

ATTACHMENT

**MINUTES OF DISCUSSIONS
(BASIC DESIGN STUDY)**

MINUTES OF DISCUSSIONS

ON

THE BASIC DESIGN STUDY

FOR

THE NDUNGU AGRICULTURAL DEVELOPMENT PROJECT

IN

THE UNITED REPUBLIC OF TANZANIA

In response to the request of the Government of the United Republic of Tanzania, the Government of Japan has decided to conduct a Basic Design Study on the Ndungu Agricultural Development Project (hereinafter referred to as 'the Project') and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Tanzania the Basic Design Study Team (hereinafter referred to as 'the Team') headed by Mr. Nobuyoshi SAKINO, Deputy Director of Construction Department, Kinki Regional Agricultural Administration Office of Ministry of Agriculture, Forestry, and Fisheries, from December 4 to December 27, 1986.

The team had a series of discussions on the Project with the officials concerned of the Government of the United Republic of Tanzania headed by Mr. Captain H.M ENDI, Regional Development Director, Ki'imanjaro Region, and carried out field survey.

SNW

(Hos)

As the result of the study, both sides agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Moshi, December 11, 1986

森野 信義

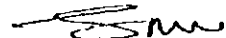
Mr. Nobuyoshi SAKINO
Leader, Basic Design Study Team
Japan International Cooperation Agency

Godwin N. Mgendi

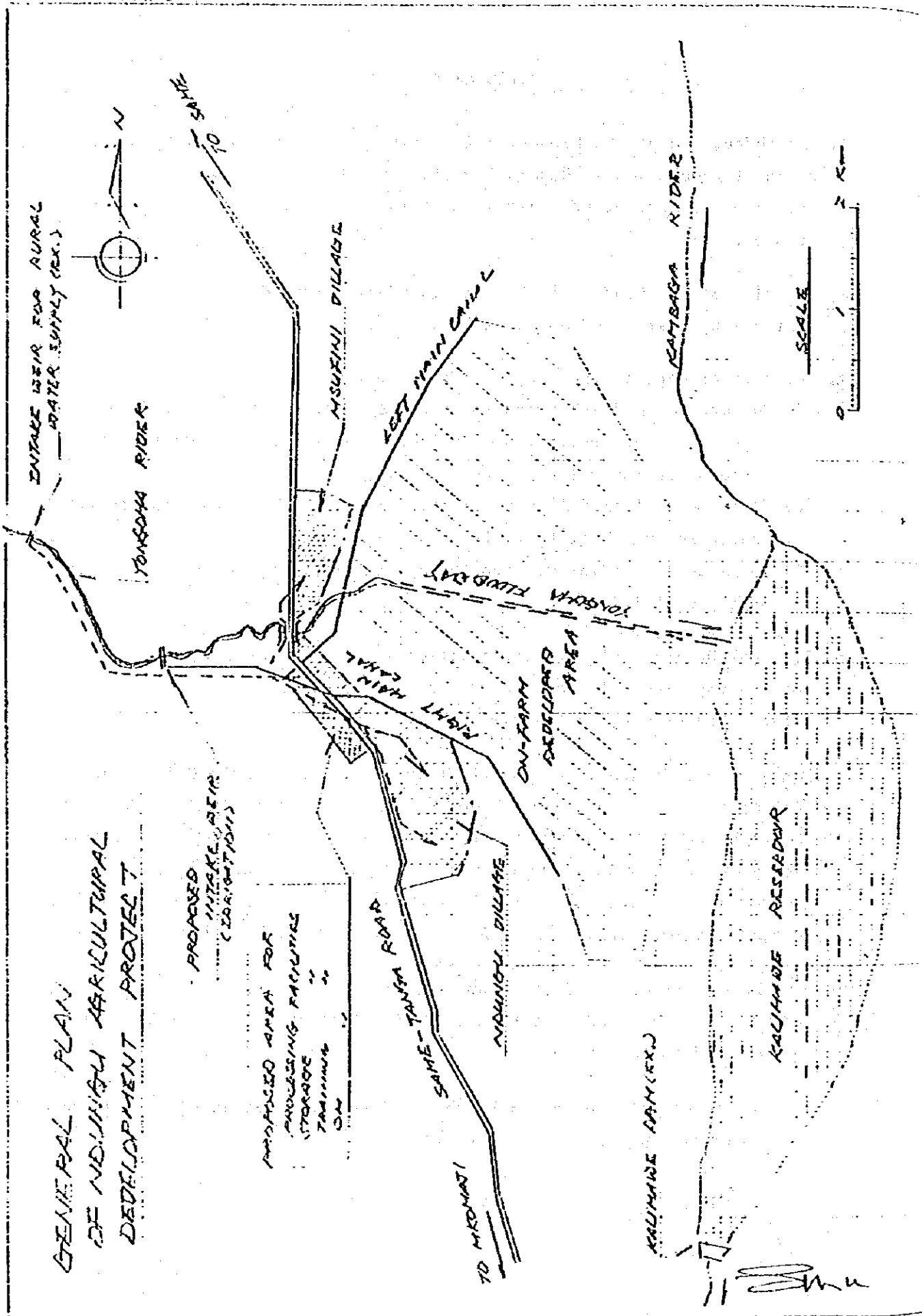
Mr. Godwin N. MGENDI
Regional Development Director
Kilimanjaro Region

