


BASIC DESIGN STUDY REPORT
ON
FOOD GRAIN STORAGEHOUSES CONSTRUCTION PROJECT
IN
THE UNITED REPUBLIC OF TANZANIA

OCTOBER 1983

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

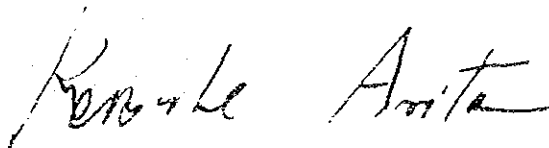
In response to the request of the Government of the United Republic of Tanzania, the Government of Japan decided to conduct a Basic Design Study on Food Grain Storagehouses Construction Project and entrusted the study to the Japan International Cooperation Agency. The JICA sent to Tanzania a study team headed by Mr. Kojiro Seki, Senior Official, Ministry of Agriculture, Forestry and Fisheries from June 15th to July 2nd, 1983.

The team had discussions with the officials concerned of the Government of Tanzania and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

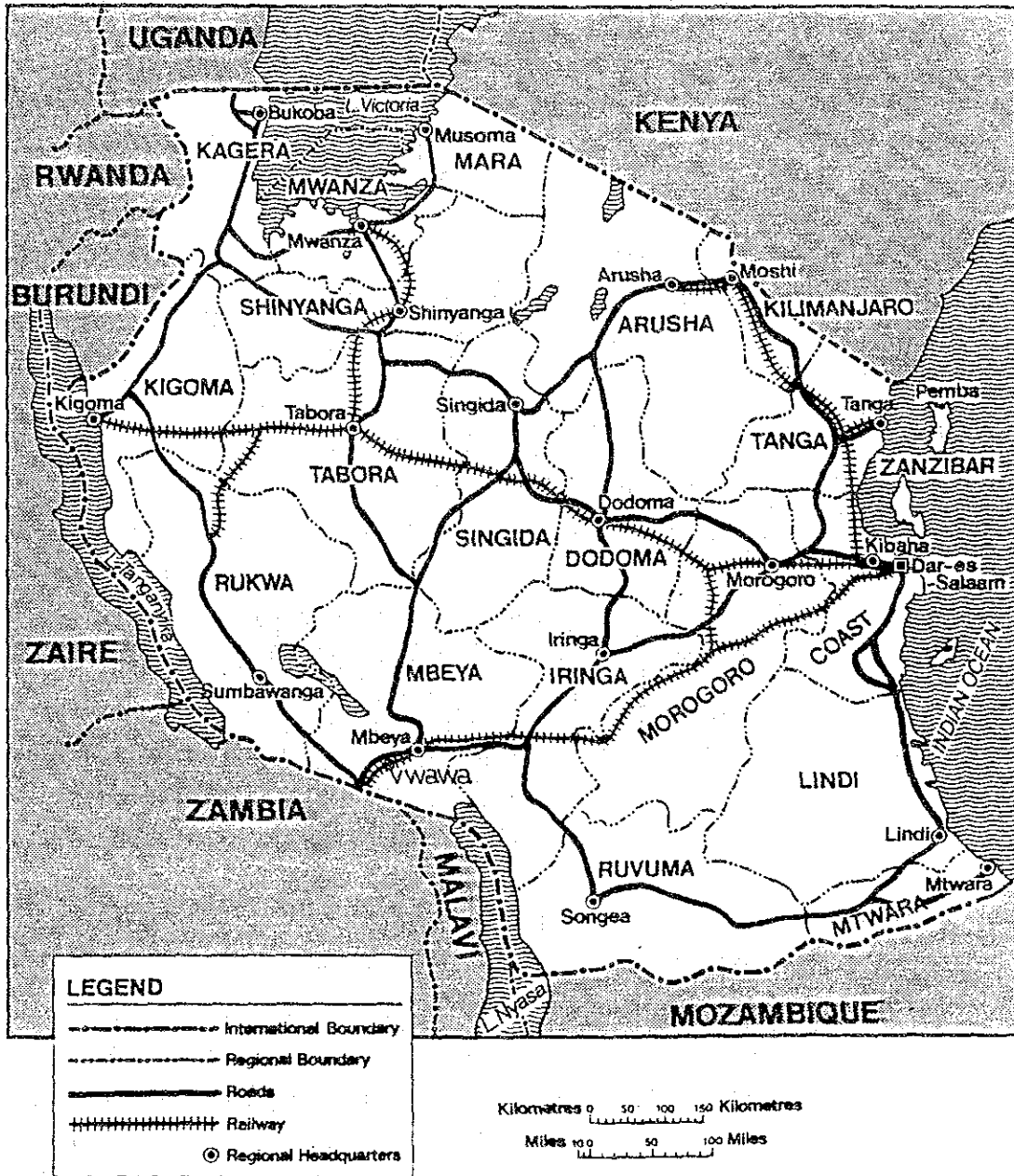
I wish to express my deep appreciation to the officials concerned of the Government of the United Republic of Tanzania for their close cooperation extended to the team.

October , 1983



Keisuke Arita
President
Japan International Cooperation Agency

Map of Tanzania



Dar es Salaam to	KILOMETRES	Atitude above Sea Level	METRES
Mbeya	851	Mbeya	1744
Tanga	354		

SUMMARY

The Japanese Government, at the request of the United Republic of Tanzania for co-operation in the supply of funds without compensation covering the grain storagehouses construction project, sent previously a preliminary survey mission through Japan International Cooperation Agency (JICA). Taking into account the results obtained from the preliminary survey, the recent basic design survey mission was dispatched with a view to investigate in detail from June 15th to July 2nd, 1983, the distribution and warehousing conditions of food grain in Tanzania and preparing the optimum basic design most suitable to the prevailing state of affairs and the related upstream projects in the National Plan. This report compiles the results of these basic design studies.

The food shortage in Tanzania now poses a serious problem. Grain distribution in this country is now under full control of National Milling Corporation (NMC), and the government is exerting its efforts in strengthening the distribution system in the country. Now, for stabilization of the people's livelihood, it has become a major problem how to increase production on one hand, and how to minimize loss in the distribution stage on the other hand.

In view of the above facts although the construction of grain storagehouses in Tanzania is now being pushed forward mostly under various foreign aid schemes, the above request made to the Japanese Government is not concerned with warehouses for stockpiling, but with those for distribution in both producing and consumption areas. The construction sites proposed by the Tanzanian Government in its request include nine regions, but as the result of the preliminary survey the following two sites were selected as the most appropriate districts: Mbozi, a producing area and Tanga, a consuming district. The mission was convinced, in the recent survey, that the remarkable effects would be expected in improving the grain distribution of the country by the construction of storagehouses in these two districts and was assured of the reasonableness of the construction project as the result of the investigation of the local natural conditions and peripheral environ-

ments. In both districts, there is a considerable shortage of storage-houses at present. However, the mission came to the conclusion that the excellent effect to alleviate the shortage can be expected by the construction of two storagehouses, one in Tanga and the other in Mbozi, with the respective storage capacities of 8,000 tons and 6,200 tons.

As regards the structure of the proposed two storagehouses of the prefabricated steel frame type is adopted as the most suitable one in order to complete construction work in the shortest period of time in the country where the construction conditions are not favorable. As to the shape of the storagehouses built in each district, a long and narrow type without partitions is adopted inasmuch as it is preferred so that natural lighting can be utilized without the aid of electricity, and also manual operation can be mainly facilitated. For the latter, however, since it will inevitably require mechanical power to stack up 25 tiers of bagged grain in the storagehouse, a conveyor system must be included in the project provided that an engine powered type is adopted instead of electrical one due to the viewpoint of eliminating possible maintenance problems.

Both sides of the storagehouses are made into platforms and the platform on one side is intended for loading and unloading on and from trucks and the one on the other side, for the use of railway wagons. Since the necessary railway siding is not available at present, both platforms are, for the time being, being designed for use of trucks. Although the railway is indispensable as transport means of grain and both of the proposed sites are located along the railway lines, it is not appropriate to include the necessary siding work in this project since this kind of work is subject to the jurisdiction of the railway corporations (TRC and TAZARA). For this reason, it is suggested in the project that NMC make application for the realization of the necessary siding in the nearest possible future, and, at the same time, that, for the time being, such a design as to facilitate transport by trucks to be adopted.

As for the period of construction work, it is 12 months, but if

design for implementation and other various sorts of procedures are included, the needed period of the whole works is 20.5 months after the Exchange of Notes.

An inspection and quality control room (also serving as an office) shall be provided in part of the storagehouse since such a room is indispensable in performing the safety storage function.

A platform for drying and fumigation shall also be provided for eliminating the deteriorated grain with high moisture content or insect-damage provided, however, that such platform shall be of a simple type without roof.

In the aspect of maintenance and management of the facilities, a problem will arise in this country from difficulty to obtain the necessary repairing parts and materials rather than from the budgetary problems. Therefore good attention has been paid to the design of the storagehouse itself as well as its attachments basing on the principle to construct such a kind of facilities as free from any technical, organizational or budgetary problems.

As the conclusion we hereby strongly propose to the Japanese Government for the implementation of these storagehouses by the grant aid because we are convinced of a great contribution being made to solution of the serious food problems in Tanzania through carrying out this project.

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I . INTRODUCTION

The food shortage in the United Republic of Tanzania now poses a serious problem and the government is pursuing a policy of promoting agricultural production on one hand, and improving the distribution system of grains on the other hand so as to minimize loss in the distribution stage as much as possible. As a whole grain storagehouses with storage capacities of more than 100 thousand tons are regarded as in shortage in Tanzania, and several construction works are in progress under foreign aids. The Japanese Government, at the request from the government of the United Republic of Tanzania for a grant of cooperation funds, dispatched a preliminary survey mission in April, 1983, through Japan International Cooperation Agency (JICA).

In the preliminary survey, the investigations were made over the prevailing situation of distribution and storages in problems on grains in Tanzania, and two districts, Tanga and Mbozi, were selected among the nine districts proposed by the United Republic of Tanzania and it was confirmed by the survey that it was most significant and effective to construct the storagehouses in these districts.

Following up the preliminary survey, the recent survey mission was dispatched for the purpose of basic design study, with major emphases placed on the following points:

- (1) To investigate in further details into the distribution situation of grains and the status of grain storagehouses in the entire Tanzania as well as in the both districts of Tanga and Mbozi, in order to realize how this project is related to other upstream projects, and recognize correctly the background of the project.
- (2) To make on-the-spot survey of the necessary items to be investigated for the construction of grain storages on the proposed sites of both Tanga and Mbozi.
- (3) To formulate the optimum basic design of the most appropriate

grain storagehouses for the present situation and future planning in Tanzania.

- (4) To estimate the construction costs involved.
- (5) To review its reasonableness as a project intended for the grant of cooperation funds.

The basic design study mission headed by Mr. Kojiro Seki, Food Agency, Ministry of Agriculture, Forestry and Fisheries was engaged, from June 15 to July 2, 1983, in survey activities including spot investigation of the proposed construction sites, conferences with the governmental personnel concerned, mainly with the National Milling Corporation (NMC) of the Tanzanian Government. (See Annexed Materials, "Item 2. Surveying Schedule").

Then the Tanzanian Government and the mission held conferences to discuss each other over the results of the survey made, confirm each other the main outline of the contents of the project, and determine the necessary matters for which the Tanzanian Government shall be responsible for implementation of the project, and finally exchanged the Minutes of Discussion recording the foregoing. (See "Annexed Materials".)

Taking into account the results of the on-the-spot survey, the optimum design and scheme of execution covering the proposed storagehouses were prepared, after analyzing the collected data and reviewing the reasonableness of the project.

The purpose of this report is to propose the optimum design and the most appropriate construction plan referring to the results of the survey, analyses of the collected data and feasibility study of the project.

II. BACKGROUND OF THE PROJECT

I. Production and Distribution of Grains in Tanzania

1-1) Agricultural Production

Although Tanzania is located in the tropical zone, as the climate of its highland area is similar to the temperate zone, it produces also varieties of the temperate zone in substantial quantities and thus the agriculture became the key industry of Tanzania. Its agricultural production accounts for 52.5% of GDP (during the period 1977 - 1980) and also 86% of the national foreign exchange earnings (during the period 1970 - 1975).

Nevertheless the production of cash crops such as coffee, sisal hemp, tea, etc., has dropped due to the recent slackening in their international market as well as the shortage of material invested for their growing resulting in worsening the economic conditions of Tanzania. The staple food of the people consists of maize, rice as well as wheat in the urban districts and sorghum, millet, cassava in the rural districts as substitutes. These staple food crops were used to have export surpluses in the 1960's, but, from the latter half of the 1980's, they have turned to the conditions that food shortages had to be covered by imports. This state of things is attributable to a drop in production caused by continuous dry weather in recent years.

Maize, rice and wheat are called the big three grains. In particular, the production of maize accounts for nearly one half of the entire agricultural production. At present, there is an extreme shortage of grains in Tanzania. There is, however, a big difference such as almost 50% in agricultural production from one year to another. Its agricultural production potential is high, however, with its vast land and as evidenced by the past export records. The Tanzanian Government looks upon the promotion of agriculture as one of the main policies in its 4th five-year economic development plan (for the period 1981 - 1986), and is carrying out a food self-sufficiency policy including the con-

struction of large-scale state farms aiming at increased production of the big three grains. Such being the case, the domestic production of grains will increase sooner or later.

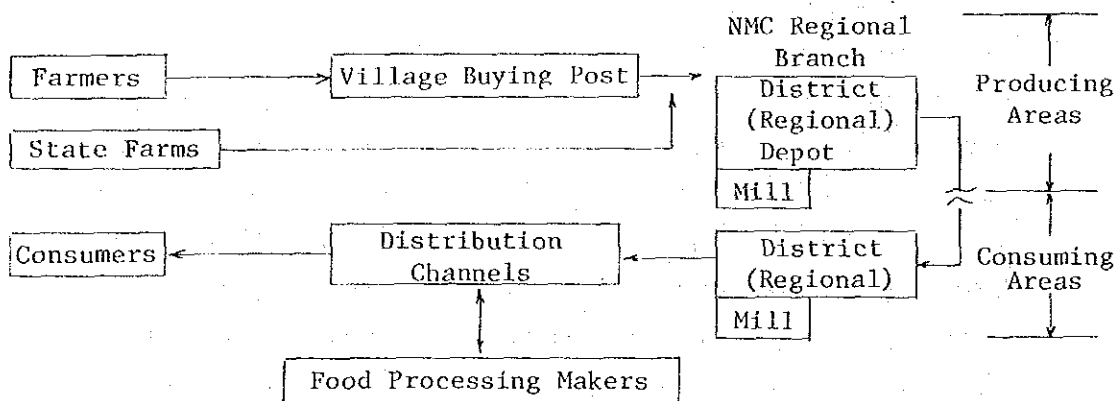
1-2) Distribution of Food Grains

The National Milling Corporation (NMC), the most conspicuous one among the various corporations under the control of the Agricultural Ministry, is the monopolistic distribution organization handling all staple grains other than cash crops. Its functions include, all over inside a region and between different regions, procurement, transport, storage, export and import, flour milling, rice cleaning and other processing operations. As regards purchasing and procurement activities, those conducted at the village level are entrusted with each village community (Ujamaa), but purchase from the state farms representing large-scale producers, are directly handled by NMC.

Sales to consumers are conducted through regional trading companies (RTC) functioning as retail organizations, and food processing makers.

The chart below shows the inter-region flow of grains.

"A chart showing the inter-region flow of grains"



Although the Tanzanian Government is exerting all possible efforts to put in order the distribution system, its distribution policy is endangered by the existence of an illegal market which, it is said, accounts for a percentage larger than that represented by the formal channels. Especially in years of a poor harvest, larger quantities are apt to be traded through illegal channels. While, in years of bountiful harvest, quantities which flow into legitimate channels increase so much that NMC is harassed by a shortage in the receiving capacity of storagehouses. In order to ensure the stabilized supply of food to the nation, it is urgently required of the government to solve the serious food shortage problem confronting this country through improving the distribution system.

Grain transport depends on the railway and trucks. Transport capacity of both of them has, however, decreased considerably due to fuel stringency and unsatisfactory maintenance of vehicles resulting from a shortage of the necessary parts. Since the railway proves more economical than the trucks, most of the regional depots and flour mills are provided with railway sidings and so for the inter-region transport, the railway is utilized.

In most cases, the quantity to be brought in by farmers at a time is not enough to fill a bag (containing 90 kg in case of maize) and bagging operation is performed at each village buying post. (The following photo shows an example of the village buying post.) Formerly, the grain rating standard was set up in details and grading system was also applied. The grain rating standard was now abolished inasmuch as the inspection instruments were not arranged properly for enforcement of the standard. Therefore the grading is done only by the inspectors' feeling at present.



Izuo Village

Height above sea level: about 2,000 m

1-3) Present Situation of Food Storagehouses

In Tanzania, one-storied storagehouses are widely used as grain storage facilities. The present capacity of one-storied grain storagehouses as of April, 1983 is 468,000 tons. NMC's annual procurement capacity is 230,000 tons (1980/1981) - 520,000 tons (1978/1979), showing a large variation. Considering stock brought forward and imported grain amounting to 3,000 tons (1978/1979) - 390,000 tons (1980/1981), however, it can be regarded that the country lacks more than 100,000 tons of storage capacity as a whole.

