 8 hectares, as shown in ANNEX I.

4. Request of G.O.M.

The contents of the requested facilities, which will be covered by Japan's Grant Aid, are shown in ANNEX II.

5. Implementing Agency

The Implementing Agency for the construction of the Project is the Ministry of Agriculture (Chief Planning Officer will be in charge) and for the operation is ADMARC (Regional Manager North will be in charge).

6. Understanding the Japan's Grant Aid System

G.O.M. has understood Japan's Grant Aid System explained by the Team which includes principles for the use of a Japanese consultant firm and a Japanese contractor for the implementation of the Project.

7. Undertaking of G.O.M.

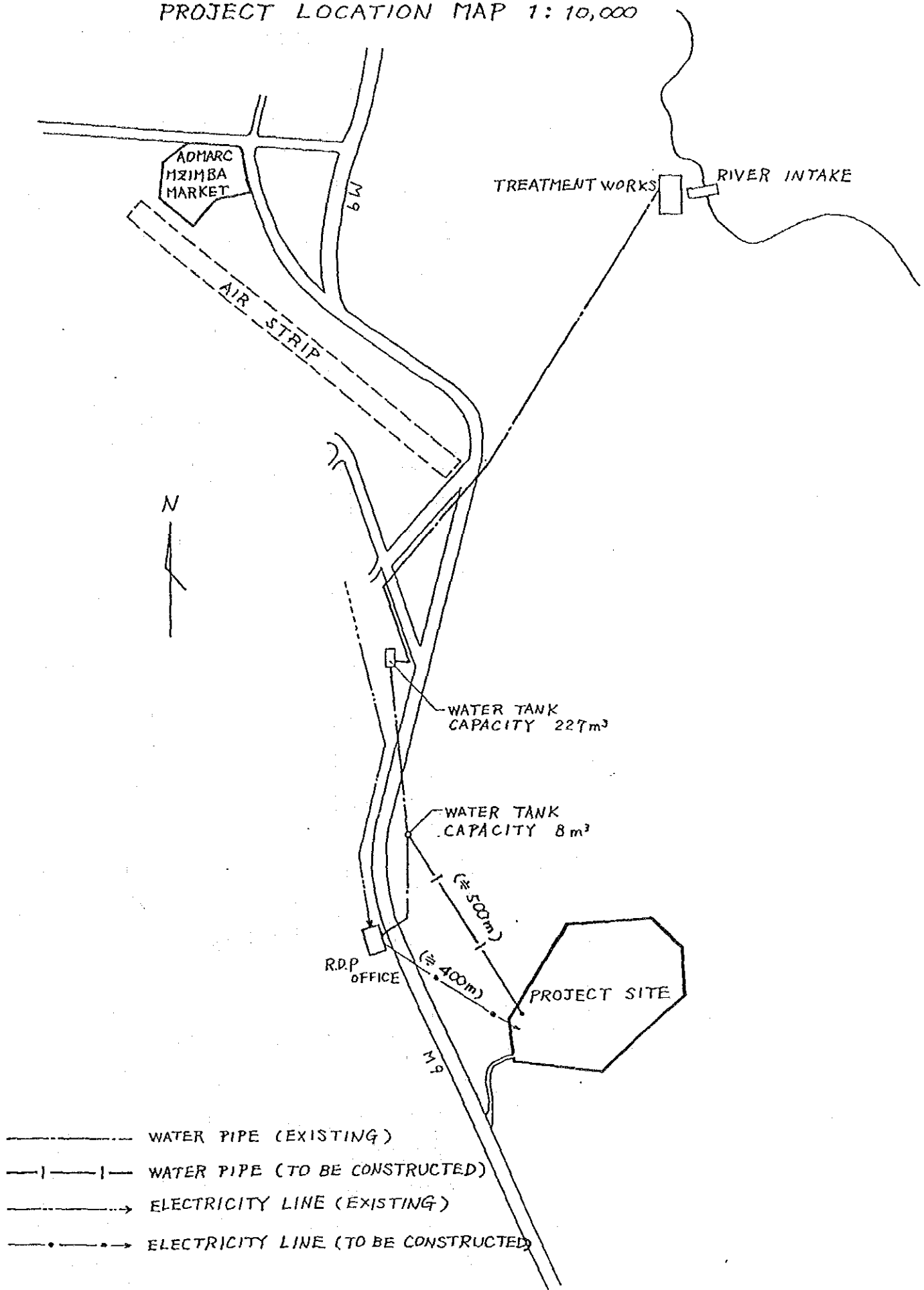
G.O.M. shall take necessary measures listed in ANNEX III on condition that the Grant Aid of G.O.J. would be extended to the Project. Finalization of detailed conditions of the Grant will be done at "the Explanation of Draft Final Report Stage" of the Basic Design Study.