ATTACHMENT

1. The objectives of the Project are to improve the foundation for agricultural production in Ndungu Division, and thus to contribute to the promotion of agricultural development in Kilimanjaro Region as a pilot project.
2. The site of the Project is located in Ndunge Division in Same District (site map is attached as ANNEX I).
3. The main concept of the Project is as follows:
 - (1) To increase and stabilize the yield and production through the improvement of irrigation & drainage system and construction of farmers' training facilities
 - (2) To increase farmers' income through the construction of the facilities concerning the post harvest
 - (3) To raise the social welfare through the improvement of rural water supply facilities
4. Regional Development Director's Office, Kilimanjaro Region is responsible for the implementation of the Project and act as coordinating body to other relevant organizations.
5. The Team will convey the request of the Government of the United Republic of Tanzania to the Government of Japan to take necessary measures to cooperate in implementing the Project and bear the cost for the Project within the scope of Japanese Economic Cooperation Program in grant form.
(List of main works requested by the Government of the United Republic of Tanzania for Japan's Grant Aid is attached as ANNEX II.)
6. The Government of the United Republic of Tanzania will take necessary measures listed in ANNEX III on condition that Japan's Grant Aid would be extended to the Project.
7. The Government of the United Republic of Tanzania has understood Japan's Grant Aid System explained by the Team.



GENERAL PLAN
OF NOUNGOU AGRICULTURAL
DEVELOPMENT PROJECT



ANNEX II

MAIN WORKS REQUESTED BY THE GOVERNMENT OF THE UNITED REPUBLIC
OF TANZANIA FOR JAPAN'S GRANT AID

- (1) Construction of technical irrigation network consisting of a diversion weir, main and secondary irrigation canals
- (2) Construction of drainage network which includes secondary drains
- (3) Construction of farm road network which includes main and secondary farm road
- (4) Improvement of river courses and construction of a flood dike
- (5) Preparation of fields suitable for paddy cultivation equipped with terminal irrigation and drainage canals and roads
- (6) Construction of buildings and facilities for O&M
- (7) Construction of processing facilities such as drying and milling facilities
- (8) Construction of storage facilities
- (9) Construction of farmers' training facilities
- (10) Improvement of rural water supply system

A handwritten signature in a circle and the initials "SM" are located at the bottom right of the page.