The capacity of the grain storagehouses belonging to NMC considerably varies depending on districts. Also, in the major producing districts which are showing a large growth in production, there is a constant shortage in storage capacity and so usually, in the year of a rich harvest, crops were piled up outdoors. Such a situation is constituting a great obstacle to the distribution of grains and is eventually increasing intermediate

losses in the distribution process, which is one of the major problems of grain shortage in this country.

The grain storagehouses in Tanzania can be classified according to the functions of distribution in the following manner:

(1) Village Buying Post

This is run by an Ujamaa (a village community) entrusted with procurement business by NMC and its storage place is located in the open or in simple sheds.

(2) Transit Depot

This is a transit point covering several buying posts for the convenience of transport and its storage place is also located in the open or in simple sheds.

(3) District Depot; Regional Depot

They are under the direct control of NMC, and forms a base for inter-region shipments and receipts. Each has one-story storagehouse or storagehouses facing a trunk road and mostly provided with railway siding too.

(4) Storagehouses annexed to Flour Mill or Rice Mill

Each storagehouse has a one-story building intended for the storage of raw material and finished products. Most mills are also provided with silos and railway sidings.

(5) Storagehouses for Strategic Grain Reserve

This is a large-scale storagehouse constructed pursuant to the strategic grain reserve policy, with the initial capacity goal of 100 thousand tons. The construction of several such storagehouses is in progress under foreign aid programs. Their object is for long-term storage of grains which are set aside under the special control by the Ministry of Agriculture subject to its permission for deliveries and receipts. The request made to the Japanese Government is not concerned with this type of storagehouses, but with those destined for distribution purposes to be installed at District

Depots or Regional Depots. The storagehouses operated by NMC include some low-grade, hired ones which account for 10 to 20% of the whole. It is reported in the surveys made by the UN that the storagehouses owned by NMC include also those in need of major repairs.

2. Grain Distribution in the Proposed Sites

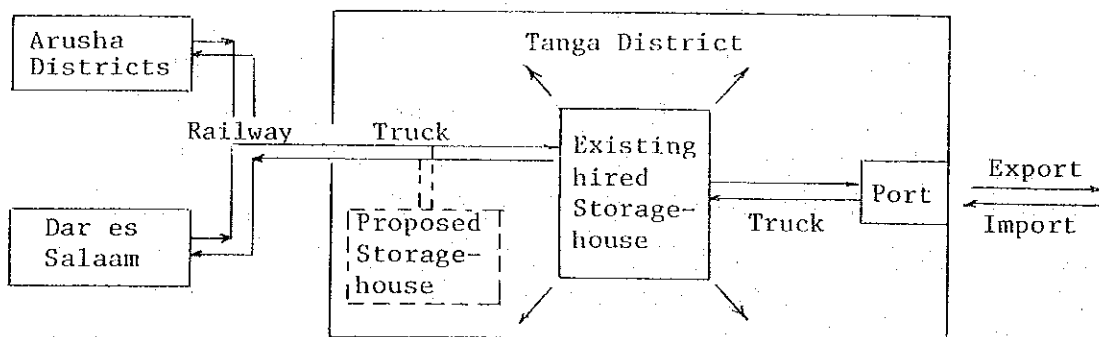
2-1) Tanga District

The present state of the existing grain distribution channels in Tanga District is as follows:- (See "A Flowchart of Grains in Tanga District")

- (1) For consumption in Tanga City, wheat from Arusha and maize via Dar es Salaam are received by means of railway transport.
- (2) Grains unloaded at Tanga Port are transported by rail to inland consuming areas.
- (3) Small quantities of peas and beans produced in inland districts are exported from Tanga Port.
- (4) Tanga District with a little quantity of grain procurement may be called totally as the consuming area.

Some of the data concerning the volume of grain distribution in Tanga District, the proposed site for the construction of one

"A Flowchart of Grains in Tanga District"



storagehouse, are unobtainable, except for the volumes of sales and procurements. There is no alternative, therefore, but to infer the required figures from the data for the entire Tanga Region. It is inferable, however, that 70 to 80% of the volume of distribution for the entire region is channeled via Tanga District.

The annual volume of handling in Tanga Region in recent years is shown in Annexed Materials, "Reference Materials." To put this in order, the total transfer of raw materials and products from other regions to Tanga Region and from Tanga Region to other regions are shown in the following table:

unit : ton

	Transfer-in	Transfer-out
1981	28,979	4,760
1982	18,602	6,499

That is, the annual transfer-in volume is 19,000 - 29,000 tons, and the annual transfer-out volume is 5,000 - 7,000 tons. Also, the production volume in Tanga Region and the sales, export and import volumes in this region are shown below:

unit : ton

	Sales	Import	Export	Procurement
1980/81	41,470	62,569	5,973	2,031
1981/82	15,732	17,068	2,832	3,285
1982/83		10,009	11,574	3,068

That is, imports are 17,000 - 63,000, exports 3,000 - 12,000 tons, and procurements 2,000 - 3,000 tons.

2-2) Mbozi District

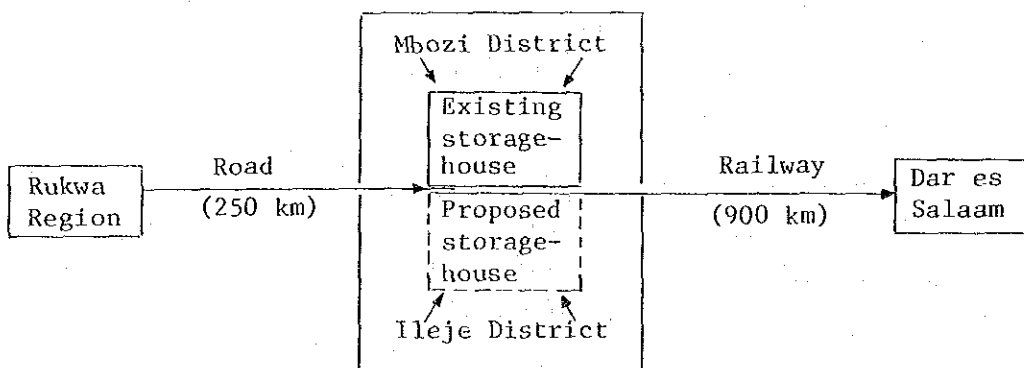
Mbozi District where the proposed site for the construction of one storagehouse is located, is situated in Mbeya Region. At the proposed site, storagehouses with the capacity of 2,000 tons exist, which is under the control of Mbozi Depot owned by NMC's Mbeya Branch.

Grains procured here are composed of maize, peas and beans, and sorghum. The grains are brought in on NMC-owned trucks or hired vehicles, from 146 village buying posts including 128 posts in Mbozi District and 18 posts in Ileje District, as well as from Nsangira Maize State Farm. The latest annual procurement figures amount to 9,000 through 11,000 tons as shown in Annexed Materials, "Reference Materials".

The proposed site occupies also an important position as a transit site for grain transport from Rukwa Region to Dar es Salaam Districts.

The flow of grains in Mbozi District is as illustrated below:

"The Flowchart of Grains in Mbozi District"



That is to say, the grains produced south of Sumbawanga, the capital town of Rukwa Region, are transported about 250 km by road, and, after being temporarily stored in this depot, transferred to Dar es Salaam districts by railway wagons. The quantity involved amounts to 8,000 to 10,000 tons, representing 30 to 50% of the annual procurement figures of Rukwa Region. (See Annexed Materials, "Reference Materials".)

3. How This Project Is Related to Other Upstream Projects

The Tanzanian Government is carrying on the construction of grain storagehouses under its economic development plan. The on-going and planned projects are lined up in Table II-1 which we obtained from NMC. Furthermore, "The National Food Strategy (June, 1982)" is referring to the future plan of the storage projects as shown in Table II-2. The storagehouses construction project, for which cooperation of our country is requested, makes an integral part of these projects.

The contents of the recommendations made by Food And Agriculture Organization (FAO) and International Development Association (IDA) of the UN, which made surveys of the grain storagehouses in Tanzania, are summarized below:-

- (1) Improvements of Existing Storagehouses
- (2) Construction of New Storagehouses
 - 100,000 ton-capacity storagehouses construction project for Strategic Grain Reserve (SGR)
 - 40,000 to 50,000 ton-capacity storagehouses construction project to meet the expected requirements up to 1982/83
- (3) Suggested Improvements on Outdoor Storage Method

The construction of storagehouses for SGR is in progress for 70,000 tons under the various foreign aid programs. The project covered by the request made to the Japanese Government is not concerned with storagehouses for SGR, but with ordinary storagehouses

for distribution purposes to be constructed in producing and consuming areas, and so it has nothing to do with the SGR project.

The request made to our country covers 14 godowns to be constructed in nine districts with an estimated total storage capacity of nearly 100,000 tons, of which 35,000 to 50,000 tons are specified, but the rest are referred. The present project covers only two districts with a total estimated capacity of about 14,000 tons, out of the above mentioned figures. Nevertheless as the selected districts represent the areas most markedly stricken by food shortage, it is expected that this project will bring most effective solution to the immediate problem confronting Tanzania.

Jan. 1983
N.M.C.

Table II-1 STORAGE, ONGOING AND PLANNED AS OF 1983

Project and Financing Source	Ongoing	Planned
National Maize project (IBRD)	Isaka 3,500	
Tanzania Government	Sumbawanga 17,000	
Strategic Grain Reserve	Dodoma 30,000	(firm commitment)
	Shinyanga 10,000	Shinyanga 10,000
	Arusha 20,000	
	Makambako 10,000	
	3 sheds 1,000 each	21 sheds 1,000 each
Transit Sheds (DANIDA)		Tabora 3,600
" (Tanzanian Govt.)		(uncertain)
Grain Storage & Milling Project		DSM 15,000
		Guiwe 5,000
		Masasi 5,000
Total	93,500	59,600

Table II-2 PROJECTED STORAGE REQUIREMENTS FOR NMC OPERATIONS

	1979/80	1982 (Jan.)	1982-85	1985	1985-90	1990	1990-2000	2000
								(Tons)
Base	372,200	372,200	-	595,700	-	846,000	-	1,682,000
Hired	N.A	159,700	-	159,700	-	200,000	-	400,000
On-going Planned		102,500	48,500	-	-	-	-	-
Additional requirement		73,000	250,300				836,000	
<u>Total</u>		<u>531,900</u>	<u>223,500</u>	<u>155,400</u>		<u>1,046,000</u>		<u>2,082,000</u>
of which:								
SGR		-	153,000	153,000		180,000		250,000
Carryover stock (ordinary)				90,000		136,000		280,000
Animal feeds				20,000		30,000		50,000
Buffer storage				38,000		52,000		104,000
Procurement/ Sales				454,400		648,000		1,398,000

Source: Project estimates, National Food Strategy

III. OUTLINE OF PROPOSED SITES

I. Outline of Tanga District

1-1) Geographical Features

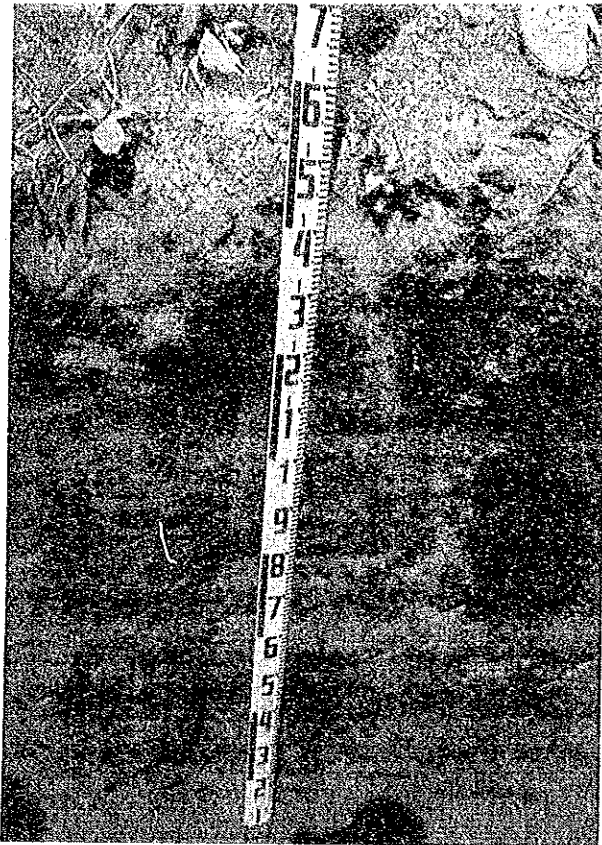
The proposed construction site is located at a place called Kange, at about 5 km distance along Korogwe Road to the west from the center of Tanga City. Of the topography of the entire Tanzania, the highland and the mountainous areas occupy a majority part. In the districts facing the Indian Ocean in the east, however, a long and narrow open field extends along the coastline. Tanga City is a port town facing the Indian Ocean to which many foreign vessels call.

The proposed site is a plot, dimension of which is about 76 m x about 140 m in a shape slightly longer in the northeast-southwest direction, is located at about 5 km distance from the Tanga Station and is sandwiched between the railway trunk line of Tanzania Railway Corporation (TRC) and a road.

The land is owned by National Milling Corporation; NMC and presently used as a farm with no building at all, but with a big tree on it. The ground surface has an about 2% downgrade from the railway track side toward the road side, while the railway track has a 10 mm/1 m downgrade toward the Tanga Station.

1-2) Geological Features

In the absence of soil exploration data, field test pitting was performed in order to ascertain the bearing power condition of soil layers. There is a surface of about 50 cm thickness and, beneath it, a layer composed of compact, red-colored soil mixed with coarse sand. The bearing power of ground is judged more than enough to withstand the construction of a grain storagehouse.



Test pitting in
Tanga District

1-3) Weather Conditions

The weather conditions in Tanzania can be generally divided into the coastal area, central high-lands, lake area and mountainous area.

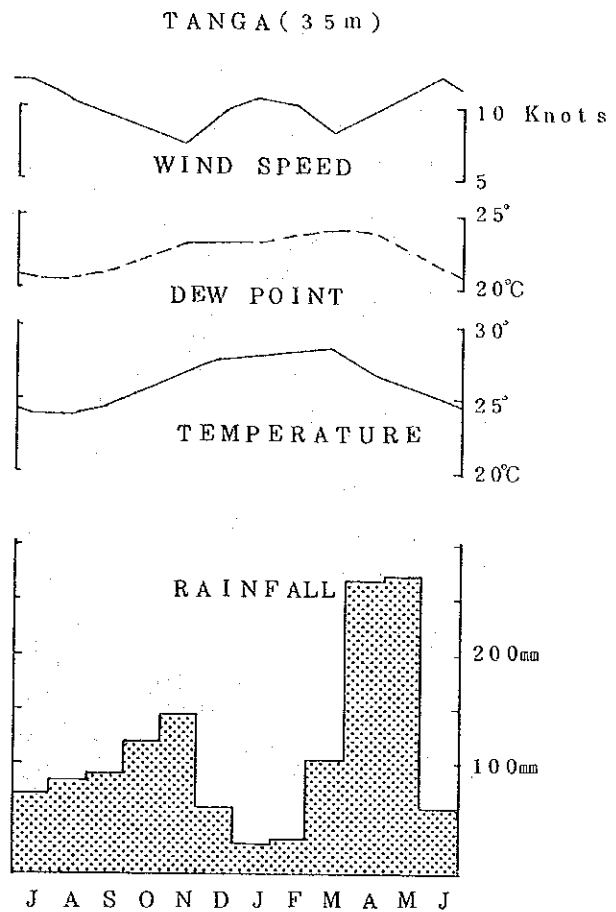
Tanga City is situated in the coastal area where the weather is generally with high temperature and humidity all the year round. The wet season with heavy rainfalls lasts from the middle of March till the middle of May, followed by another wet season with light rainfalls towards November.

The temperature from June through September resembles that of the fall in Japan, but it is the hottest from December to March, exceeding 30°C from day to day with high humidity.

The temperature and precipitation in Tanga District are shown in the graph below:

According to the records of agricultural meteorology published by the Directorate of Meteorology, the average meteorological data in April which correspond to the wet season in Tanga Region, are also shown as follows:

Maximum Temperature: 30.8°C
Average Temperature: 27.1°C
Minimum Temperature: 23.3°C
Relative Humidity : 72% (at 3 p.m.)



1-4) Infrastructure

Power supply is available. Telephone lines are installed along the railway track. Water supply is unavailable, and drainage facilities, it is judged, do not exist.

As far as drainage is concerned, no serious problem is feared despite of heavy rainfalls in the wet season and lack of proper drainage facilities because the building is expected to have the raised-floor structure which does not raise any problem as to damp-proofing of the floor.

The proposed site is accessible by a trunk road kept in sufficient condition for transport by trucks. The railway track is a main track, not a siding.