8. Data for the Basic Design Study

G.O.M. shall prepare and submit the necessary data to the Team described in ANNEX IV by September 3, 1990 for the smooth implementation of the Study.

ANNEX I - 1

PROJECT LOCATION MAP 1:10,000

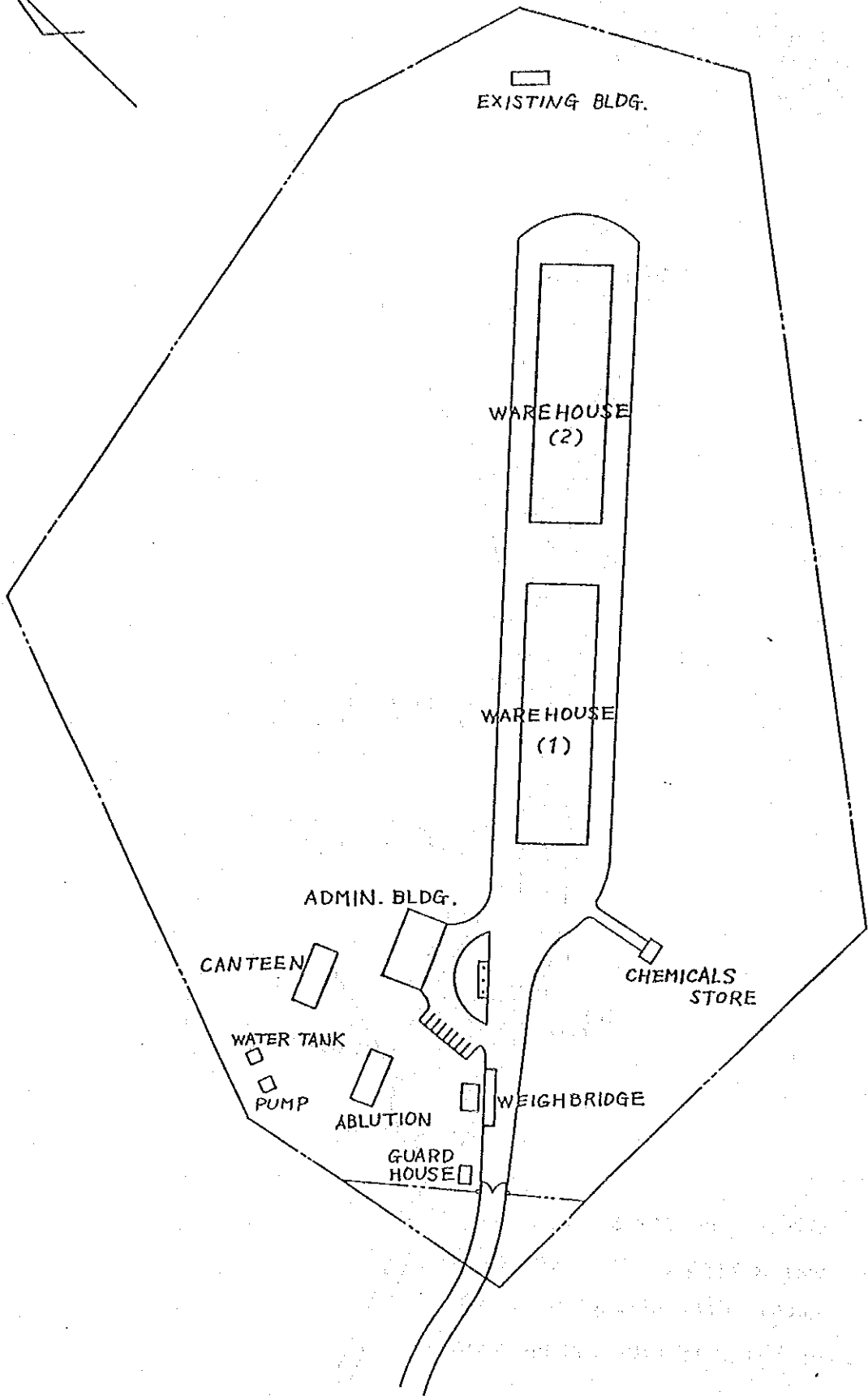
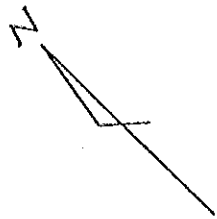