ANNEX III
MEASURES TO BE UNDER TAKEN BY THE GOVERNMENT OF THE UNITED
REPUBLIC OF TANZANIA

- (1) To secure the land for processing facilities, storage facilities and farmers' training facilities
- (2) To clear and reclaim the land mentioned above prior to the commencement of the construction work
- (3) To provide electricity distribution line to the site of processing facilities, storage facilities and farmers' training facilities
- (4) To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
- (5) To ensure prompt unloading, tax exemption and custom clearance at the port of disembarkation
- (6) To exempt Japanese nationals concerned from customs duties, internal taxes and other fiscal levies which may be imposed in the United Republic of Tanzania with respect to the supply of the products and services under the verified contracts
- (7) To provide and accord Japanese nationals concerned with necessary permission, licences and other authorization required for the Project
- (8) To bear all the expenses other than those to be borne by the grant aid necessary for the execution of the Project
- (9) To maintain and use properly and effectively the facilities constructed and equipment purchased under the grant aid

**MINUTES OF DISCUSSIONS
(DRAFT FINAL REPORT)**

**MINUTES OF DISCUSSIONS
ON
THE DRAFT FINAL REPORT OF THE BASIC DESIGN STUDY
ON
THE NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
IN
THE UNITED REPUBLIC OF TANZANIA**

In response to the request of the Government of the United Republic of Tanzania for grant aid for the Ndungu Agricultural Development Project (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA).

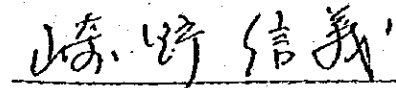
JICA sent the Basic Design study Team headed by Mr. Nobuyoshi SAKINO Deputy Director, Construction Department, Kinki Regional Agricultural Administration Office, Ministry of Agriculture Forestry and Fisheries in December, 1986.

The Basic Design Study Team had a series of discussions on the Project with the officials concerned of the Government of the United Republic of Tanzania and carried out field survey.

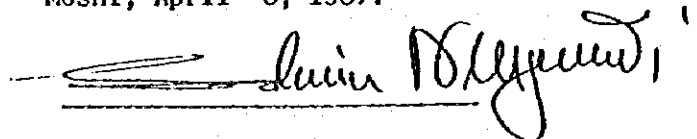
As a result of the discussions and survey, JICA prepared the Draft Final Report and dispatched a mission to explain and discuss the Draft Final Report from March 29 to April 9, 1987.

Both sides had a series of discussions and have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the project.

Moshi, April 3, 1987.



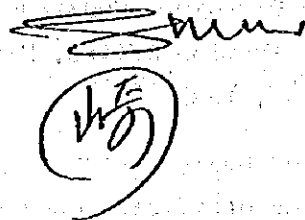
Mr. Nobuyoshi SAKINO
Team Leader
JICA Study Team



Mr. Godwin N. MGENDI
Regional Development Director
Kilimanjaro Region

A T T A C H M E N T

1. The Tanzanian side has agreed in principle to the basic design proposed in the Draft Final Report. Minor but appropriate alterations mutually agreed upon will be incorporated in the Final Report.
2. The Tanzanian side understood Japan's Grant Aid system and reconfirmed the measures to be taken by the Government of the United Republic of Tanzania for the realization of the Project as agreed upon in the Minutes of Discussions dated December 11, 1986.
3. JICA will submit the Final Reports (10 copies in English) to the Tanzanian side in May, 1987.

A handwritten signature in black ink is located above a circular stamp. The signature appears to be 'S. M. M.' or similar. The circular stamp contains the Japanese characters '山崎' (Yamazaki) written in a stylized font.

MEMBERS OF THE STUDY TEAM

<u>Position</u>	<u>Name</u>	<u>Home Post</u>
1. BASIC DESIGN STUDY TEAM		
Team Leader	Mr. Nobuyoshi Sakino	Ministry of Agriculture, Forestry and Fisheries
Agriculturist	Mr. Tadahito Morisawa	Ministry of Agriculture, Forestry and Fisheries
Coordinator	Mr. Noriaki Niwa	First Basic Design Study Division, Grant Aid Planning and Survey Department, JICA
Rural Development Expert	Mr. Takayoshi Yamazaki	Nippon Koei Co., Ltd.
Irrigation and Drainage Engineer	Mr. Koji Naito	Nippon Koei Co., Ltd.
Agronomist	Mr. Makoto Ishizuka	Nippon Koei Co., Ltd.
Rice Processing Expert/Architect	Mr. Norimitu Takashima	Nippon Koei Co., Ltd.
Water Supply Engineer	Mr. Masayuki Taguchi	Nippon Koei Co., Ltd.
2. DRAFT FINAL REPORT EXPLANATION TEAM		
Team Leader	Mr. Nobuyoshi Sakino	Ministry of Agriculture, Forestry and Fisheries
Coordinator	Mr. Noriaki Niwa	First Basic Design Study Division, Great Aid Planning and Survey Department, JICA
Rural Development Expert	Mr. Takayoshi Yamazaki	Nippon Koei Co., Ltd.
Irrigation and Drainage Engineer	Mr. Koji Naito	Nippon Koei Co., Ltd.