2. Outline of Mbozi District

2-1) Geographical Features

The proposed site is located at a place called Vwawa in Mbozi District in Mbeya Region. This district is near to the Zambian border, forming a mountainous area with an elevation of more than 1,500 m, which is rich in farm products. Vwawa is situated between the railway track of Tanzania Zambia Railway Authority (TAZARA) and TANZAM Highway.

The proposed site is adjacent to the southeast side of the Vwawa Station and at about 1.5 km distance to the north from Vwawa Town located along the highway. There are two storagehouses (with the storage capacity of 1,000 tons each) and to the south side of which the projected site, about 100 m x about 150 m, lies in a shape longer in the direction from south to north. NMC does not own the whole of the land which is now used as a cultivated field, and in which two dwelling houses exist. It is reported, however, that this will offer no problem as to acquisition of the land.

The site is generally even. It is adjacent to a railway land on the side of the railway track which is raised by 2.7 m higher than the projected site.

2-2) Geological Features

In the same way as in Tanga District, field test pitting was performed in order to ascertain the bearing capacity condition of soil layers. There is a surface of about 50 cm thick, and beneath it, a red-colored, clay layer. The bearing capacity of ground is judged, in the same way as in Tanga, more than enough to withstand the construction of a storagehouse.



Test Pitting in Mbozi District

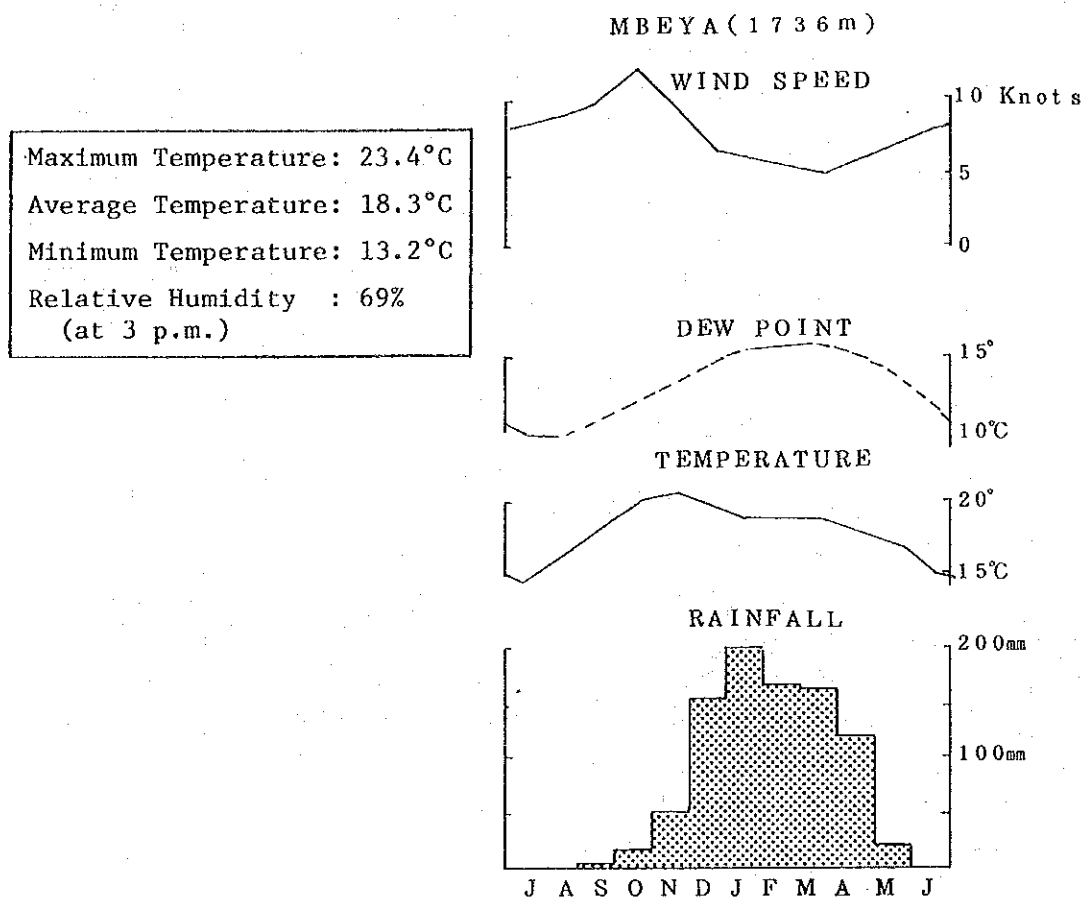
2-3) Weather Conditions

This district has weather conditions of the typical mountainous area, characterized by sudden changes in atmospheric temperature between day and night, and low humidity, which resemble, as a whole, those of the temperate zone, hence crops of the temperate zone are also cultivated.

It has the wet season from December through March, but with less rainfall than in Tanga District. The average temperature and precipitation in Mbeya Region are shown in the following graph.

According to the records of agricultural meteorology published by the Directorate of Meteorology, the average

meteorological data in January which corresponds to the wet season in Mbeya Region, are also shown as follows:-



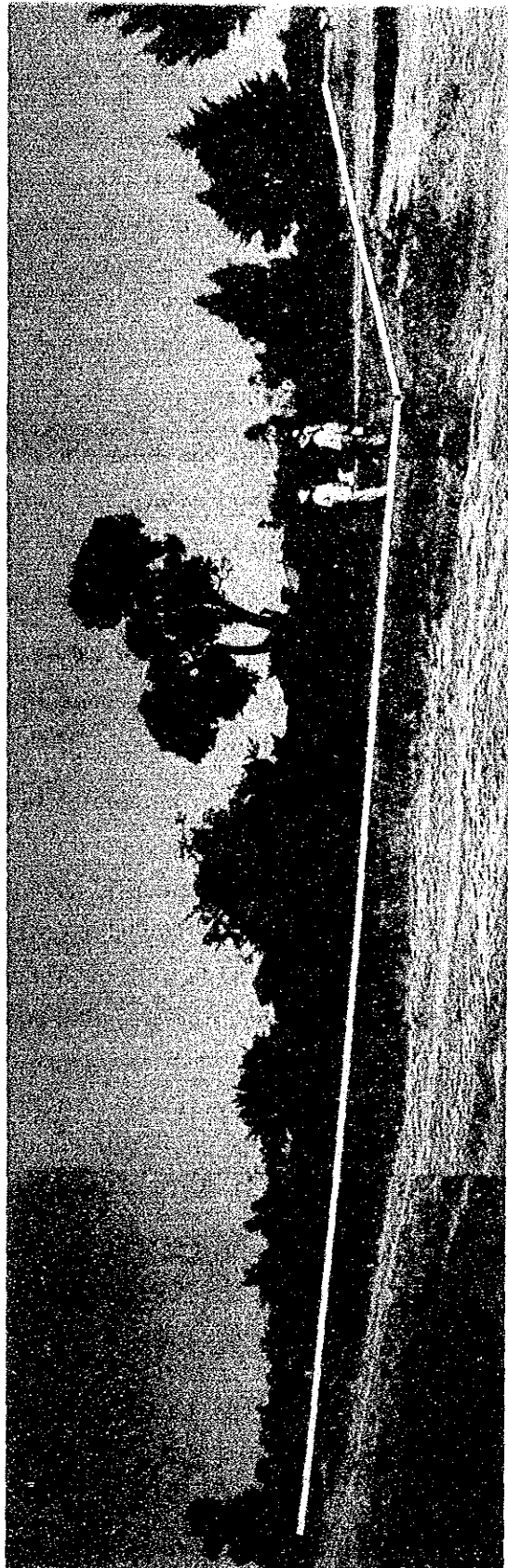
2-4) Infrastructure

This district utterly lacks such facilities as electric power, water supply, sewerage and telephone service. It is judged that water can easily be pumped from artesian wells. As to drainage, it is same as with the case of Tanga District.

The road running along the projected site is not a trunk road, but, from the fact that trucks loaded with grains from the producing areas are coming in and out of the existing storage-houses, it is judged that this road will also become a useful access road to the new storagehouse. Both the railway main track and sidetracks are available. The sidetracks are provided with a platform for loading goods.



TANGA SITE



VAWA SITE

3. Storagehouse Situation in The Proposed Sites

3-1) Storagehouse Situation in Tanga City

Table III-1 shows the capacity of storagehouses in Tanga Region, of which the storagehouses existing in the city of Tanga are five with a total storage capacity of 7,090 tons, majority of which, namely 5,600 tons, is represented by hired storagehouses and the rest by the rented storagehouses of other governmental organizations. Here, the following problems exist in connection with storagehouses:

- (1) Since NMC has none of its own storagehouse, depending entirely upon hired ones, storing operations are not stabilized from a long-range point of view.
- (2) The necessary rentals amount to TS17,000 per month (1 TS = ¥20).
- (3) Due to a scarcity of storagehouses, NMC is forced to hire some lower grade ones which are unsuitable for the storage of grains.
- (4) For grain transport, the railway wagons are generally utilized for economic reasons, but as those hired storagehouses are not provided with railway side tracks, the arrangement for the transshipment is necessary. Since the railway side is not sufficiently equipped with facilities for transshipment, NMC hires temporarily siding facilities owned by other organizations. This entails, however, difficulty in securing them at the desired time and place, resulting in extra transshipment charges.

June 18, 1983
Tanga Branch
N.M.C.

Table III-1 Storagehouses in Tanga Region

Location	Description	Capacity (ton)	Ownership	Monthly Rental Fee (Tsh)
<u>Tanga District</u>				
Gofu	NATEX (RTC)	1,250	Entrusted by Govt.	
"	HASHAM	140	"	
"	J.S. Davis	2,100	Hired	2,000
"	VUASU	100	Ex-Coop	
"	T.H.B. (TECO)	3,500	Hired	15,000
<u>Muheza District</u>				
Railway	Muheza	1,200	Govt. Trustee	
<u>Korogwe District</u>				
Old Korogwe		2,500	NMC	
"		2,500	"	
New Korogwe		10,000	"	
<u>Lushoto District</u>				
Soni		300	Hired from village coop.] 2,000
"		90	"	
"		500	NMC	
<u>Handeni District</u>				
Town	KIVESA	250	Govt. Trustee	
"	NMC Handeni (transit shed)	1,000	NMC	
<u>Pangani District</u>				
Total		25,430		

3-2) Present State of Mbozi Depot

Vwawa, the projected construction site in Mbozi District, has only storagehouses with the capacity of 2,000 tons (i.e. 2 houses of 1,000-ton capacity). (See Table III-2 and the photo.) As far as grain distribution is concerned, the required grains are transferred to Vwawa from Ileje District which may be regarded as belonging to the same area as Mbozi District, where there is a 1,000-ton capacity storagehouse intended exclusively for procurement purposes.

The channels and quantity of distribution in Mbozi District have already been described in "II. Background of the Project, 2. Grain Distribution in the Projected Sites, 2-2) Mbozi District". Here, there is a great difference between the required storage capacity and the existing storage capacity. This represents a shortage of storagehouses, resulting in storing considerable quantities in the open. Although there is a railway siding near the existing storagehouse, its unavailability for direct loading from the storagehouse causes inconvenience. To provide the projected storagehouse with its own siding will greatly improve handling operation, in view of the nature of the proposed storage-

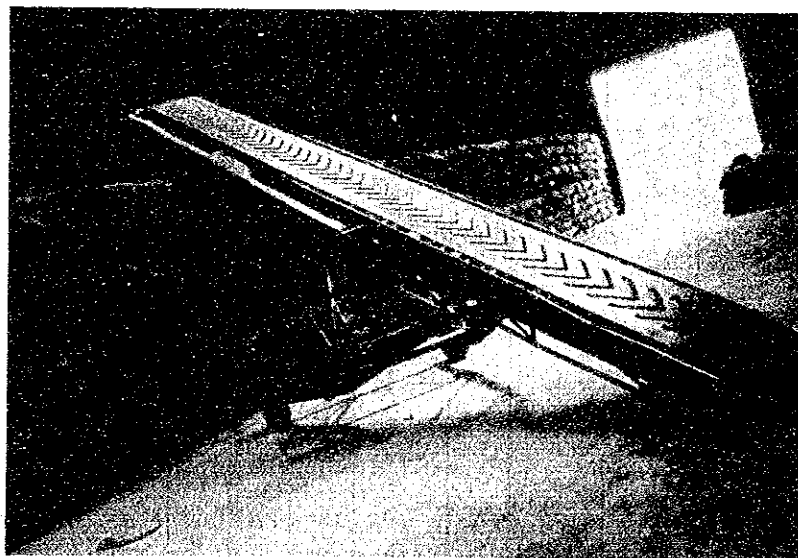


Mbozi Depot
1,000 tons x 2 buildings
(36.25 m x 13.35 m)

house which will be intended to ship almost all stored grains by freight-cars. Furthermore, as the existing storagehouse has neither office nor storing place for chemicals and equipment a portion of the storagehouse itself should be used for such purposes. This incurs managerial problems.

3-3) Equipment Attached to Storagehouse

Accessory equipment necessary for storagehouse include goods handling machines, pallets, fumigation equipment and chemicals. Wwawa storagehouse of Mbozi Depot is equipped only with one unit of belt conveyor as good handling machines. Generally speaking, Tanzania remains terribly backward in the diffusion of cargo-handling machines for storagehouse use. Only some number of conveyors and handcarts are in use. The existing conveyors, too, are in bad repair, and many of them are out of order. The models in use are of the chain- or belt-driven type, driven by an electric motor or engine, both of them being of the angle-changeable, derrick type. Fumigation equipment and chemicals are procured by NMC Headquarters to be distributed among its storagehouses through each branch. (See Annexed Materials "Reference Materials.")



Beltconveyor
7 m(Length) x 600 mm(Width) Engine: 3 HP

June 24, 1983
Mbeya Branch
N.M.C.

Table III-2 Storagehouses in Mbeya Region

Location	Description	Capacity ton	Owner	Building Structure			No. of fire extinguishers
				Floor	Wall	Roofing	
Mbeya	Iyunga new godown	6,000	NMC	Waterproof	Concrete block	Iron sheets	6
"	Industrial area hired godown	1,300	Registrar of Buildings	Cemented	"	"	11
	2 transit sheds	2,000	NMC	"	Iron sheet fencing	"	0
Ileje	1 transit shed (DANIDA)	1,000	"	"	"	"	0
Kyela	No.1, 2 & 3 godowns	2,900	Unions	"	Iron sheet fencing (No.1 & 2) Concrete block(No.3)	"	18
Ilongo	Mswishi	1,500	"	"	Iron sheets	"	1
Chimala	Isitu, Chimala godown	3,000	Unions(Umoja wa vijiji)	"	Iron sheet fencing	"	2
Rujewa	2 Rujewa godowns	2,200	Co-operative	"	Concrete block	"	2
Ndalambo	Ndalambo godown	Not speci- fied (Very small)	Mbeja Region Co-operative Union(MRECU)	"	"	"	0
Madibira	Transit sheds	1,000	NMC	"	"	"	0
Mbao	Mbao go- down, Mbozi district	Not speci- fied (Very small)	Co-operative	"	"	"	0
	TOTAL	20,900					

3-4) Loading/Unloading Operation

Loading and unloading operation for trucks and railway wagons depends mostly on man power, but conveyors are used sometimes, only when grain sacks are lifted. Therefore, the use of conveyors is limited either to loading on railway wagons or to "stacking" operation. This operation is performed by temporary laborers under the supervision of a stacker (who has "stacking skill"). Odd jobs (such as screening, repacking in bags, etc.) are handled by women laborers.

3-5) Pest Control of Stored Grain

Grain storagehouses in Tanzania are, generally speaking, not of the sealed-up type. For pest control, it is a common practice to fumigate each stack of grain only, after covering it with two or three layers of sheets. (Refer to "3-3 Equipment Attached to Storage" for the equipment and chemicals in use for this purpose.) Since vermin mixed in any bag of grain will spread rapidly among other bags of grain in the storagehouse, effective control should be performed prior to warehousing. This is called "control before the door". For this purpose, large-sized storagehouses built recently in Tanzania are equipped with a platform for drying and fumigation operation. Since the practice of strict quality control, thorough pest control and drying before warehousing, eliminates subsequent damage to the stored goods, "control before the door" is indispensable.

4. Construction Work Situation in the Projected Sites

4-1) Present State of Construction Work

In Mbeya City, the mission inspected several buildings presently under construction. Suspension of work or considerable delays in their work, were seen in almost all the cases, owing to difficulties in procuring reinforcing bars and other construction materials, as well as, due to a paralysis of conveyance of materials caused by fuel shortage. (Refer to Table III-3.) The

country's economies are harassed by an extreme shortage of foreign exchange, hence it is tremendously difficult to obtain the necessary fuel and other imported materials and equipment.

4-2) Construction Materials and Equipment

Construction materials and equipment procurable in Tanzania include cement, reinforcing bars, bricks, timber, aggregate and so on. Local procurement of construction machinery presents serious difficulties.

(1) Cement

Cement is transferred from Dar es Salaam to the construction sites located in Mbeya City. Two cement factories, one in Dar es Salaam and the other in Tanga, produce about 500,000 tons annually, making it feasible to meet our cement requirements in Tanzania. This annual production has been on the decrease, however, year by year, as a result of the recent chronic fuel shortage and the superannuated manufacturing equipment.