- WATER PIPE (EXISTING)
- |-|-| WATER PIPE (TO BE CONSTRUCTED)
- > ELECTRICITY LINE (EXISTING)
- > ELECTRICITY LINE (TO BE CONSTRUCTED)

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ANNEX II : Major Facilities Requested by the Government of the Republic
of Malawi

1. Buildings

(1) Warehouse

- 1) Storage capacity : 10,000 metric tonnes in terms of maize
 - 2) Commodities to be stored: maize, fertilizer and other agricultural products
 - 3) Number of buildings : one or two
- (2) Administration building : one
- (3) Chemicals store : one
- (4) Canteen block : one
- (5) Ablution block : one

2. Warehousing Equipment

- (1) Handling equipment
- (2) Measuring apparatus
- (3) Inspection device
- (4) Fumigation device

ANNEX III : Necessary measures to be taken by the Government of the
Republic of Malawi

1. To provide data and information necessary for implementation of the Project.
2. To secure the site for the Project and to clear, fill and level the site as needed before commencement of construction.
3. To construct gates and fences in and around the site and to construct the access road from M 9 to the site when needed.
4. To provide facilities for distribution of electricity, water supply, and drainage to their connection points within the site before commencement of construction.
5. To provide other incidental facilities such as telephone system, furniture, etc., if deemed necessary.
6. To ensure prompt unloading, tax exemption, customs clearance of the goods for the Project at the port of disembarkation in Malawi and prompt internal transportation therein of the products purchased under the Grant Aid.
7. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Malawi with respect to the supply of the products and services under the verified contracts.
8. To accord Japanese nationals whose services may be required in connection with the Project under the verified contracts such facilities as may be necessary for their entry into Malawi and stay therein for the duration of their work stay.
9. To provide necessary permissions, licences and other authorization for carrying out the Project.
10. To bear two kinds of commissions to the Japanese foreign exchange bank for the banking services, based upon the "Banking Arrangement", namely, the advising commission of the "Authorization to Pay" and payment commission.

11. To bear all the expenses, other than those to be borne by the Grant Aid.

12. To ensure the necessary budget and personnel for the proper and effective implementation of the Project, including operation and maintenance of the equipment provided under the Grant Aid.

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W. J. K. H.

ANNEX IV : Additional Data List Required

1. ADMARC

- Organization chart and staff numbers in details (Head Office, Regional Office, Depot and Market).
- Budget and actual expenditures for the whole organization, Mzuzu and Kazomba Depot for the last five years.
- Structure of budgetary system and cash flow of fund for purchases and credit.
- Prices of agricultural produce and inputs offered to farmers during the last 10 years.
- Data (weekly report) for the usage of the warehouse constructed by Japan's Grant Aid at Bangula Depot.
- List of the required equipment for the Project.
- Weight and Measures Act.

2. Ministry of Agriculture

- Statistics of agricultural production such as maize, ground nuts, beans (pulses), sunflower, tobacco, etc., by regions and Mzimba District for the last five years.
- ADMARC Storage Development Plan in Public Sector Investment Program (including present conditions of storage capacity, background data for estimates, investment cost and project list).
- Information of agricultural development projects which are going on under Mzuzu ADD including name, objective, duration and cost.
- Existing storage facilities and additional requirements by regions and by depots.
- Construction cost of SFFRFM's depot in Mzuzu.
- Cost estimation data of Mzuzu depot financed by the Dutch Government.

3. Bibliography

- ADMARC annual accounts and reports for 1987/88, 1988/89 and 1989/90.
- ADMARC in-house magazines.
- ADMARC market code list for 1988/89 and 1989/90.
- ADMARC organization and management review and its annexures, Deloitte Haskins+Sells, November 1987.
- Guide to agricultural production in Malawi, Ministry of Agriculture, 1988/89.
- Organization and management of agricultural services for smallholder farmers in Malawi, University of Malawi, Centre for Social Research, September 1988.
- National Development Program (the latest edition), Department of Economic Planning and Development.