ITINERARY OF THE STUDY TEAM

1. Basic Design Study Team

Group I:	Mr. Nobuyoshi SAKINO	(Team Leader)	Dec. 1~16
	Mr. Tadahito MORISAWA	(Agriculturist)	Dec. 1~16
	Mr. Noriaki NIWA	(Coordinator)	Dec. 1~16
	Mr. Takayoshi YAMAZAKI	(Rural Development Expert)	Dec. 1~30
	Mr. Makoto ISHIZUKA	(Agronomist)	Dec. 1~30
Group II:	Mr. Koji NAITO	(Irrigation & Drainage Engineer)	Dec. 1~30
	Mr. Norimitsu TAKASHIMA	(Rice Processing Expert/Architect)	Dec. 1~30
	Mr. Masayuki TAGUCHI	(Water Supply Engineer)	Dec. 15~30

Date	Group I		Group II	
	Schedule	Action	Schedule	Action
Dec. 1 Mon.	Lv. Tokyo (KL868, 21:30)	Travel	- Do -	- Do -
2 Tue.	Ar. Amsterdam (06:05)	Travel	- Do -	- Do -
3 Wed.	Lv. Amsterdam (KL563, 22:30)	Travel	- Do -	- Do -
4 Thr.	Ar. Daressalaam (11:05)	Courtesy call to Japanese Embassy & JICA Office and internal meeting	- Do -	- Do -
5 Fri.	Lv. Daressalaam (10:00) Ar. Kilimanjaro (10:50)	Courtesy call to RDD's Office and first discussion	- Do -	- Do -
6 Sat.	Moshi to Same	Courtesy call to Same District Gov. & DED's Office and discussion	- Do -	- Do -
7 Sun.	Same	Field Survey	- Do -	- Do -
8 Mon.	Same to Moshi	Meeting with DED and travel	- Do -	- Do -
9 Tue.	Moshi	Meeting with RDD	- Do -	- Do -
10 Wed.	Moshi	Meeting with RDD	- Do -	- Do -
11 Thr.	Mosi to Daressalaam	Meeting and signing of the Minutes of Discussions	Moshi to Same	Travel and Field Survey
12 Fri.	Daressalaam	Visiting Japanese Embassy & JICA Office to report the result of field survey	Same	Field Survey, Data Collection and Data arrangement
13 Sat.	Daressalaam	Visiting the authorities concerned of the Gov. of TANZANIA to report the result of Field Survey Messrs Sakino, Morisawa and Niwa Lv. Daressalaam for Japan (AF488, 20:38), Yamazaki and Ishizuka making Data Collection in Daressalaam	"	"
14 Sun.	Daressalaam → Same	Travel	"	"
15 Mon.	Same	Data Collection	"	"
16 Tue.	"	Field Survey	"	"
17 Wed.	"	Data Collection	"	"
18 Thr.	Same to Moshi	Travel and Data Collection	"	"
19 Fri.	Moshi	Inspection of Lower Mosi Project	"	"
20 Sat.	"	Data arrangement and analysing	"	"
21 Sun.	"	"	"	"
22 Mon.	"	Examination of Field Survey	Same to Moshi	Travel
23 Tue.	"	"	- Do -	- Do -
24 Wed.	"	"	- Do -	- Do -
25 Thr.	"	Report to RDD's Office	- Do -	- Do -
26 Fri.	Lv. Kilimanjaro for Daressalaam	Travel	- Do -	- Do -
27 Sat.	Lv. Daressalaam (AF488, 20:40)	"	- Do -	- Do -
28 Sun.	Ar. Paris (07:30)	"	- Do -	- Do -
29 Mon.	Lv. Paris (AF272, 14:40)	"	- Do -	- Do -
30 Tue.	Ar. Tokyo (12:35)	"	- Do -	- Do -