The mission inspected also Mbeya Cement Factory now under construction in Mbeya District. This factory is reported to go into operation shortly, but its production capacity is still unknown. In consideration of the situation as it is, a situation may arise where cement will have to be imported, although basically we shall be depending upon domestic cement.

(2) Reinforcing Bars

Although it is reported that the mill in Tanga produced about 8,800 tons in fiscal 1982, the supply runs short for the total demand, and it is considered risky to look to the domestic products for the entire supply of this item. It is, therefore, projected that the domestic products will be used as much as possible, but that most of the requirements will be covered by imports.

(3) Timber

Domestic timber, both hardwood and softwood, is usable.

(4) Aggregate

Tanga Site is accessible to a quarry, presently in operation in Kiomoni District, the products of which seems to meet our requirements both in quality and in quantity.

Mbozi Site is accessible to two quarries, one of which produces river gravel of good quality on River Songwe, 26 km distant from Mbozi to Mbeya, where a local construction company operates a crushing plant at present. The available quality and quantity seem to meet our requirements sufficiently. Land sand is available for use from the environs of both sites.

(5) Bricks

Both sun-dried bricks and burnt bricks are available. Neither of them is considered for use, however, in this project because of their small production scale and poor quality.

Cost data of materials, obtained in the on-site survey, are shown in Annexed Materials, "Reference Materials". In this connection, it is considered necessary to take into account possible increases in costs due to the general uptrend of prices as well as imbalance between supply and demand.

4-3) Contractors (Constructors)

The contractors are divided into seven classes according to the amounts of construction prices contracted by them. Class I can undertake work for amounts exceeding 30 million shillings, Class VII the amounts ranging from 30,000 to 1,000,000 shillings. 32 for Class I, 16 for Class II and 56 for Class III, are registered respectively. There are 55 engineering offices registered, including those of foreign nationals such as India, Arabia, Italy, Zambia and so on. (Refer to Annexed Materials, "Reference Materials" for further details.)

4-4) Building Laws

There are no existing laws or regulations equivalent to the "Building Standard Law" in Japan. Building coverage, floor area ratio, distance from highway to building, etc. are, however, stipulated. (See Table III-4.) Generally, the British standards prevail. Work under foreign-aid programs are, however, governed in conformity with the criteria and standards of the respective countries.

It seems that Tanzania, not entirely free from earthquakes, has experienced minor tremors about once at intervals of a few years.

No laws or regulations exist, which correspond to "The Japanese Law for Prevention and Extinction of Fires".

The existing storagehouses are, however, without exception, equipped with British-made fire extinguishers. Besides, preventive measures against disasters caused by fumigation chemicals, are made compulsory.

Table III-3 The Investigation of Construction

PROJECT NAME	KIND	AMOUNT (T.S)	TERM	CAUSE OF DELAY
New office Development National Insurance Corporation of Tanzania	Architecture	-	suspended	Material shortage
Bank of Tanzania Mbeya	Architecture	38 million	1980-1 1983-1	Material shortage (especially re- inforcing iron)
Mbeya Tex (Textile Mill Mbeya)	Architecture	-	suspended	Material shortage
Mbeya Cement Factory	Architecture	700 million	mostly completed	Material and fuel shortage
Songea-Makomboko Road (Wino-Makomboko)	Civil Work	-	1980-1 1982-7	Material shortage

Table III-4 GENERAL PLANNING SCHEME
MINIMUM PLOT SIZE, PLOT RATIO, SITE AND ACCOMMODATION DENSITY

TABLE II DAR ES SALAAM	ZONE I RESIDENTIAL							ZONE II SHOP & OFFICE		ZONE III SERVICE TRADE		ZONE IV GENERAL INDUSTRY	ZONE V SPECIAL INDUSTRY	ZONE VI PUBLIC BUILDINGS OR PRIVATE OPEN SPACES				
	A	B	C	D	E	F	G	MULTI STORES	SINGLE STORES	MULTI STOREY	SINGLE STOREY	GENERAL INDUSTRY	SPECIAL INDUSTRY	PUBLIC BUILDINGS	SCHOOL	SPORTS GROUND		
	DETAACHED HOUSES	TERRACED	MULTI STORIED BLOCK OF FLATS	CHARACTER TO BE HIGH MID LOW	DENSITY	DENSITY	DENSITY	370	370	370	370	370	370	370	370	370	370	
MINI PLOT SIZE ARR. M ²	370 *	930 ***	1,400	112	930	930	2,800	370	370	370	370	370	370	370	370	370	370	
MINIMUM PLOT SIZE SQUARE FEET	400 *	10,000 ***	15,000	1,200	10,000	10,000	30,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
PLOT RATIO	0.4	0.25	0.20	0.5	0.7	0.6	0.3=	2.5X 0.5#	0.7+ 0.5#	2.5X 0.5#	0.7+ 0.5#	0.7+ 0.5#	0.7+ 0.5#	0.7+ 0.5#	0.7+ 0.5#	0.7+ 0.5#	0.7+ 0.5#	
MAX. SITE COVERAGE	40%	25%	15%	50%	40%	20%	15%	70%	50%	70%	70%	70%	70%	70%	70%	70%	70%	70%
MAX. NO OF HABITABLE ROOMS PER HOUSE AREA ACRE	80	50	40	120	150	120	70	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%
MAX. NUMBER OF HABITABLE ROOMS PER ARE HECTARE	200	125	100	300	375	300	300	300	300	300	300	300	300	300	300	300	300	300

- * The committee may decide upon areas where the minimum plot size shall be 2,500 square feet or 235m².
- ** The committee may decide upon areas where the minimum plot size shall be 3,000 square feet or 280m².
- *** The committee may decide upon areas where the minimum plot size shall be 6,000 square feet or 560m².
- = The committee may with the consent of the Minister decide upon areas where the plot ratio shall be 1:33 and site coverage 20%.
- X The committee may with the consent of the Minister permit development with a plot ratio of 3.0 in special cases and large plots.
- # If residential use included limited to one dwelling unit
 - + If commercial use only
 - ° for corner plots
 - °° for internal plots
- ≠ Housing area means the area occupied by plots, together with any small public or private open spaces.

IV. CONTENTS OF THE PROJECT

1. Purpose and storage capacity

1-1) Selection of Projected Sites

The request received from the Government of Tanzania was for 14 storehouses in nine areas and the results of the preliminary survey which was carried out before, as well as the results of the survey on the distribution of grain which was carried out at this time are as follows: (The order of priority is in accordance with the priority order of the Tanzania side.)

Mbozi, the No. 3 priority, would require 920 kilometers of land transportation from the port of Dar es Salaam but is one of the most rich producing areas and as it is situated along the TANZAM Highway and the TAZARA Railway the construction is not technically difficult. The problem is that a large transportation cost would be required.

The objective of the request is not to build a grain reserve storagehouse but to construct an ordinary distribution storagehouse for the collection of cereal grain as well as to adjust the demand and supply.

Tanga, the No. 1 priority site, and a large consumer area as well as Mbozi the No. 3 priority and a producing area were selected as the candidate sites. Grains should naturally be stored at the producing area, upstream to the distribution flow, and in this respect the construction of a storagehouse at Mbozi, one of the major producing areas, is proper regardless of the higher construction cost and is in line with the objectives of this project.

1-2) Storage Capacity

In the preliminary survey, the grain distribution volume was taken on a region by region basis and the regions where an extreme shortage of storagehouse existed were selected. However, in the

Selection of Projected Sites

Priority	Locations	Required Storage Capacity (TON)	Shortage (TON)	Storagehouse under Construction	Producing Area	Provided with Railway	Construction Difficult	Total Marks
1	Tanga	15,000 20,000	17,000	No	Consumer Area	Yes	easy	⊙
2	Songea	5,000 10,000	11,700	Yes	Yes	No	difficult	X
3	Mbozi (Mbeya)	10,000	10,000 13,000	No	Yes	Yes	A little difficult	⊙
4	Bukene (Tobora)	5,000 10,000	enough	No	Yes	Yes	difficult	○
5	Dodoma		4,000	Yes	Yes	Yes	difficult	X
6	Rukwa		14,900	No	Yes	No	difficult	X
7	Kagera		9,800	No	Yes	No	difficult	X
8	Dar es Salaam		52,200	Yes	Consumer Area	Yes	easy	○
9	Arusha		10,600	Yes	Yes	Yes	easy	○

Remarks: ⊙ : Suitable project site

basic design survey carried out at this time, emphasis was placed on the appropriateness of the storage capacity assuming the distribution volume of grain to be stored at the storagehouse in case it was constructed in the selected construction site.

In the construction site of Tanga District and Mbozi District the situation of the grain distribution was quantitatively grasped and the required storage capacity was then determined from the difference with the capacity presently available. As a result, as shown in Table IV-1, Tanga lacks 17,000 tons at the lowest and Mbozi lacks 10,000 to 13,000 tons of storage capacity.

When planning the storage capacity, there is no need to compute this at the maximum distribution volume but rather at the minimum distribution volume which allows the storage houses to work effectively. For Tanga it was concluded that the scales of 8,000 tons would be appropriate with high economical efficiency and for Mbozi 6,200 tons.

2. Basic Design Policy

The usual construction structure of grain storagehouses is of reinforced concrete with brick walls but in this project the request was for a prefab style. The results of the survey at this time also came to the conclusion that the prefab style would be the most ideal for the construction in this project.

The reasons for this are as follows:

- (1) When carrying out the project under the grant co-operation funds, there is a restriction that the construction period is very limited.
- (2) Almost all of the materials necessary for the building would have to be brought from Japan. Also, as the materials would have to be transported 920 kilometers by land from the unloading port to the Mbozi site the materials should be light in weight and already processed into the required lengths.

Table IV-1 Estimated Required Capacity for Storagehouses at Proposed Sites

<u>Proposed Site & Description</u>	<u>Marketed Amount per annum (ton)</u>	<u>Expected Rate of Rotation</u>	<u>Necessary Capacity (ton)</u>	<u>Existing capacity (ton)</u>	<u>Required Capacity (ton)</u>
<u>Tanga Region</u>					
Transit	24,000-36,000	1/3	22,000-54,000	19,440-NMC & Gov.	3,000-35,000
Sales	16,000-42,000			5,990 -- hired	
Import	17,000-63,000			(1,490 .. Gov.)	(17,000-42,000)
Export	3,000-12,000			(5,600 .. hired)	
Procurement	2,000- 3,000			1.0	
<u>Vwawa, Mbozi District, Mbeya Region</u>					
Procurement	9,000-11,000	1.0	12,000-15,000	2,000	10,000-13,000
Transit	8,000-10,000	1/3			

N.B. In (), the estimated figures for Tanga District only.

- (3) As local procurement of the construction materials is difficult, the work to be done at the site should be as simple as possible.

For the above reasons, the design for this project will be carried out under the following basic policies:

- (1) The prefab method will be used. Although the same construction method need not be used for both the Tanga area and the Mbozi area, but as the result of study of same method will be used.
- (2) As regards the maintenance of the facilities, this should basically simple and inexpensive so that can be easily managed, technically as well as economically, simple and inexpensive. As the counter measures for this, electricity will not be used for illumination and power, the painted parts will be held down to a minimum and glass which is breakable will not be used, etc.
- (3) The building will not be of the sealed-up type for fumigating purposes.
- (4) Sufficient consideration will be paid to insect and rodent control and especially to prevention of human pilfering.
- (5) Importance will be placed on ventilation but a structure that gives no obstacle to the above-mentioned pilfering will be adopted.
- (6) To keep the construction costs down will be fundamental and luxurious finish will be avoided.

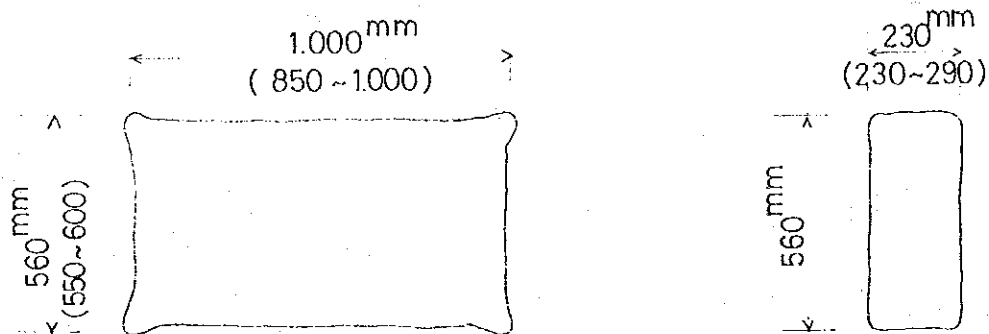
3. Stacking Dimensions Necessary for Scale Planning

3-1) Items to be Stored and How Stacked

The items to be stored shall be the principal grains which include maize, wheat, beans, rice, paddy, cassava chip, millet, and sorghum.

These shall be stored in sacks with hemp sacks being the

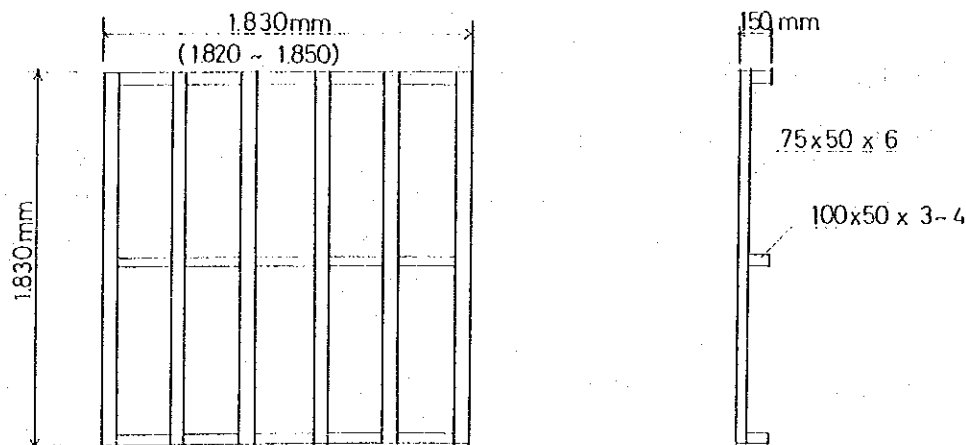
common, using a 90 kg sack for maize, 100 kg for rice, and 50 kg for cassava chips. The storage capacity of the storagehouses will be computed with the maize. The size of a 90 kg sack of maize is as follows, but as the accuracy of the weight by sacks is not uniform the size of the sacks will also be not uniform: (The figures in parentheses shows the actual measured value, but the standard size shown at NMC Headquarters is 1,000 x 560 x 230 mm.)



3-2) Method of Stacking

For the pallet the standard size is 6 ft x 6 ft. The size here is also not uniform. The outline is as shown in the drawing below. On this pallet, sacks filled with grain are stacked. This may be calculated at a ratio of 1 m x 0.56 m per sack. In many cases, the 5-sack method is used, but there are also cases of irregular stacking.

The sacks are stacked in 25 layers, but we have heard that 30 layers was desired. However, due to the lack of sufficient stacking and unstacking equipment this was designed as stacks of 25 sacks-layers.



3-3) Stacking Dimensions

The floor space of a 90 kg sack of grain is 1 m x 0.56 m, or 0.56 m², while the height is 0.23 m. Therefore the per unit space is (90 kg x 25 layers = 2,250 kg)/0.56 m² = 4.018 tons/m². At NMC, the aisleway is put at 20% of floor area which is taken as the rating capacity. The ratio of the storage capacity per construction area is 4.018 tons/m² x 0.8 = 3.214 tons/m².

The stacking height will be (0.23 m x 25 + 0.15 m) = 5.90 m. A space of approximately one meter will be kept from the topmost sack so as to provide ventilation.

4. Railway Siding

The Tanga Railway is owned by the Tanzania Railway Corporation (TRC) and the line laid down by the site is the main line. The railway line of Mbozi is that of the Tanzania Zambia Railway Authority (TAZARA). By the side of the site parallel to the main line is a siding and a platform belong to this siding for loading and unloading cargo. The distance from this platform to the boundary of the site is approximately 70 meters. From the existing storagehouses (1,000 tons x 2 buildings) at the site, the goods are transported by cargo trucks to the platform where they are loaded into the railway cars.

When a visit was made to the Tanzania Railway Corporation and the Tanzania Zambia Railway Authority to conduct a survey it was found that both corporations used the same technical standard, i.e. the "Standard Dimensions, East Africa Railways and Harbours": for the drawing-in of the siding. It was also learned that NMC, the organization requesting the siding, should submit an "Application for the Provision of a Customer Siding" to the Railway Corporation. The Railway Corporation will then make a preliminary survey on the request and when it is found that both economically and technically the siding is feasible, the applicant will be

asked to present the basic design and a profit statement. Then, when the budget has been verified work on the project can start.

In the case of Tanga it is the main line and it is therefore not possible to draw a siding from a suitable place of the main line. In other words, if the branch line is drawn from Tanga Station approximately five kilometers would be necessary.