ANNEX V : List of Attendants

Malawi Side

1. Ministry of Agriculture

Dr. G.A.A. Thyangathyanga : Controller of Agricultural Services
Mr. M.J.M. Mughogho : Assistant Chief Economist
Mr. P.C. Kulemeka : Senior Economist
Mr. M. Mwabumba : Economist
Mr. Slack : Adviser for Smallholder Agricultural Credit

2. Ministry of Finance

Mr. G.B. Chiwaula : Secretary to the Treasury
Mr. E.E.J.S. Kamanga : Under Secretary
Mr. A. Mzoma : Desk Officer for Japan

3. Agricultural Development & Marketing Corporation (ADMARC)

Mr. J.S. Magombo : General Manager
Mr. E.G. Shaba : Assistant General Manager, Administration
Mr. M.J. Phiri : Assistant General Manager, Finance
Mr. W.C.J. Horrea : Market & Depot Controller
Mr. D.S. Sankhani : Assistant Market Services Controller
Mr. E.K. Zakeyo : Regional Manager (North)

4. Smallholder Farmers' Fertilizer Revolving Fund of Malawi (SFFRFM)

Mr. B.A. Chinguwo : Logistics Manager

Japanese Side

1. Basic Design Study Team

Mr. K. Matsuoka : Team Leader, JICA
Mr. Y. Murata : Distribution System Planner, Ministry of
Agriculture, Forestry and Fisheries
Mr. S. Ozawa : Project Coordinator, JICA
Mr. K. Shirai : Chief Engineer, NISSOKEN
Mr. Y. Yamazaki : Postharvest Planner, NISSOKEN
Mr. Y. Uchida : Architectural Designer, NISSOKEN

2. JICA Malawi Office

Mr. Y. Nakai : Resident Representative
Mr. N. Yaegashi : Assistant Resident Representative
Mr. H. Mitsugi : Assistant Resident Representative
Mr. D. Mmanga : Secretary

[APPENDIX] 3. Member List and Itinerary of Draft Report Explanation Team

1) Member List

Mr. NAKAI, Yoshihide Team Leader
 Japan International Cooperation Agency,
 Malawi Office
 (JICA)

Mr. OZAWA, Shoji Project Coordinator
 Japan International Cooperation Agency
 (JICA)

Mr. SHIRAI, Kazunari Chief Engineer
 NISSOKEN Architects & Engineers
 (NSK)

Mr. YAMAZAKI, Isamu Post-harvest Planner
 NISSOKEN Architects & Engineers
 (NSK)

2) Itinerary of Draft Report Explanation Team

Draft Report Explanation was carried out for the eleven days from December 9th to 19th, 1990.

<u>Date</u>	<u>Day</u>	<u>Activity</u>
Dec. 8	Sat.	Lv. Tokyo
9	Sun.	Ar. Lilongwe via Amsterdam
10	Mon.	Visit to Ministry of Finance and Ministry of Agriculture to explain the draft report
11	Tue.	Explanation of the draft report at Ministry of Agriculture
12	Wed.	Ditto
13	Thu.	Discussion on the Minutes

- 14 Fri. Signing of Minutes of Discussions at Ministry of
Agriculture
[Shirai and Yamazaki] Supplementary survey at Mzuzu and
Blantyre
- 15 Sat. [Shirai and Yamazaki] Supplementary survey at Mzimba and
Bangula
- 16 Sun. Move to Lilongwe
- 17 Mon. Preparation of the report to be submitted to JICA Hq.
[Ozawa] Lv. Lilongwe, Ar. Lusaka
- 18 Tue. Data collection and meeting at Ministry of Agriculture
Report to JICA
[Ozawa] Report to Embassy of Japan in Zambia
Lv. Lusaka, Ar. Lilongwe
- 19 Wed. [Shirai and Yamazaki] Lv. Lilongwe
- 20 Tue. Ar. London via Harare
- 21 Fri. Lv. London
- 22 Sat. Ar. Tokyo

MINUTES OF DISCUSSIONS
THE BASIC DESIGN STUDY ON THE PROJECT FOR
THE MULTIPURPOSE AGRICULTURAL WAREHOUSE CONSTRUCTION IN
THE REPUBLIC OF MALAWI
(CONSULTATION ON DRAFT REPORT)

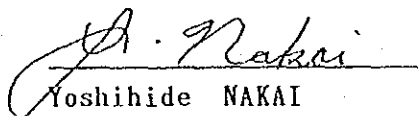
The Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for the Multipurpose Agricultural Warehouse Construction (hereinafter referred to as "the Project") in August 1990 and as a result of a series of discussions, field survey in Malawi and a technical examination in Japan, JICA has designed an appropriate plan for the Project and prepared the Draft Report of the Basic Design Study.