2. Draft Final Report Explanation Team

Date		Schedule	Action
Mar. 29	Sun.	Lv. Tokyo (SR-187, 20:20)	Travel
30	Mon.	Lv. Zurich (SR-292, 17:20)	Travel
31	Tue.	Ar. Daressalaam	Courtesy call to Japanese Embacy, JICA and the authorities concerned of the Gov. of TANZANIA
Apr. 1	Wed.	Daressalaam to Kilimanjaro	Discussion with RDD
2	Thr.	Moshi to Same	Discussion with DED
3	Fri.	Moshi	Discussion with RDD and signing of the Minutes of Discussions
4	Sat.	Moshi	Supplemental survey
5	Sun.	Kilimanjaro to Daressalaam	Travel
6	Mon	Daressalaam	Report to Japanese Embacy, JICA and the authorities concerned of the Gov. of TANZANIA Messrs Sakino, Yamazaki & Naito Lv. Daressalaam for Japan (LH-589, 20:20), Mr. Niwa staying in Tanzania to coodinate another JICA Mission
7	Tue.	Ar. Copenhagen (10:25)	Travel
8	Wed.	Lv. Copenhagen (SK-989, 15:40)	Travel
9	Thr.	Ar. Tokyo (15:40)	Travel

LIST OF PERSONNEL CONTACTED

1. Regional Commissioner's Office, Kilimanjaro

Mr. Kimiti : Regional Commissioner

2. Regional Development Director's Office, Kilimanjaro

Mr. G.N. Mgendi : Regional Development Director (RDD)

Mr. J.J. Mpiza : Regional Planning Officer

Mrs. Benne : Regional Planning Officer

Mr. G.K.B. Fuime : Regional Planning Officer

Mr. A.P. Mkwawa : Regional Administration Officer

Mr. F.A. Matowo : Regional Irrigation Officer

Mr. J. Lutashobya : Regional Irrigation Officer

Mr. C.P.A. Nyangala : Project Manager, Lower Moshi Agricultural Development Project

Mr. E.E. Kasyanju : Resident Engineer, Lower Moshi Agricultural Development Project

Mr. G.R. Moshi : Project Manager, KADC

Mr. J.M. Lutashobya : Agriculture Field Officer, KADC

Mr. A. Neautaku : Officer, Regional Agriculture Development Office (RADO)

Mr. R. Malata Shio : Irrigation Engineer, RDD

Mr. E. Mungure : Irrigation Engineer, RADO

Mr. M. Kessi : Civil Engineer, RADO

3. District Commissioner's Office, Same

Mr. Y.B. Lukoya : District Commissioner

Mr. M.P. Massaro : District Labour Officer

4. District Executive Director's Office, Same

Mr. E.R.S. Chambo : District Executive Director (DED)

Mr. A.H. Khonkoli : District Planning Officer

Mr. J.A. Simbeye : District Planning Officer

Mr. R.K. Kivia : District Agriculture Development Officer (DADO)

Mr. P.J. Kilewo : District Irrigation Officer

Mr. J. Sige : District Water Engineering Technician

Mr. E.M. Malleko : District Agriculture Field Officer

5. Ndungu Division, Ward and Village

Mr. M.Y. Kihara : Divisional Secretary, Ndungu

Mr. D. Mvungi : Ward Executive Officer, Ndungu

Mr. W. K. Saidi : Ward Secretary, Ndungu

Mr. F.M. Ngoda : Ward Counselor, Ndungu

Mr. H. Suleman : Village Chairman, Ndungu

Mr. E. Chombo : Ward Extension Officer, Ndungu

6. Cooperative Union

Mr. W.W. Mkwizu : General Manager, Vuasu Cooperative Union

Mr. C.M. Kadio : Procurement and Transport Manager, Vuasu Cooperative Union

Mr. S.K. Chuwa : Commercial Manager, Kilimanjaro Native Cooperative Union (KNCU)