At Wwawa, in Mbozi District, there is already a siding and to redraw this to the side of the new storagehouse would not be technically difficult. However, in this case the approval would have to be obtained from Tanzania and Zambia and thus would require time administratively. Also, when drawing a branch line from the siding the distance would be quite long due to the grade and the financial burden would be much greater.

From the above situation, it is judged that it will be difficult to lay a railway siding together with the construction of the storagehouse.

5. Transportation Measures and Loading and Unloading Methods
Necessary for the Plan

The railway is an indispensable means of transportation in this country and both construction sites are located along the railway line. However, as mentioned above, apart from the problems of regulations, technical and economical problems must also be considered when drawing in a siding and so an early realization is not possible. Therefore, although the Government of Tanzania will of course eventually lay a railway siding here, for this project a siding will be scheduled in the design but will not be a target of the project. For this project, consideration will be paid to transporting the goods by cargo trucks in the absence of a railway siding.

Also, the floor of the storagehouse will be of the raised type and the work of loading and unloading will, in principle,

be done by hand. However, a belt conveyor, chain conveyor, and a stacker will be necessary to stack the 90 kg sacks of grain 25 layers inside the storagehouse. As the facilities for servicing the equipment are extremely poor in this country the kind of equipment used must be matched to the existing technical level.

In the Mbozi District there is no supply of electric power at present. At the existing storagehouse, a belt conveyor powered by an engine is being used. Electricity can be used in the Tanga District, but engine power will be used. The reason for this is that repairs can be made more easily in the case of a breakdown and a supply of parts is available.

6. Layout, Scale and Structure of Buildings

6-1) Building Layout and Scale of Tanga Storagehouse

The Tanga District storagehouse will be long and narrow stretching from the northeast to the southwest. On the northern side will be the platform for the cargo trucks, while on the southern side will be the platform for the railway cars. For the time being the side for the railway cars will be used for the cargo trucks.

The size of the building will be $22.6 \text{ m} \times 108 \text{ m} = 2,440.8 \text{ m}^2$. The sacks of grain will be stacked in 25 layers and the capacity of the storagehouse will be 7,992 tons.

The basic drawings are shown on the following pages "TANGA SITE PLAN" and "TANGA STORAGE."

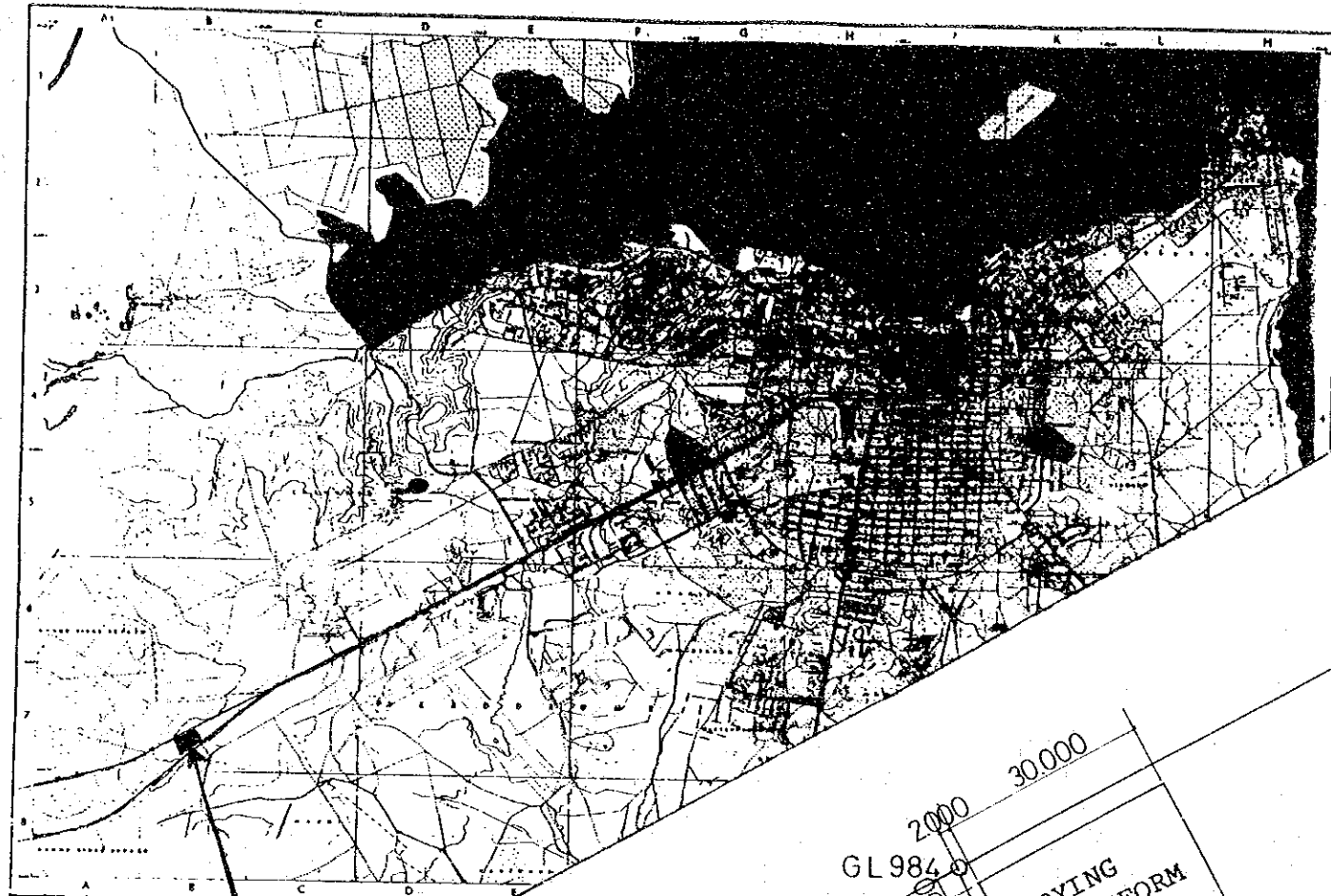
6-2) Building Layout and Scale of the Vwawa storagehouse (in Mbozi District)

The Vwawa storagehouse in the Mbozi District will be long and narrow north to south. On the east side will be a platform for the cargo trucks, while on the west side will be a platform for the railway cars.

For the time being, the railway car side will be used for the cargo trucks.

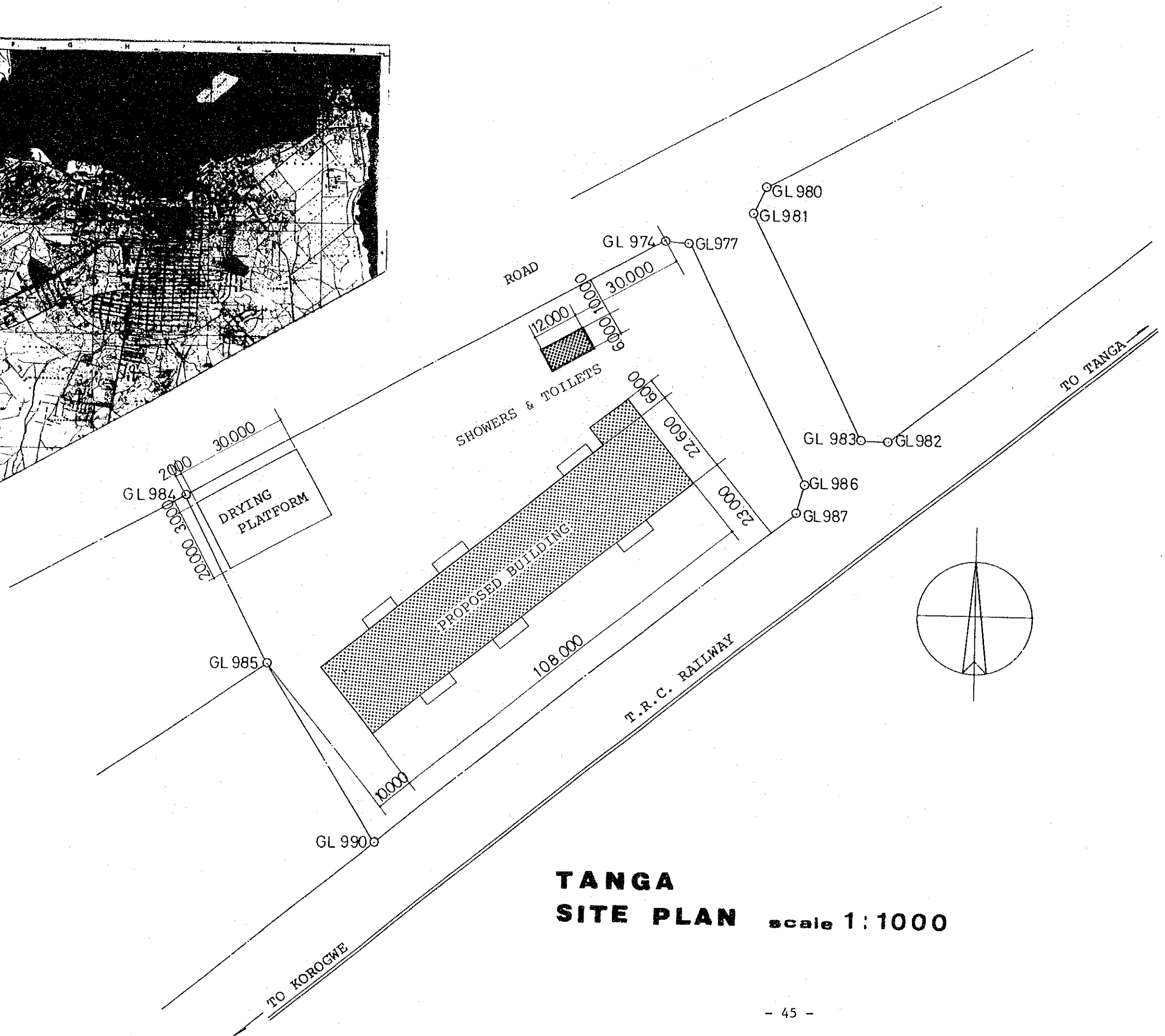
The size of the building will be $22.6 \text{ m} \times 84 \text{ m} = 1,898.4 \text{ m}^2$. The sacks of grain will be stacked in 25 layers and the storage-house will have a capacity of 6,216 tons.

The basic drawings are shown on the following pages "VWAWA (MBOZI) SITE PLAN" and "VWAWA (MBOZI) STORAGE".