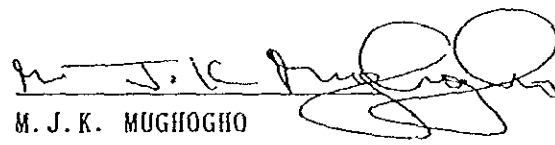
JICA sent a team in order to explain and consult with Malawi Government officials on the components of the Draft Report, headed by Mr. Yoshihide NAKAI, Resident Representative of JICA Malawi Office, from December 9 to 19, 1990.


As a result of the discussions, both parties confirmed the main items described on the attached sheets.

The Team will make the Final Report in accordance with the confirmed items, and send it to the Government of Malawi by the end of February 1991.

Lilongwe, December 14, 1990


Yoshihide NAKAI
Team Leader
Basic Design Study Team
JICA


M. J. K. MUGHOGHO
for: Secretary for Agriculture
Ministry of Agriculture


E. F. J. S. KAMANGA
for: Secretary to the Treasury
Ministry of Finance

ATTACHMENT

1. Components of Draft Report

The Government of Malawi has agreed and accepted in principle the components of the Draft Report proposed by the Team.

2. Grant Aid Programme Extended by Japan

(1) The Government of Malawi has understood the system of Japanese Grant Aid explained by the Team.

(2) The Government of Malawi will take necessary measures, described in Annex, for smooth implementation of the Project on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

[Handwritten signature]

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ANNEX : Necessary measures to be taken by the Government of the
Republic of Malawi

1. To provide data and information necessary for implementation of the Project.
2. To secure the site for the Project and to clear, fill and level the site as needed before commencement of construction.
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5. To provide other incidental facilities such as telephone system, furniture, etc., if deemed necessary.
6. To ensure prompt unloading, tax exemption, customs clearance of the goods for the Project at the port of disembarkation in Malawi and prompt internal transportation therein of the products purchased under the Grant Aid.
7. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Malawi with respect to the supply of the products and services under the verified contracts.
8. To accord Japanese nationals whose services may be required in connection with the Project under the verified contracts such facilities as may be necessary for their entry into Malawi and stay therein for the duration of their work stay.
9. To provide necessary permissions, licences and other authorization for carrying out the Project.
10. To bear two kinds of commissions to the Japanese foreign exchange bank for the banking services, based upon the "Banking Arrangement", namely, the advising commission of the "Authorization to Pay" and payment commission.

11. To bear all the expenses, other than those to be borne by the Grant Aid.

12. To ensure the necessary budget and personnel for the proper and effective implementation of the Project, including operation and maintenance of the equipment provided under the Grant Aid.

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List of Attendants

Malawi Side

1. Ministry of Agriculture

Dr. G.B. Mthindi :Senior Deputy Secretary, Planning Division
Mr. M.J.K. Mughogho :Assistant Chief Economist, Planning Division
Mr. P.C. Kulemeka :Senior Economist, Planning Division
Mr. Fred W.Y. Mwachengere: Economist, Planning Division
Mr. M. Mwabumba :Economist, Planning Division

2. Ministry of Finance

Mr. E.E.J.S. Kamanga :Under Secretary

3. Office of the President and Cabinet

Mr. E.W. Matola :Senior Economist Economic Planning and
Development Department
Mr. James Milner :Economist, Economic Planning and Development
Department

4. Agricultural Development & Marketing Corporation (ADMARC)

Mr. W.C.J. Horrea :Market & Depot Controller
Mr. D.S. Sankhani :Assistant Market Services Controller
Mr. E.K. Zakeyo :Regional Manager (North)
Mr. M.G. Mezalumo :Assistant Technical Services Controller

Japanese Side

1. Basic Design Study Team

Mr. Y. Nakai :Team Leader, Resident Representative, JICA Malawi
Mr. S. Ozawa :Project Coordinator, JICA Headquarter
Mr. K. Shirai :Chief Engineer, Nissoken
Mr. Y. Yamazaki :Postharvest Planner, Nissoken