- 7. Tanzania Railways Corporation**
Mr. N. Macha : Station Master, Same Station
- 8. Tanzania Electric Supply Corporation**
Mr. C.M. Derwa : Manager, Same Station
- 9. Office of the Prime Minister and First Vice President**
Mr. B.G. Moses : Dupty Principal Secretary
- 10. Ministry of Finance, Economic Affairs and Planning**
Mr. M.T. Kibwana : Commissioner for External Finance
Mr. P.J. Mbena : Finance Management Officer
Mr. K. A. Choma : Finance Management Officer
- 11. Ministry of Agriculture and Livestock Development**
Mr. Mhagama : Commissioner for Planning and Marketing
Mr. B. H. Katani : Head of Agricultural Plans and Programs
- 12. Zonal Irrigation Office, Kilimanjaro**
Mr. C. K. Cihza : Senior Irrigation Officer
Mr. M. E. Kossi : Assist. Executive Engineer
- 13. The Japanese Embassy**
Mr. Yasushi Kurokouchi : Ambassador Extraordinary and Plenipotentiary
Mr. Sousuke Itou : Counselor
Mr. Syougo Takeuchi : First Secretary

14. JICA Office

- Mr. Yoshinori Sano : Resident Representative
Mr. Syunsuke Iizuka : Deputy Resident Representative
Mr. Hiroshi Murakami : Assistant Resident Representative

15. Kilimanjaro Agricultural Development Center (KADC)

- Mr. Junji Inoue : Leader
Mr. Shingi Takahashi : Irrigation and Drainage Expert
Mr. Yoshikatu Seko : Irrigation and Drainage Expert
Mr. Motonori Tomitaka : Upland Crop Expert
Mr. Toshizou Horihata : Rice Expert
Mr. Kohichi Sato : Agricultural Machinery Expert
Mr. Ryouji Tanakura : Agricultural Machinery Expert
Mr. Akira Sato : Coordinator
Mr. Kazuo Torii : Coordinator

COUNTRY DATA

I. Basic Index

1. Land and Population

- (1) Name of country : United Republic of Tanzania
- (2) Capital of country : Dar es Salaam
- (3) Independence of country : February 9, 1961 (Main land)
December 10, 1963 (Zanzibar)
- (4) Territory : 945,100 km²
- (5) Population : 21,200,000 (in 1985, estimated)
- (6) Density of population : 22,4 person/km²
- (7) Growth rate of population : 3.4%
- (8) Average span of human life : 52 years (1983)

2. Politics

- (1) Form of government : Republican system
- (2) Sovereign : President Ali Hassan Mwinyi
- (3) Parliament : Single chamber system
- (4) Main political party : Chama Cha Mapinduzi
(Revolutionary party)

3. Religion

Islamism (31%), Christianity (25%), Primitive Religion (44%)

4. Language

Swahili, English

5. Education

- (1) Literacy rate of adults : 79% (in 1980)
- (2) Enrollment ratio of primary school : 72% (in 1985)

6. Climate and Topography

Tanzania is located between latitude 1°S and 11°45'S, and between longitude 29°20"E and 40°38"E. Most part of the national land is in vast undulating plain upheaving westward, and has various zones characterized by its geographical features, i.e. swampy area with Mangroves along the coast, tropical rain forest, hilly savanna and dry highland.

Because of its location in tropical zone, the seasonal variation of the climate other than the precipitation is comparatively small. Variation and distribution of the precipitation have much influence on agricultural production, thus the most part of the country suffers from alternations of flood and drought due to its insufficient and uncertain distribution. In general, the climate is broadly divided into two seasons, i.e. the dry season (June to October) and the wet season (November to May). An annual mean temperature is varied according to the altitude about 26°C in the coastal plains and less than 20°C in the high lands of more than 1,200 m.