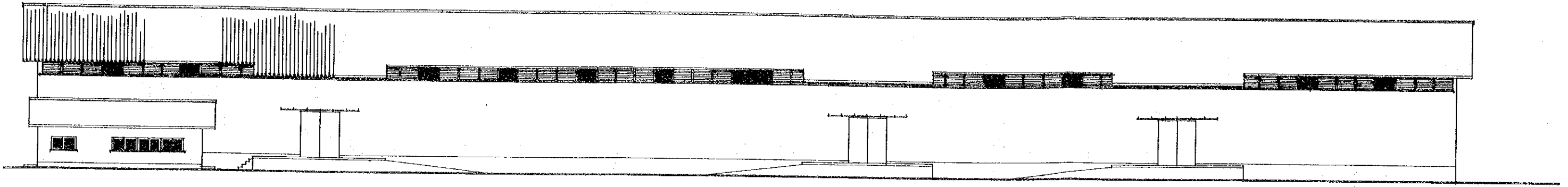


PROPOSED SITE

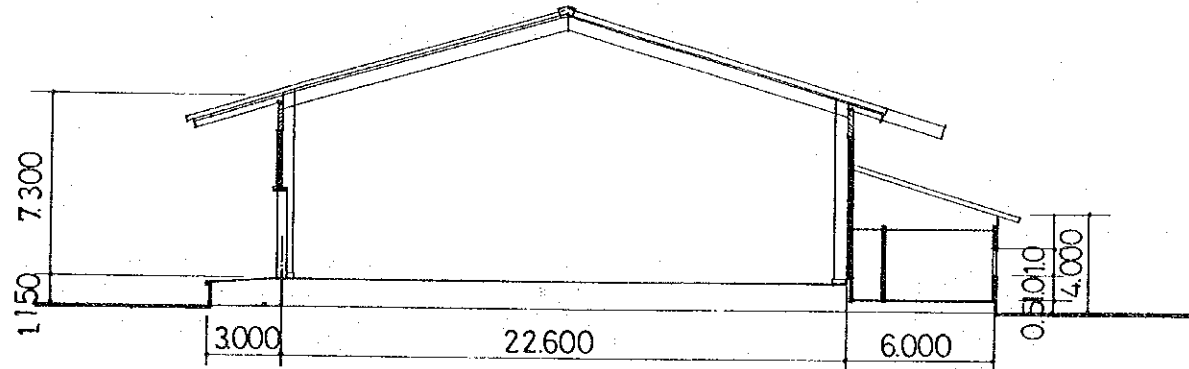
LOCATION MAP



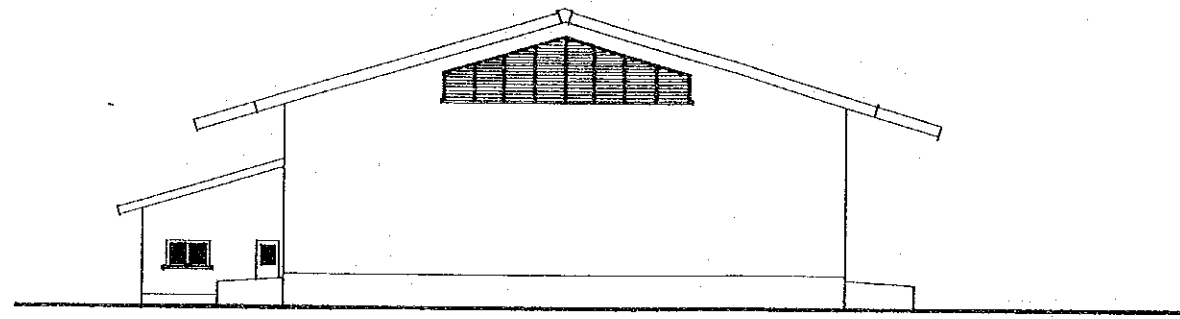
**TANGA
SITE PLAN** scale 1:1000



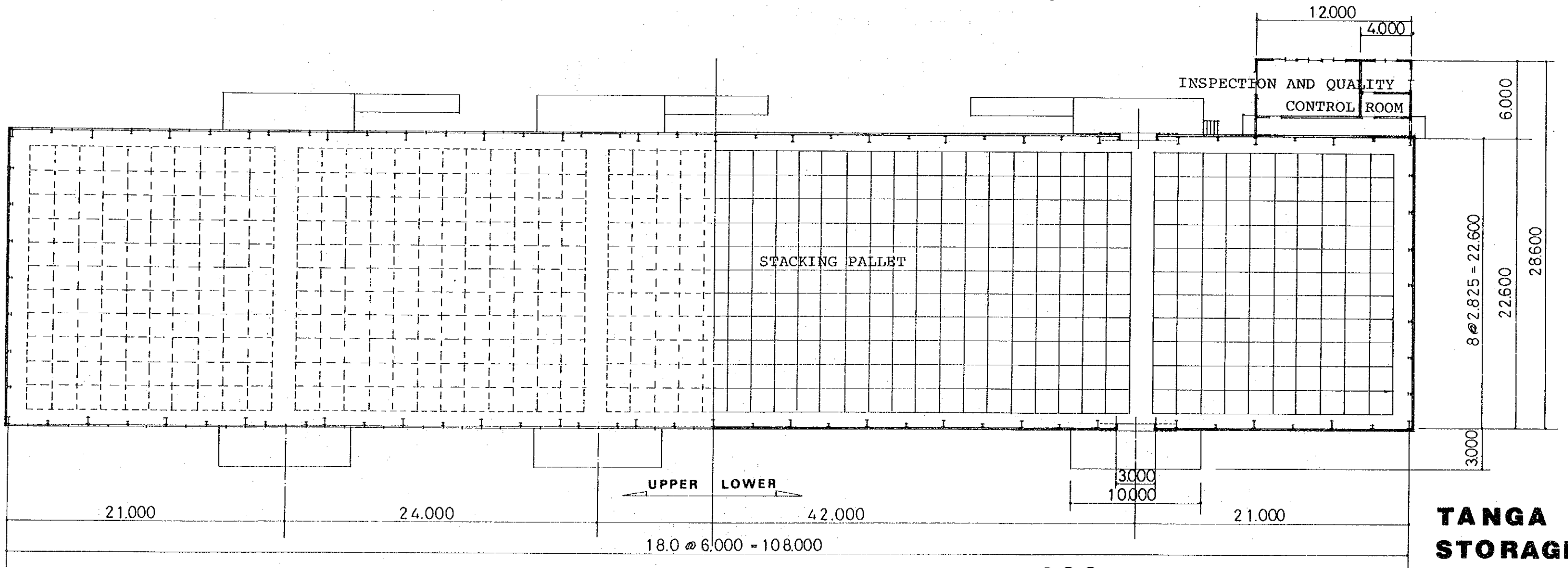
FRONT ELEVATION



SECTION



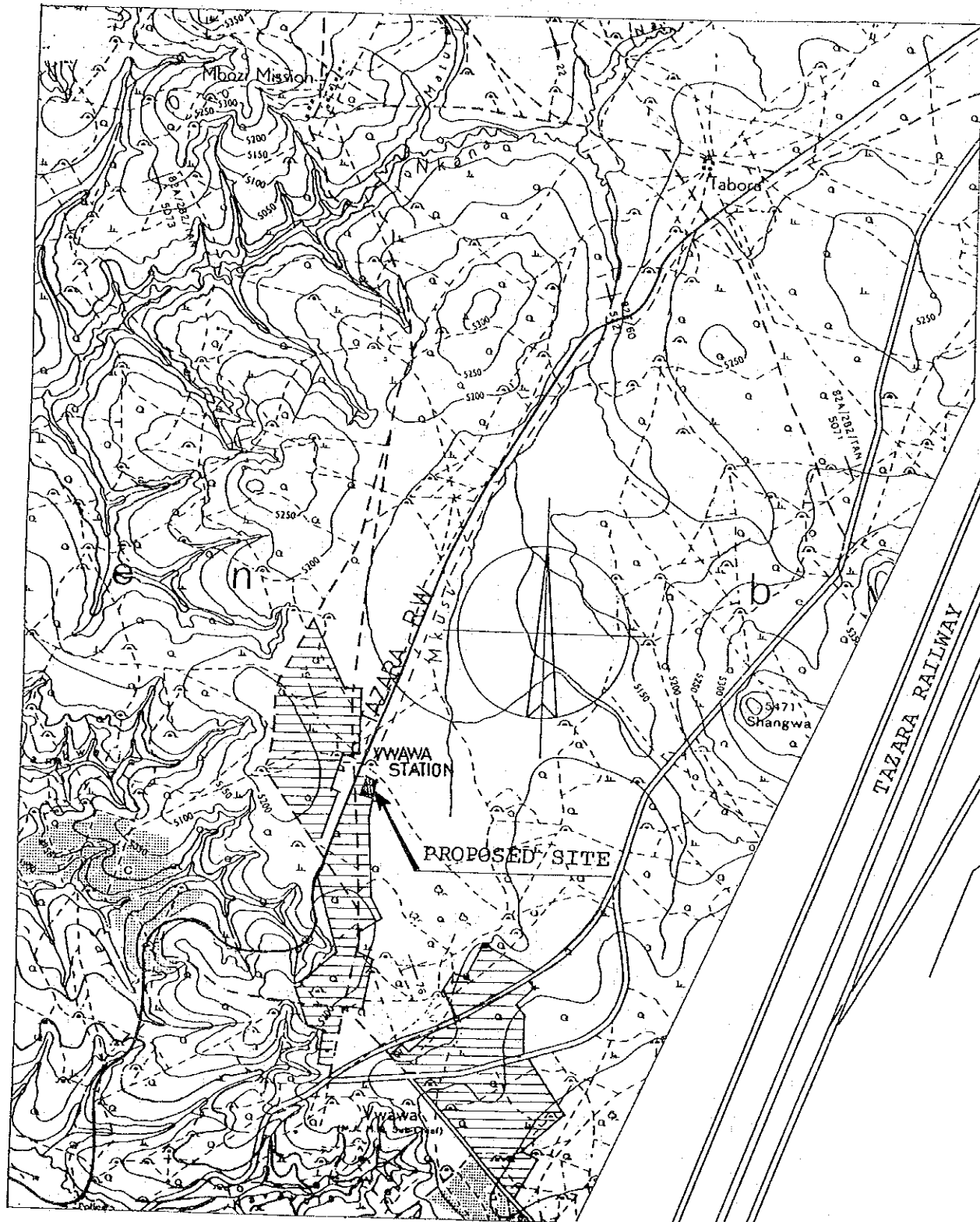
SIDE ELEVATION



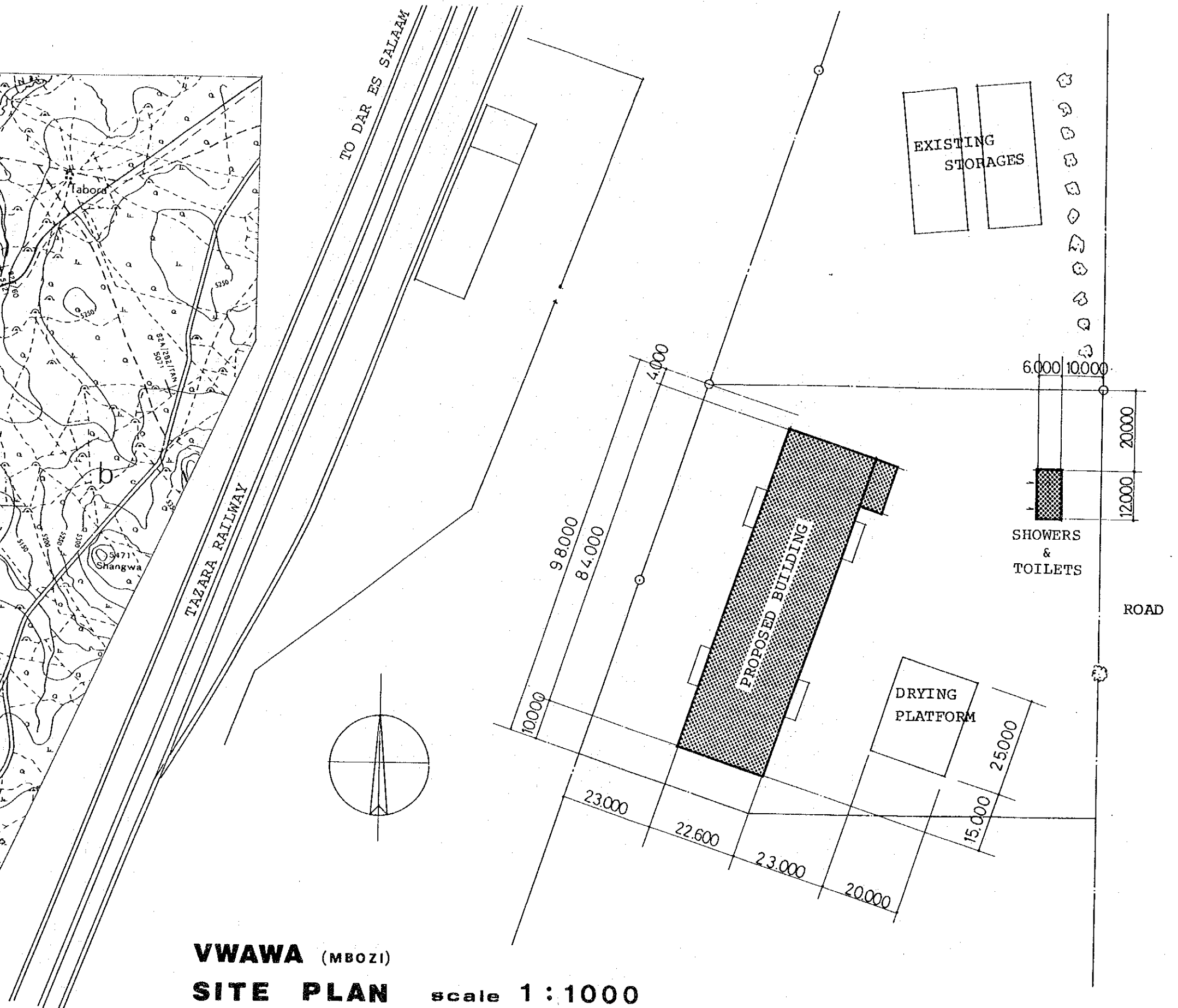
TANGA STORAGE

FLOOR PLAN

scale 1 : 300

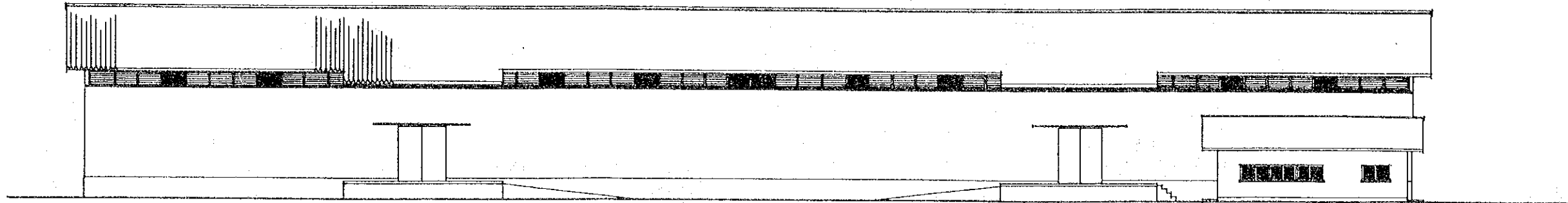


LOCATION MAP

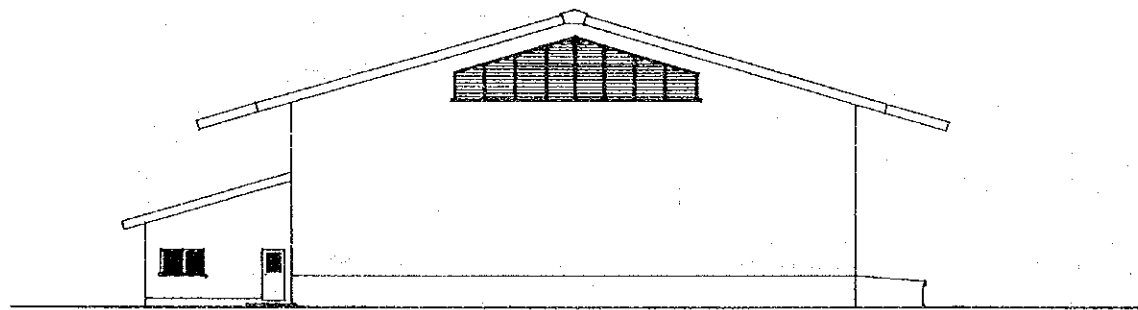


VWAWA (MBOZI)

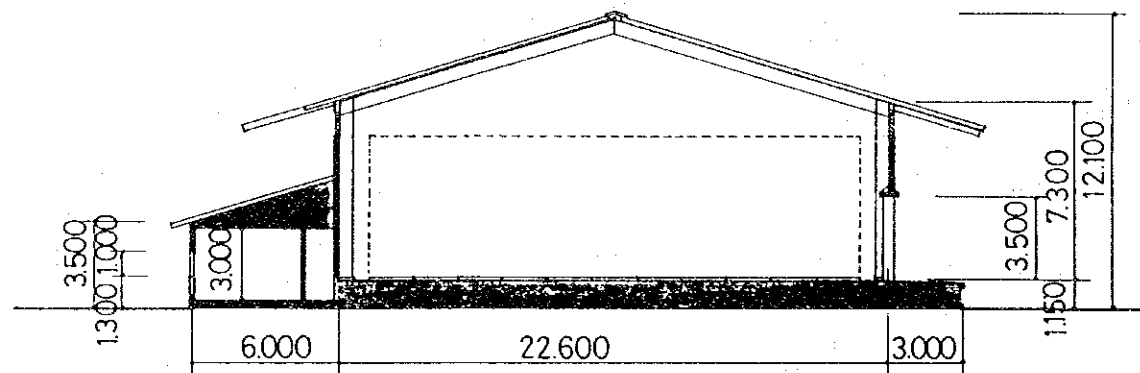
SITE PLAN scale 1 : 1000



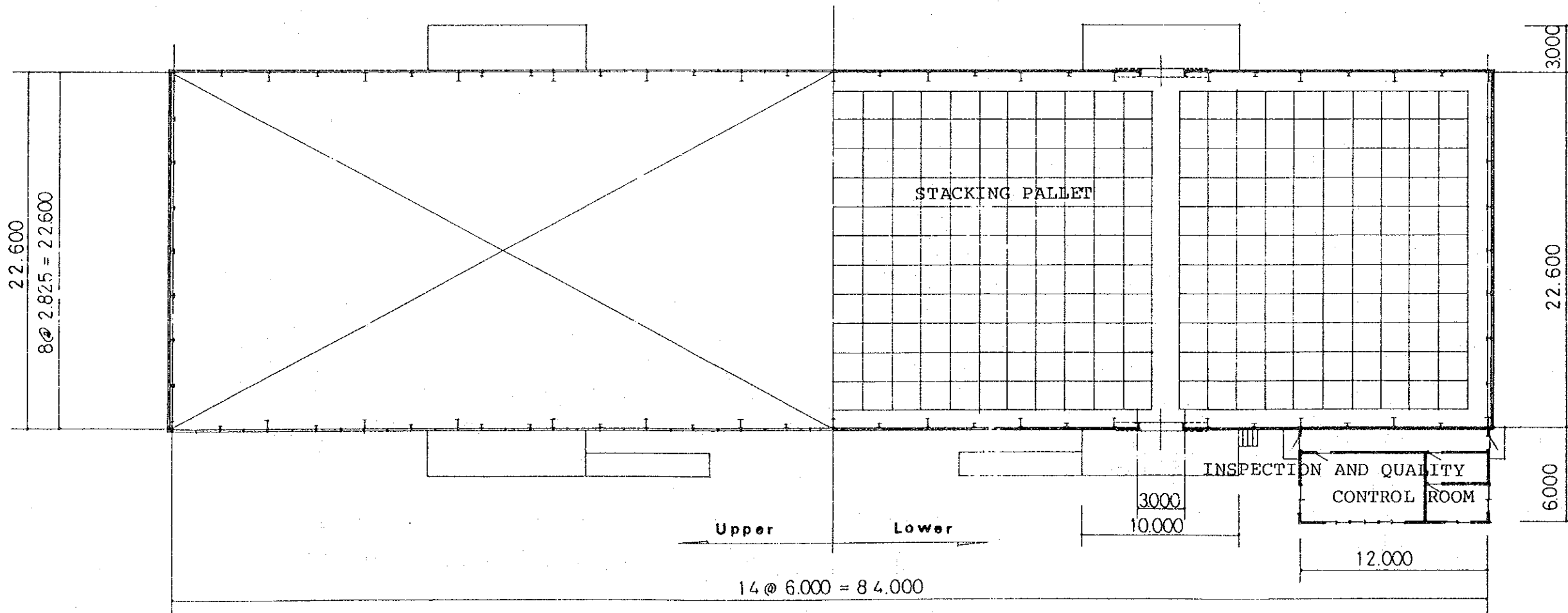
FRONT ELEVATION



SIDE ELEVATION



SECTION



FLOOR PLAN

scale 1 300

**VWAWA (MBOZI)
STORAGE**

6-3) Building Structure

- (1) One building construction of one story high with angle roof without partitions for each site

The building shall not be of the closed type so as to allow natural ventilation. Thus, fumigation will not be carried out by building units, but sheets will be placed on each stack. Therefore, there will be no necessity to make the buildings smaller or to place partitions in the building. The partitions are convenient for the management of the existing storagehouses, but as there is no custom for such management there is generally no need for this.

- (2) Steel frame building, prefab type, wall panel materials

For the reasons mentioned in "2. Basic Design Policy", this shall be of the prefab method. The structure will be of ferro-concrete and it will be ideal to use heat insulation materials for the walls, but considering that what is to be constructed in the present project is not a storagehouse for strategic grain reserve and judging that the specifications heretofore in use are not required as far as the present situation is concerned, ordinary angled corrugated sheets will be used.

- (3) Raised floor type, platforms on both sides

As mentioned in "5. Transportation Measures and Loading and Unloading Methods Necessary for the Plan", the floor of the storagehouse will be of the raised type and a platform for cargo trucks built on both sides. One side shall be designed assuming that eventually a railway siding will be drawn in. The raised floor type is also an effective structure to prevent inundation in the rainy season and a temperature rise in the storagehouse.

7. Functions of Buildings

7-1) Distributive Functions of Storagehouses

- (1) Grains can be stored safely. Losses during storage, both

qualitative and quantitative, can be properly carried out as well as storage control and inventory control.

- (2) The sacks of grain can be received and handled efficiently within the storagehouse. Quality testing as well as drying, selection, and fumigation can be carried out as necessary.
- (3) The grains can be shipped out properly according to the shipment orders.
- (4) Speedy and safe loading and unloading work can be carried out. Loading and unloading from the trucks and railway wagons, as well as stacking, can be carried out efficiently using manual labor and conveyors.

7-2) Architectural Functions of Storagehouses

- (1) The roof shall be of the V type bent sheet which has a high durability and lasts many years, with maximum consideration given to leaking of rain.
- (2) A skylight will be constructed as necessary at the uppermost part of the walls so that work within the storagehouse can be carried out sufficiently with natural light.
- (3) Alongside the skylight a ventilation window will be built at the uppermost part of the walls for ventilation inside the storagehouse.
- (4) Steel bars and wire meshes will be placed on the ventilation window to prevent birds and insects from entering and also to prevent pilfering.
- (5) The ventilation effect will be higher if there was a "base window" at the bottom part of the walls, but as this would make it difficult to prevent pilferage, as well as to control, and to prevent moisture damage, incomplete operation of this, this will not be used in this project.
- (6) The side of the entrance doors will be such that the loading and unloading equipment, such as belt conveyors can pass through without trouble and will be of a construction that

will not allow ants and other insects from entering. A rat-guard will be installed to prevent rats from entering.