2. JICA Malawi Office

Mr. N. Yaegashi :Assistant Resident Representative
Mr. T. Kakinuma :Specialist

[APPENDIX] 5. List of Concerned Persons

MINISTRY OF AGRICULTURE

Dr. G.A.A. Thyangathyanga	Controller of Agricultural Services
Mr. M.J.M. Mughogho	Assistant Chief Economist (Planning Division)
Mr. P.C. Kulemeka	Senior Economist (Planning Division)
Mr. M. Mwabumba	Economist (Planning Division)
Mr. Slack	Adviser for Smallholder Agricultural Credit
(Mzuzu ADD)	
Mr. J.F. Mwenechanya	Program Manager (Mzuzu)
Mr. Sambo	Input Marketing Officer (Mzuzu)

MINISTRY OF FINANCE

Mr. B. Mawindo	Deputy Secretary
Mr. G.B. Chiwaula	Secretary to the Treasury
Mr. E.E.J.S. Kamanga	Under Secretary
Mr. A. Mzoma	Desk Officer for Japan
Mr. J.M. Mhango	Administrative Officer

ADMARC (Agricultural Development & Marketing Corporation)

Mr. J.S. Magombo	General Manager
Mr. E.G. Shaba	Assistant General Manager, Administration
Mr. M.J. Phiri	Assistant General Manager, Finance
Mr. W.C.J. Horrea	Market & Depot Controller
Mr. D.S. Sankhani	Assistant Market Services Controller
Mr. E.K. Zakeyo	Regional Manager (North)
Mr. Mwawa	Technical Services Controller
Mr. J.A. Tewete	Assistant Regional Manager (North)
Mr. C.T. Kaunda	Statistical Clerk (North)
Mr. C. Mwale	Marketing Clerk (North)
Mr. K.Y.K. Longwe	Regional Building Supervisor (North)
Mr. F. Kaima	Regional Farm Input Officer (North)
Mr. Chibweya	Division Supervisor (Mzimba)
Mr. P.S. Mchensa	Depot Supervisor (Bangula)
Mr. D.C. Banda	Registration Clerk (Bangula)
Mr. P.A. Moyo	Silo Superintendent (Kanengo)
Mr. C.D. Kumwenda	Silo Operator (Kanengo)
Mr. E.Y. Safaringera	Regional Manager (Central)
Mr. P. Mandala	Assistant Regional Manager (Central)
Mr. H.F. Tsonga	Depot Supervisor (Mzuzu)

SFFRFM (Smallholder Farmers' Fertilizer Revolving Fund of Malawi)

Mr. B.A. Chinguwo Logistics Manager

MINISTRY OF WORKS & SUPPLIES

Mr. Mervyn M. Matenda Chief Architect
Mr. Francis Chinsinga Secretary (Consultants & Contractors Board)
Mr. Liwimbi Chief Quantity Surveyor Technician

(WATER Department)

Mr. Kafundu Assistant General Manager
(Principal Hydrogeologist)
Mr. P.P. Mkandawire Hydrogeologist
Mr. Own Kankhulungo Principal Civil Engineer (Water Supply Branch)
Mr. F. Kumwenda Water Superintendent
Mr. Moyo Senior Draftsman
Mr. R.G.R. Banda Water Superintendent (Mzuzu)
Mr. Malipa Draftsman

OFFICE OF PRESIDENT AND CABINET

Mr. J.J. Matope Commissioner for Town and Country Planning
(Department of Physical Planning and Housing)
Mr. Manda Senior Planning Officer
(Department of Physical Planning and Housing)

ESCOM

Mr. R.J. Chideru Assistant Consumers Engineer (Mzuzu)

OTHER

Mr. B. Ngala Hiring Officer. Plant Vehicle Hire Organization
Mr. Peter W. Nkosi Branch Manager (Lilongwe)
The National Insurance Co., Ltd.
Mr. M.M. Limbuni Representative Lilongwe Office
Clarkson Notcutt Ltd. (Insurance Company)
Mr. G.J. Kalimansenga Insurance Clerk
Clarkson Notcutt Ltd. (Insurance Company)
Mr. Gary Cooke Lilongwe Office Manager. Brunnette & Partners
Mr. D. kamisa Quantity Surveyor. Terrastone Construction Company
Mr. S.P. Marsh Senior Quantity Surveyor. Wade Adams (Lilongwe)
Mr. Santos Managing Director. Barriga's Building Contractors
Mr. M. Arima Managing Director. A.B.C. Cosmo Ltd.