II. Socio-economic Index

1. Gross Domestic Product (GDP)

	1983	1984	1985
Current market prices (Tsh. × 10 ⁶)	65,976	75,658	91,576
(US\$ × 10 ⁶)	5,296	4,179	5,053
Real growth rate (%)	-0.6	3.2	2.3
Per capita GDP (US\$)	267	204	238
Exchange rate (Tsh. per US\$)	12.46	18.11	18.12
Population (× 10 ⁶)	19.8	20.5	21.2

(Source : IMF data and Country Report, The Economist Intelligence Unit, UK)

2. Origins and Components of GDP

Origins of GDP 1984

	(% of total)
Agriculture	: 46.1
Manufacturing	: 4.7
Construction	: 2.4
Commerce	: 9.8
Transport	: 6.6
Finance	: 8.5
Public administration	: 19.3

Components of GDP 1984

	(% of total)
Private consumption	: 82.4
Government consumption	: 12.2
Gross fixed investment	: 11.8
Change in stocks	: 2.7
Exports	: 8.3
Imports	: -17.5

(Source: Country Report, The Economist Intelligence Unit, UK)

3. Principal Exports and Imports

Principal Exports 1984

	(US\$ × 10 ⁶)
Coffee	: 144.9
Cotton	: 46.6
Cloves	: 42.6 ^a
Cashewnuts	: 26.6 ^a
Tea	: 21.6 ^b

Principal Imports 1982

	(US\$ × 10 ⁶)
Machinery	: 306.4
Fuel	: 271.8
Food	: 120.5
Metals	: 98.5
Transport equipment	: 83.5

a 1982, b 1983

(Source: Country Report, The Economist Intelligence Unit, UK)

4. Main Destinations and Origins of Trade

Main Destinations of Exports 1983

	(% of total)
West Germany	: 17.0
UK	: 13.9
Netherlands	: 7.9
Switzerland	: 6.3
Italy	: 5.5

Main Origins of Imports 1983

	(% of total)
Unite Arab Emirates	: 14.8
UK	: 13.4
West Germany	: 12.2
Japan	: 10.8
India	: 5.2

(Source: Country Report, The Economist Intelligence Unit, UK)

5. National Consumer Price Index

	(%)				
	1981	1982	1983	1984	1985
Annual Charge	25.6	28.9	27.1	36.0	27.0

(Source: IMF data)

6. Balance of Payments

	(US\$×10 ⁶)				
	1981	1982	1983	1984	1985
Trade Balance	-599	-682	-440	-471	-646
Exports (FOB)	(563)	(413)	(379)	(369)	(326)
Imports (CIF)	(-1,162)	(-1,095)	(-819)	(-840)	(-972)
Services (net)	51	13	-15	-43	-30
Private Transfers (net)	22	25	19	63	130
Current Account	-526	-644	-436	-451	-546
Government Transfers	107	94	84	96	104
Capital Account	399	390	313	85	49
Other Capital Movements and Errors and Omissions	18	67	39	111	114
Overall Balance	-2	-93	-	-159	-279

(Source : IMF data)

7. Gross Official Foreign Reserves

	(US\$×10 ⁶)				
	1981	1982	1983	1984	1985
Gross Official Foreign Reserves	52.8	39.1	62.5	38.3	38.8

(Source: IMF data)

8. External Debt

- (1) External debt : US\$1,480 million (1981)
Accumulated external debt as of May 1984 is estimated at US\$2,500 to 3,000 million.
- (2) Debt service ratio : 7.2% (1981)
(Source : IBRD data)

9. Trade with Japan

(1) Principal exports and imports (1983)

Principal Exports		Principal Imports	
	(US\$×10 ³)		(US\$×10 ³)
Coffee	: 13,325	Rice ^a	: 12,558
Cords and nets	: 1,881	Steel coil	: 12,383
Cloves	: 690	Automobiles	: 7,615
Shrimps	: 616	Steel plates	: 4,501
Sisal	: 600	Transport equipment	: 4,360

a Deferred payment based on official assistance

(Source: Statistics of Japanese Custom)