- (7) As there will be no "base window" there is the chance that the door will be left open for ventilation and so a screen door will be installed on the inside of the door.
- (8) The height of the ceiling shall be such that there will still be sufficient space at the top (necessary for ventilation) even when the sacks of grain are stacked in 25 layers.
- (9) So as to maintain the quality of the grain, a quality test control room (also used as an office) will be an indispensable function of the storagehouse and so such a room shall be set up. The size of this room shall be about 6 m x 12 m = 72 m².
- (10) As high moisture content grain and blight insects will become the cause of quality deterioration, a drying platform will be constructed for drying and fumigation purposes. However, this platform will be of simple construction and will have no roof.
- (11) The necessary number of fire extinguishers will be placed on the walls of the building.

8. Details of Storagehouse Facilities

In order to fulfill the above mentioned functions of the storagehouse, the following facilities and equipment will be necessary:

- The building and the loading platform
- Access (railway siding, road)
- Testing and quality control room, office, chemicals and equipment room
- Workers' resting place
- Drying and fumigation platform
- Loading and unloading equipment (conveyor, handcarts, hook)
- Wooden pallets or polystyren boards
- Weighing machines (platform scale, truck scale)
- Fire extinguishers
- Testing and quality control equipment

Those that will be arranged from the Japan side in the present project are described in "V. Project Execution Structure, 1-3) Scope of the Work." and others will be arranged and borne by the Tanzania side.

V. PROJECT EXECUTION STRUCTURE

1. Execution Plan

1-1) Procurement of Materials, Equipment and Labour Force

As the procurement of the necessary supplies and construction equipment for the projects is extremely difficult, the details of the survey concerning the construction supplies and equipment have been given in "III. Outline of Proposed Site, 4. Construction Work Situation in the Projected Site". Apart from the framework material and cement and a part of the reinforced concrete, the building will be of the prefab method and practically all of the supplies will be from Japan.

The general laborers among the workers necessary for the construction project can be procured from the Mbeya and Mobzi Districts and the Tanga District. Although there will not be too much need for skilled workers such workers can be obtained at Dar es Salaam. The labor cost is as shown in Annexed Materials, "Reference Materials".

1-2) Transportation of Materials and Equipment

For transporting the construction supplies and equipment by land there are the railways and the cargo trucks. When considering the information gathered through a survey at this time on the Railway Corporation, the transportation agents, and the local contractors it was determined that for this project cargo truck transportation should be selected.

As the construction period for this project at the site is 12 months, the railway whose schedule is unpredictable although the freight rate is now cannot be depended on. Therefore, the calculation of the construction cost will include the cargo truck transportation cost. The transportation cost data is as shown in Annexed Materials, "Reference Materials".

For the unloading part of the supplies and equipment from Japan to Tanga, Tanga Port can be used. There are ten 5-ton unloader cranes among the Tanga Port facilities, but the port is shallow and so the boat must moor offshore, and a lighter used, thus adding to the unloading costs.

Dar es Salaam is an important port of Tanzania and large ships can moor near the shore. The supplies and equipment from Japan to Mbozi must be unloaded at Dar es Salaam Port and transported 920 kilometers by land. This land cargo transportation cost will be enormous. Thus, the materials which are heavy and bulky and considered uneconomical for transportation, must be avoided in the construction design.

1-3) Scope of the Work

The scope of the work of this project that can be covered with the grant cooperation fund from Japan is as follows:

- (1) Construction of the storagehouse building (including the loading and unloading platform)
- (2) Construction of the testing and quality control room related to the above
- (3) Construction of shower rooms and toilets
- (4) Construction of the drying and fumigating platform (without roof)
- (5) As auxiliary equipment, the supply of the conveyer (with spare parts), handcarts, wooden pallets or polystyren boards, hooks, and fire extinguishers
- (6) Supply of a part of the equipment for testing and quality control
- (7) Transportation cost for the supplies and equipment
- (8) Designing and construction management

The scope to be covered as well as the conveniences provided by the Tanzanian side for the project are as follows:

- (1) Obtaining the necessary land for the construction of the facilities and the clearing and levelling of the site prior to the start of construction.
- (2) Providing an access road (including paving inside the site)
- (3) Construction of a fence around the facilities and the planting of greenery inside the site.
- (4) The supply of the necessary electricity, telephone, water and drainage facilities prior to the start of the construction of the project, as well as other necessary facilities. Especially, should be provided water supply for shower rooms and toilets.
- (5) Assistance in obtaining the necessary construction machinery for the project as well as the fuel for the vehicles.
- (6) Assurance of speedy unloading of the supplies and equipment at the ports in Tanzania as well as the speedy tax free passage through customs and inland transportation.
- (7) Tax exemption for the expatriates working on this project as well as the provision of necessary conveniences in their entering the country and staying in Tanzania.

1-4) Term of Work

The period of site work shall be 12 months. As mentioned earlier, the climatic conditions between Tanga and Mbozi differs, but in general the dry season is between June and October during which construction work can be carried out. A certain amount of difference can also be considered in the number of working days due to the above conditions, but in the construction of the storagehouse, apart from the foundation work, there will be little effect due to rain and so the construction period for both Tanga and Mbozi should be about the same. The schedule sheet is as shown in Table V-1.

2. Storagehouse Operations under This Project

The operation of the storagehouse to be constructed shall be in the same way as the existing storagehouse with the branch office of the NMC in that area in charge. The branch office shall have a depot manager for each storagehouse. (Refer to Table V-2, and Table V-3.) Under the depot manager, there shall be a person in charge of each job as shown in Table V-4. The loading and unloading work shall be carried out by temporary hired laborers as same as at present.

It should be best to have the depot manager who is in charge of the rental storagehouse in the city also be in charge of the operations of the storagehouse at Tanga. This is because there is a deep relationship in operations with the rental storagehouse and depending on the situation the rental storagehouse may have to be temporarily suspended.

In the case of Mbozi, there is already storagehouses there and Mbozi depot manager has already been appointed and so there is no need to find new staff.

At present, apart from the temporary hired hands, there are staffs of 23 persons and the staffs should also be able to operate the new storagehouse.

Table V-1. CONSTRUCTION SCHEDULE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1. Consultant Agreement	█																					
2. Bank Agreement	█																					
3. Detail Design	█		▬																			
4. Tender Document				▬	▬																	
5. Approval of Detail Design					█																	
6. Announcement & Prequalification					▬																	
7. Tendering						▬	▬															
8. Evaluation of Tender							█															
9. Contract								█														
10. Bank Agreement								█														
11. Construction																						
12. Supervisor																						

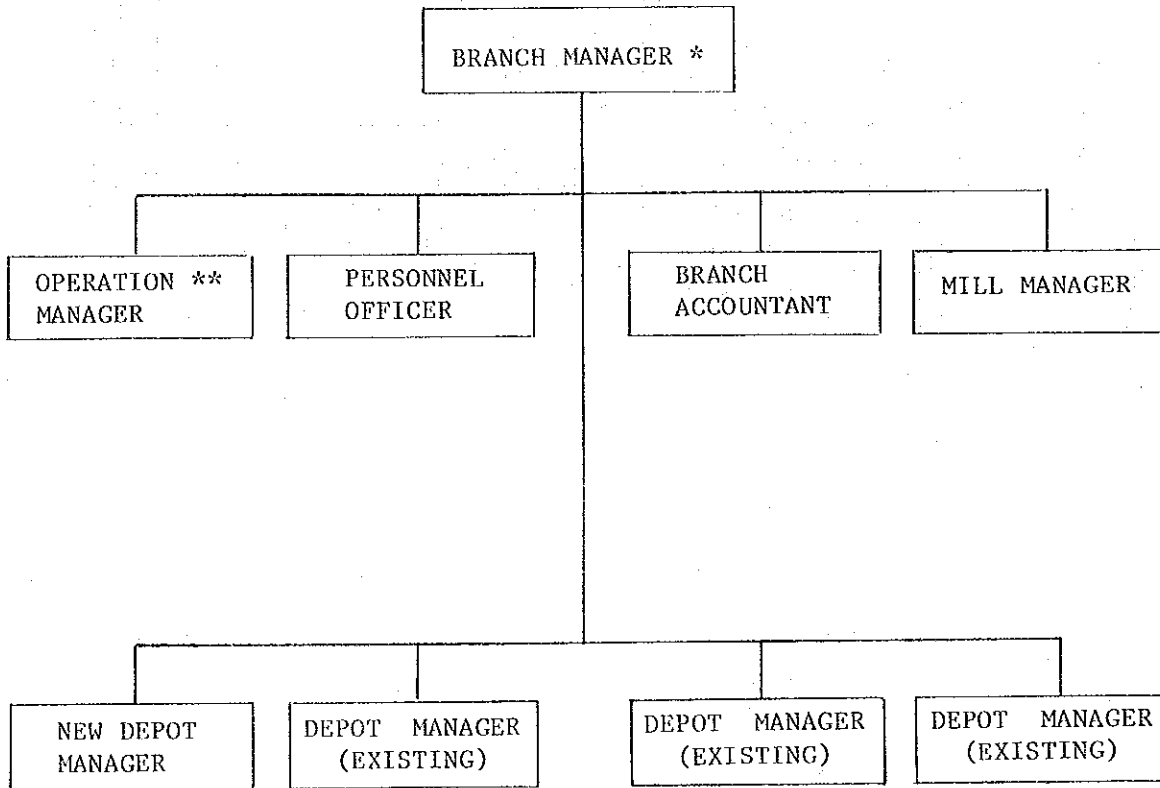
Exchange of Notes

Construction Contract

█ Works in Tanzania

▬ Work in Japan

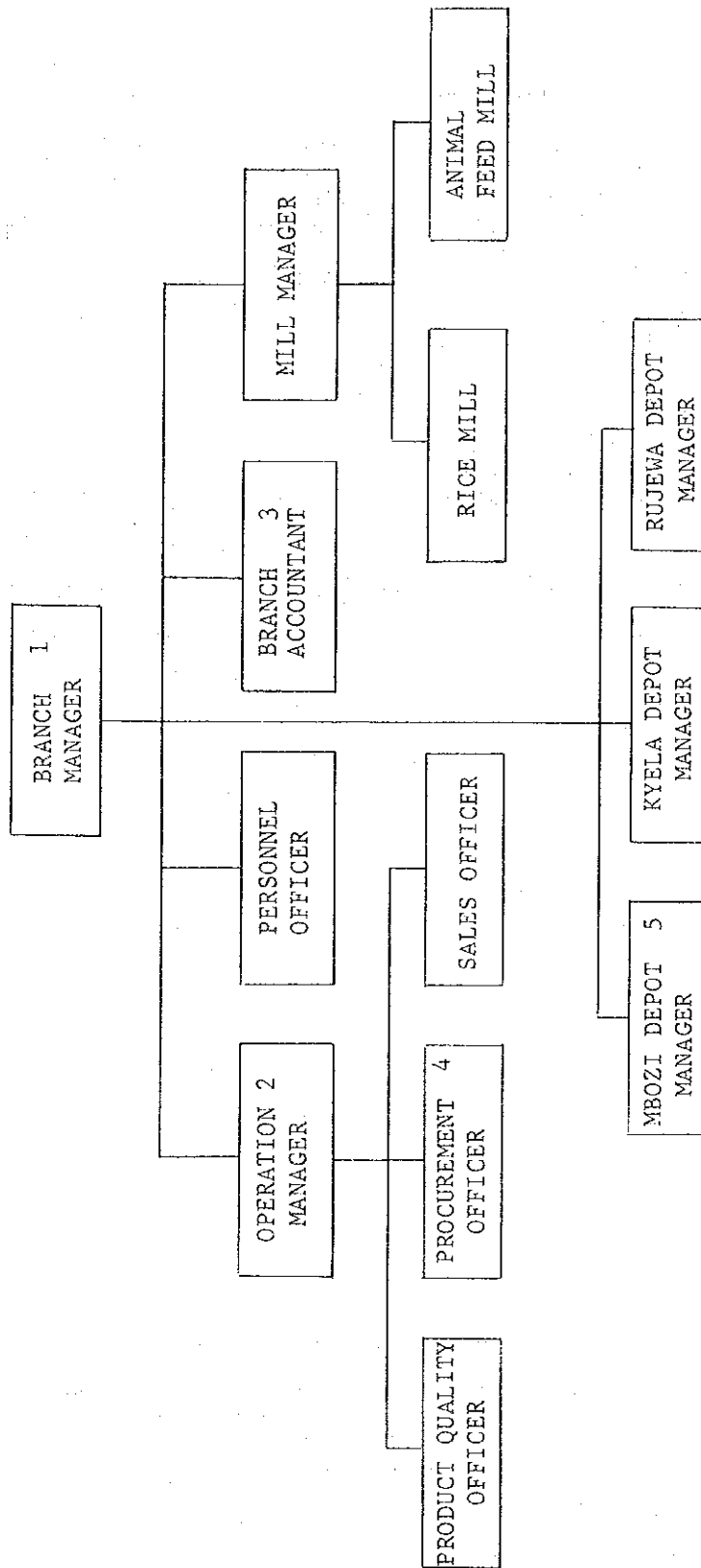
Table V-2 ORGANIZATION OF NMC TANGA BRANCH



* MR. NYAMBO

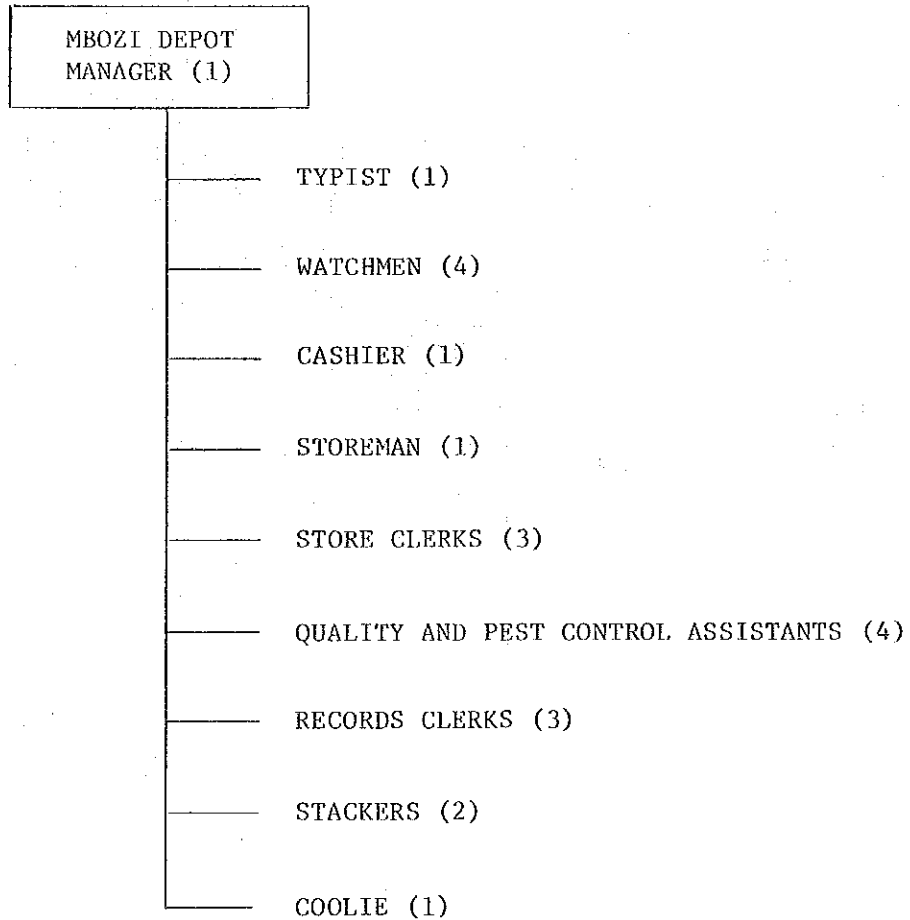
** MR. E.R.M. KIBALA

Table V-3 ORGANIZATION OF NMC MBEYA BRANCH



1. MR. B. J. SIAME
2. MR. MBAGA (ACTING)
3. MR. G. M. MARWA
4. MR. MBAGA, MR. MBOYA, MISS C. MILEMBE
5. MR. M. MDANZI MBWANA, MR. G. P. MBUKWA (ACTING)

TABLE V-4 ORGANIZATION OF MBOZI DEPOT (1982/83)



REMARK: (); Number of Workers (Total 23 persons)
Loading and unloading hold by temporary workers.

3. Maintenance and Management Scheme and Approximate Budget Estimated

More than the budget for maintenance, the question of whether the necessary supply parts can be obtained for the maintenance is an important question. The reason, why maintenance poses no problem technically and economically was stressed in the basic design, is because of this.

As no electric power will be used, the only operating costs are personnel costs, fumigating costs, fuel costs for loading and unloading machines and building repair costs.