Mrs. Kaimila	Assistant Operations Manager National Bank of Malawi Lilongwe Branch
Mr. J.A. Knieli	Managing Director. Precision Tool & Engineering
Mr. A.M. Rajani	General Manager. Press Steel & Wire Ltd.
Mr. R.I. Surtee	Manager. Press Steel & Wire Ltd.

JICA MALAWI OFFICE

Mr. Y. Nakai	Resident Representative
Mr. N. Yaegashi	Assistant Resident Representative
Mr. h. Mitsugi	Assistant Resident Representative
Mr. Dereck L. Mmanga	Secretary

[APPENDIX] 6. Reference Materials Collected by the Study Team

- 1) MALAWI POPULATION AND HOUSING CENSUS 1987, PRELIMINARY REPORT,
National Statistical Office
- 2) MALAWI POPULATION CENSUS 1977 MZIMBA DISTRICT,
National Statistical Office
- 3) MALAWI STATISTICAL YEARBOOK 1987, National Statistical Office
- 4) TRANSPORT STATISTICS 1986, National Statistical Office
- 5) MALAWI MONTHLY STATISTICAL BULLETIN (FEB. 1990, DEC. 1987 & JAN. 1986)
National Statistical Office
- 6) BUDGET STATEMENT 1990, Ministry of Finance
- 7) MALAWI IN FIGURES 1987, National Statistical Office
- 8) MID-YEAR ECONOMIC REVIEW 1989-1990, Office of the President & Cabinet
(Dept. of Economic Planning & Development)
- 9) ECONOMIC REPORT 1990, Office of the President & Cabinet
(Dept. of Economic Planning & Development)
- 10) HIRE CHARGE SCHEDULE (EFFECTIVE FROM 1-4-90), Plant & Vehicle Hiring
Organization
- 11) MANUAL ON STORAGE MANAGEMENT AND QUALITY CONTROL,
Agricultural Development and Marketing Corporation
- 12) PROJECT, CONSTRUCTION OF MULTIPURPOSE STRATEGIC
STORAGE SHEDS-BLANTYRE AND MZUZU ADMARC, 18th October 1989
- 13) TOWN AND COUNTRY PLANNING GUIDELINES AND STANDARDS,
Office of the President and Cabinet (Town and Country Planning Dept.)
- 14) LIST OF PERSONS AND FIRMS REGISTERED UNDER CONSULTANTS AND CONTRACTORS
ACT 1968 (CAP. 53:05) AS AT OCT. 1989, Ministry of Works

- 15) LIST OF REGISTERED ARCHITECTS AND QUANTITY SURVEYORS, Daily Times
Aug.25, 1990
- 16) Guide to Agricultural Production in MALAWI 1989-1990,
Ministry of Agriculture
- 17) ADMARC TRADERS PRICE LIST & TELEPHONE LIST (1st APRIL, 1990)
- 18) ADAMRC MIRROR, HOUSE MAGAZINE, JANUARY 1990
- 19) Annual Accounts & Report, 1987, 1988, 1989, The Agricultural Development
& Marketing Corporation
- 20) MZIMBA DISTRICT PHYSICAL DEVELOPMENT PLAN, Office of the President and
Cabinet
- 21) INDUSTRIAL SAFETY CODE OF MALAWI (ISCOM)
- 22) MALAWI 25, TWENTY FIVE YEARS OF INDEPENDENCE IN MALAWI, 1964-1989
- 23) THE MALAWI COOK BOOK by Annabel Shaxson, Metric Edition 1985
- 24) Za Alimi, The Farmers' Paper, JULY 1990
- 25) WOMAN and Food Processing in MALAWI
- 26) Weights and Measures, LAWS OF MALAWI
- 27) Primary Agriculture Book 7, N.T. Kaperemera, MACE
- 28) PROJECT PLAN, AGRICULTURAL PRODUCE AND INPUT MULTIPORPOSE STORAGE
FACILITIES, Ministry of Agriculture, 19th December 1986
- 29) MALAWI TELEPHONE AND TELEX DIRECTORY July, 1989, Malawi Post Office

JICA