For the building maintenance, partial repainting will be required for the inside walls and the steel frames, each seven years. As regards the floor, as the building is so constructed that the cargo trucks cannot enter the storagehouse, the plan does not include any floor repairs. The operating budget as estimated from the existing storagehouse of NMC has been put as follows:

(1) Personnel costs

Store keeper	1 person	x 1,000 TS/month	= 1,000 TS/month
Clerks	3 persons	x 900 TS/month	= 2,700 TS/month
Cashiers	2 persons	x 900 TS/month	= 1,800 TS/month
Messenger	1 person	x 850 TS/month	= 850 TS/month
Cleaner	1 person	x 850 TS/month	= 850 TS/month
Quality	3 persons	x 850 TS/month	= 2,550 TS/month
Watchmen	4 persons	x 850 TS/month	= 3,400 TS/month
Mechanic	1 person	x 850 TS/month	= 850 TS/month

TOTAL: 14,000 TS/month

14,000 TS/month x 12 months = 168,000 TS/year

200,000 TS/year in the existing 10,000-ton class storagehouse.

Tanga Storagehouse 200,000 TS/year = 4,000 yen/year

Vwawa Storagehouse 200,000 TS/year = 4,000 yen/year

(2) Fumigation costs

In the existing 10,000-ton class storagehouse, Phostoxin is sprayed 4 times a year, using 5 cartons each time, and its cost is 100,000 TS/year. Also, Novan or Sumithion is sprayed once a week, spraying about 300 lit. each time, and its cost is 29,500 TS/year. From these data, the fumigating costs can be calculated in terms of the capacity ratio of each storagehouse, Tanaga and Vwawa, as follows:

Tanga Storagehouse 103,600 TS/year = 2,070,000 yen/year
Vwawa Storagehouse 90,650 TS/year = 1,813,000 yen/year

(3) Fuel costs for loading and unloading machines

Although it is difficult to judge the rate of operation, the estimated budget is as follows:

Tanga Storagehouse 7,100 TS/year = 142,000 yen/year
Vwawa Storagehouse 7,100 TS/year = 142,000 yen/year

(4) Painting costs

Tanga Storagehouse 3,640,000 yen/7 years =
520,000 yen/year
Vwawa Storagehouse 3,220,000 yen/7 years =
460,000 yen/year

VI. BUSINESS EVALUATION

In the United Republic of Tanzania, the food grain storage facilities are socially indispensable and this construction project is one of the important measures. The Tanzanian Government makes its evaluation depending on the suitability of the target and the minimum costs required to attain the objective.

- (1) The request from the Tanzanian Government was for nine sites, but as mentioned in "IV. Contents of the Project, 1-1) Selection of Projected Sites," the two districts of Tanga and Mbozi which were judged to have the greatest effect on the improvement of the country's grain distribution were selected. Mbozi which is a producing area is located in a remote area, hence the transportation and construction costs will be higher, but as an upstream storagehouse in the producing area, it is the most suitable candidate site that permits the safe storage of grains immediately after harvesting and subsequently the shipment of grains to the consuming area when required. Tanga is a large consuming area and is also under peculiar condition regarding storagehouse circumstances from the past, hence it is judged effective to construct here a consuming area storagehouse for elevating the safety of food supply. The selection of Mbozi and Tanga as the projected sites is thus very appropriate.
- (2) As regards the basic design, based on the basic policy that the capacity is large in reference to the amount of investment, a study should be made to evaluate if the so-called excessive design portion referring to invalid investment exists and if all the functions that are recognized as necessary are satisfied. The shape of buildings, the height of roofs, the exit and entrance doors, the raised floor type and the prefab method have structures and functions adopted for respective necessary reasons. The high level functions of a grain storagehouse was expected, but as the present project covers ordinary distribution storagehouses instead of long-term storagehouses for strategic grain reserve, the functions were held down to the

specifications suited to the present situation in Tanzania. Judging from this standpoint, the contents of the basic design are appropriate.

- (3) The operation maintenance control plan is one of the most important checkpoints in this country's facilities plan. The shape and structure of buildings will pose no operational problem as NMC is already accustomed to their use. As for the organization for operation, the existing organization rather than a newly organized one will administer these facilities. Using no electric power and reducing building repairs to only the necessary parts, selection was made of simple loading and unloading machines and accessory equipment which develop few troubles, with a supply of trouble-free spare parts available.

It is evaluated that the facilities will be operated without breakdown and that there will be no problems budget-wise, technical-wise and organization-wise in the maintenance control.

VI. CONCLUSION AND PROPOSAL

In Tanzania where the food situation is increasingly worsening, the improvement of the distribution through the construction of a grain storagehouse, in other words, reducing intermediate losses during the process of distribution, and the stabilization of food supply through the improvement of a distribution system are important measures to secure food for the people.

The Tanga storagehouse, which will function as a distribution storagehouse in the consuming area, shall have buildings of 22.6 m x 108 m = 2,440.8 m² and capacity of 7,992 tons. The Vwawa storagehouse, which will function as a distribution storagehouse in the producing area, shall have buildings of 22.6 m x 84 m = 1,898.4 m² and capacity of 6,216 tons.

Although the lack of storagehouses for Tanzania as a whole will continue to remain great, it has been evaluated that the execution of the present project will have a large effect on improving the distribution of grains. As regards the construction taking into consideration the present situation of Tanzanian economy, the execution plan has been drawn up in such a way that the principal materials and equipment will be brought in from Japan and the construction works will be completed in a short time using the prefab method.

Together with the storage facilities, another important factor in improving the distribution is the transportation means. As both sites are conveniently located near the railways, drawing a siding to the storagehouse platform will greatly increase the effectiveness of loading and unloading.

It may be impossible to expect that a siding will be drawn in as soon as the storagehouse is completed, but application procedures for the early realization of such a siding as well as a proposal to the Tanzanian Government to set up a budget for such will be made.

This construction plan of the storagehouses is made out paying good attention to the effect that almost no trouble occurs as to the maintenance and management. Therefore, the Tanzanian Government is also requested to make due attention so that no problem exists in the mobilization plan of the necessary enough staffs for operations as well as in setting up of the necessary budget for the maintenance and management after the implementation of these storagehouses facilities.

The effects of this project are very great for solving the food problem of Tanzania and is sufficiently suitable for the grant cooperation fund project of Japan. The earlier carrying out of this project is proposed to the Japanese Government.

ANNEXED MATERIALS

1. Organization Chart of Survey Team Survey

Leader	Overall direction	Kojiro Seki Ministry of Agriculture, Forestry and Fisheries
Member	Plans management	Akira Kojima Tsukuba International Agriculture Research Center, Japan International Cooperation Agency
Member	Construction planning	Katsusaburo Kimura Mitsui Consultants Co., Ltd.
Member	Construction design	Takanori Honda Mitsui Consultants Co., Ltd.
Member	Calculation	Mineo Endo Mitsui Consultants Co., Ltd.
Member	Grain distribution	Isamu Yamazaki Kaigai Kamotsu Kensa Co., Ltd.

2. Survey Schedule

June 15 (Wed.) Leader and 4 mission members arrived DSM (Dar es Salaam) on SK965 via Paris (23:20).

June 16 (Thurs.) Courtesy call to the Japanese Embassy, the Ministry of Finance, and the Ministry of Agriculture and discussions held with NMC.

June 17 (Fri.) Left DSM by car and arrived in Tanga. Field investigation at Tanga.

June 18 (Sat.) Field investigation at Tanga. Visit to existing storagehouse at Tanga.

June 19 (Sun.) Left Tanga by car and arrived DSM. (Delayed due to car running out of fuel).

June 20 (Mon.) Discussions with NMC. Visit to existing storagehouse in the city of DSM. Survey on railway related situation. Mr. Kojima arrived DSM on SK965 (23:20).

June 21 (Tues.) Left DSM by car and arrived at Iringa.

June 22 (Wed.) Left Iringa by car and arrived Mbeya. Visited storagehouse at Iringa and at Makanbako.

June 23 (Thurs.) Discussions with Mbeya Branch of NMC. Field investigation at Mbozi.

June 24 (Fri.) Field investigation at Mbozi.
Visited construction site in the city of Mbeya.

June 25 (Sat.) Left Mbeya by car and arrived at Iringa (Delayed due to car trouble).

June 26 (Sun.) Left Iringa by car and arrived at DSM.

June 27 (Mon.) Discussions with JICA (prepared minutes).
Discussions with NMC (presented minutes).

June 28 (Tues.) Discussions with JICA (typed minutes).
Final discussions with NMC and signed minutes.

June 29 (Wed.) Reported to the Ministry of Agriculture.
Reported to the Ministry of Finance.
Reported to the Japanese Embassy.

June 30 (Thurs.) The leader, as well as members Kojima and Yamazaki returned to Japan on SK966 via Copenhagen (07:20).

Supplementary survey carried out on the construction situation by the Consultants organization members.

July 1 (Fri.) Supplementary survey on the construction situation and railway situation.
Visit to construction site in the city of DSM.

July 2 (Sat.) Survey of transportation situation.
Consultants organization members returned to Japan on AF488 via Paris (20:25).

3. List of Interviewees

Japanese Embassy	Ambassador Mr. Asaba Councillor Ishihara First Secretary Furuichi Second Secretary Muto
JICA Office	Resident Representative Tanikawa Staff member Takahata
Ministry of Finance	Mr. M. T. Kibwana, Commissioner Mr. E. K. Kamba Mr. N. M. Mboyi Mr. A. I. Muneni
NMC Head Office	Mr. Mwanambilimbi, Executive Chairman Mr. L.M. Mwanache, General Manager Mr. L.M. Kimati, Director of Planning Mr. M.M. Mallya, Director of Manpower & Administration Mr. C.L. Manga, Storage Officer Mr. Machenje, Senior Planning Officer Mr. J.I. Mmari, Technical Inspector.
TANGA Branch	Mr. Kibala, Operation Manager
MBEYA Branch	Mr. B.J. Siame, Branch Manager Mr. Mbagu, Procurement Officer Mr. Mboya, Procurement Officer

MINUTES OF DISCUSSION

ON

BASIC DESIGN STUDY ON FOOD GRAIN STORAGEHOUSES CONSTRUCTION PROJECT IN THE UNITED REPUBLIC OF TANZANIA

In response to the request by the Tanzanian Government for the construction of food grain storagehouses (hereinafter referred to as "The Project"). The Government of Japan has sent through Japan International Cooperation Agency (JICA), a survey team headed by Mr. Kojiro Seki, Officer, Food Agency, Ministry of Agriculture, Forestry & Fisheries, to conduct the basic design survey on the Project from 15th June to 2nd July, 1983.


The Team held a series of discussions and exchanged views with the relevant authorities of the Tanzanian Government after its on-the-spot survey at Tanga and Mbozi.

As a result of its study and discussions both parties have agreed to recommend to their respective Governments to examine the result of study attached herewith towards the realisation of the Project.


June 29, 1983.



Kojiro SEKI
Leader
Japanese Survey Team



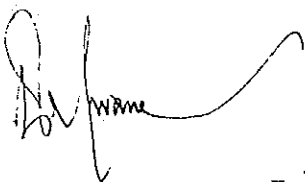
G. S. MWANACHE
General Manager
The National Milling Corporation

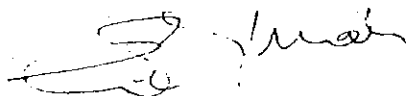


L. M. KIMATI
Director of Planning
The National Milling Corporation

ATTACHMENT

1. The objective of the Project is to provide storagehouses of food grain for The National Milling Corporation, Tanzania.
2. The Proposed sites of the Project are at Tanga District, Tanga Region and at Mbozi District, Mbeya Region.
3. The Basic concept for the storagehouse is as follows :
 - (1) One building with inspection and control rooms at each site.
 - (2) One-storied prefabricated building
 - (3) Steel-frame structure.
 - (4) Elevated floor type.
4. According to the analysis of the data collected in this study and cost estimate in Japan, the capacity which was informed by the Preliminary Survey Team could be modified.
5. The storagehouses will be designed in consideration that the railways siding will be constructed by the Tanzanian Government in the near future. However, loading and unloading are alternatively available for lorries or for the other means in design.
6. The Japanese team will convey the requests of the Tanzanian Government to the Government of Japan that the latter will provide the storagehouses and appropriate conveying equipment within the scope of Japanese economic cooperation in grant form.
7. The Tanzanian Government will take necessary measures listed in the Annex on the condition that the grant aid by the Government of Japan is extended to the Project.
8. Both sides confirmed that the Japanese Survey Team explained Japan's Grant Aid Programme and that the Tanzanian side understood it.

M. Seki 



1. To secure land necessary for the construction of the facilities and to clear, fill and level the sites as needed before the start of the construction.
2. To assist in securing the fuel and oil for the construction equipment and vehicles.
3. To provide facilities for distribution of electricity, telephone, water supply and drainage and other incidental facilities outside the building.
4. To construct and prepare the access road to the Project sites.
5. To ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in Tanzania and prompt internal transportation for the consignment purchased under the grant.
6. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Tanzania with respect to the supply of the products and the services under the varified contracts.
7. To accord without delay to Japanese nationals whose services may be required in connection with the supply of the products and services under the varified contract such facilities as may be necessary for their entry into Tanzania and their stay therein for the performance of their work.
8. To maintain and use properly and effectively the facilities constructed and equipment purchased under the grant.
9. To bear all the expenses, other than to be borne by the grant, necessary for the construction of the facilities as well as for the internal transportation of the products and services under the grant.
10. To undertake incidental civil works such as planting and fencing, if needed.
11. To provide the space necessary for such construction as temporary offices, working areas, stock yards and others.

K. S. S. C.

S. M. W. - 77 - 5

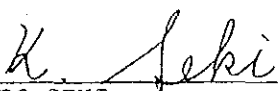
S. M. W.

MINUTES OF DISCUSSION
THE DRAFT REPORT OF THE BASIC DESIGN STUDY
ON
THE FOOD GRAIN STORAGEHOUSES CONSTRUCTION PROJECT

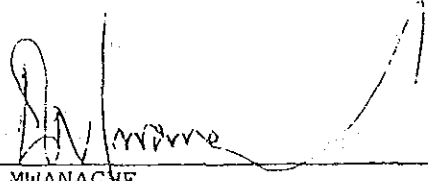
The Government of Japan has sent, through Japan International Cooperation Agency (JICA), a Basic Design Study Team to the United Republic of Tanzania from 12 September to 19 September, 1983 for the purpose of presenting and explaining the draft of final report of the Basic Design Study (The Report) on the Food Grain Storagehouses Construction Project in the United Republic of Tanzania (The Project).

The Team held meetings with the officials concerned of the National Milling Corporation (NMC) to explain and discuss on the Report. As a result of the discussions, both parties have agreed as follows :


1. The Report principally satisfied the Tanzanian side and appropriate alterations in design agreed during the discussion will be incorporated in the Final Report..
2. The Final Report (10 copies in English) on the Project will be submitted to NMC by the end of October, 1983.
3. The Team and NMC understood and confirmed the measures to be undertaken by both parties for the Project.



KOJIRO SEKI
Leader
Japanese Study Team



G. S. MWANACHE
General Manager
The National Milling Corporation



L. M. KIMATI
Director of Planning
The National Milling Corporation

Date: September 16th, 1983.

ATTACHMENT

The Tanzanian side requested that shower rooms and toilets should be installed outside the storagehouses.

The Japanese Team agreed to convey the request to the Government of Japan on condition that water supply should be provided to the sites by the Tanzanian side before the construction.

H. Seki

Sofiane
S. S. S. S. S.

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1. STORAGE OF FOODGRAIN

A Guide for Extension Workers

FAO (FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS) 1975

2. APPROPRIATE TECHNOLOGY FOR GRAIN STORAGE

Report of a Pilot Project, 19-7

COMMUNITY DEVELOPMENT TRUST FUND OF TANZANIA

3. THE AGRICULTURAL POLICY OF TANZANIA

MINISTRY OF AGRICULTURE, 1983

4. STORAGE FACILITIES AS AT APRIL 1983

NMC

5. MAP OF TANGA, 1:10,000, 1974

SURVEY & MAPPING DIVISION, MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT

6. MAP OF VWAWA, 1:50,000, 1981

McELHANNEY SURVEYING & ENGINEERING CO.

7. MAP OF VWAWA, 1:50,000, 1953

DIRECTORATE OF COLONICAL SURVEYS

8. MAP OF VWAWA, 1:250,000, 1970

SURVEYS & MAPPING DIVISION, MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT

9. MAP OF MBEYA DISTRICT, 1:500,000, 1962

SURVEY DIVISION, MINISTRY OF LANDS,
FORESTS AND WILDLIFE

10. ROAD MAP OF TANZANIA, 1:2,000,000

TANZANIA TOURIST CORPORATION

11. STANDARD DIMENSIONS, METER GAUGE, EAST AFRICAN RAILWAYS AND
HARBOURS

12. APPLICATION FORM FOR THE PROVISION OF A CUSTOMER SIDING, TANZANIA
ZAMBIA RAILWAY AUTHORITY

13. GENERAL PLANNING SCHEM

MINIMUM PLOT SIZE, PLOT RATIO, SITE AND ACCOMMODATION DENSITY

MINISTRY OF LANDS, HOUSING AND URBAN
DEVELOPMENT

14. FARMING WEATHER FOR NOVEMBER 1982 - MAY 1983

DIRECTORATE OF METEOROLOGY AND FAO