(2) Trade balance (1983)

	(US\$×10 ³)
Import from Japan	-75,160
Export to Japan	18,410
Balance	-56,750

(Source: Statistics of Japanese Custom)

10. Central Government Budget

(Tsh. X 10⁶)

	1981/82	1982/83	1983/84	1984/85	1985/86
Total revenue	10,101	11,819	13,995	18,855	20,160
Tax revenue	9,078	11,252	13,407	18,231	19,300
Nontax revenue	1,023	567	588	624	860
Total expenditure and net lending	19,182	18,442	20,894	25,699	27,403
Recurrent expenditure	13,980	14,062	16,174	20,376	21,782
Development expenditure	5,196	4,359	4,733	5,308	5,606
Next lending	6	21	21	15	15
Overall deficit	-9,081	-6,623	-6,891	-6,844	-7,243
Fund procurement					
Grants	1,656	1,593	1,234	1,892	1,685
Net foreign borrowing	1,204	970	230	608	-9
Net domestic borrowing	5,008	4,472	5,681	4,260	5,567
Adjustment to cash and other items	1,213	-412	154	84	-

(Source: IMF data)

III. Development Index

1. National Development Plan

(1) Past National Development Plans

- First 3-year Plan (1961 - 1963)
- First 5-year Plan (1964 - 1968)
- Second 5-year Plan (1969 - 1973)
- Third 5-year Plan (1974 - 1980)
- Fourth 5-year Plan (1981 - 1985)
- National Economic Survival Program (NESP) (1981/82)
- Structural Adjustment Program (SAP) (1982 - 1985)

Although the Government of Tanzania had enforced the First, Second and Third 5-year Plan since the middle of 1960s, the Forth 5-year Plan was suspended and introduced the National Economic Survival Program (NESP) in 1981 as an urgent countermeasure, to cope with the rapid economical decline towards the end of 1970s. The Government further took the Structural Adjustment Program (SAP) for the rehabilitation of national economy. However, the anticipated result was not realized sufficiently, because of the extreme lack of foreign exchange.

(2) Current national development plan

The Economic Recovery Program (ERP) was launched in 1986 for the period 1986-1990. In the ERP, the target annual growth rate of GDP was set at 4.5% on an average to be attained by the following manner:

- Achievement of food self-sufficiency through increase of agricultural production,
- Gaining of foreign exchange by the means of export promotion,
- Rehabilitation of major social infrastructure,
- Amelioration of the rate of operation in existing factories, and
- Improvement of the condition of revenue and expenditure of the national finance.

Increase of agricultural production both for food crops and export crops was given first priority in the program. In order to attain the target, the development fund of US\$143 million was projected to be invested mainly in; i) strengthening of extension services and research works, ii) stabilize of farm inputs supply, iii) acceleration of irrigation development, iv) promotion of estate development and v) rehabilitation of foundation for productio of export crops.

2. National Budget

The national budget in 1986/87 are as shown below:

				(Tsh × 10 ⁶)	
Expenditure	Total	55,596	Revenue	Recurrent	33,620
	Recurrent	39,736		Grants & loans	17,333
	(increase by 82% of 1985/86)			from foreign donors	
	Development	15,860		Non-bank borrowing	2,143
	(increase by 183% of 1985/86)			Bank borrowing	2,500

(Source: Daily News, 20 June, 1986)

This budget was built as a first year's national budget for the period of ERP, and was set to increase by about 100% over that of Tsh. 27,403 million in 1985/86. The extreme increase of budget reflected the devaluation in April 1986 recommended by IMF. The amount of Tsh. 17,333 million, which is larger than the estimated development expenditure, was asked for the grants and loans for foreign donors.

Such countries as Sweden, West Germany, Holland, Norway and Japan were the donor countries, and international organizations, e.g. IDA also played an important role on it.

Agriculture took the largest share of the development budget with 28.2%, followed by economic services (24.1%) and social services (19.3%), while industry was accorded a low priority at 8%.

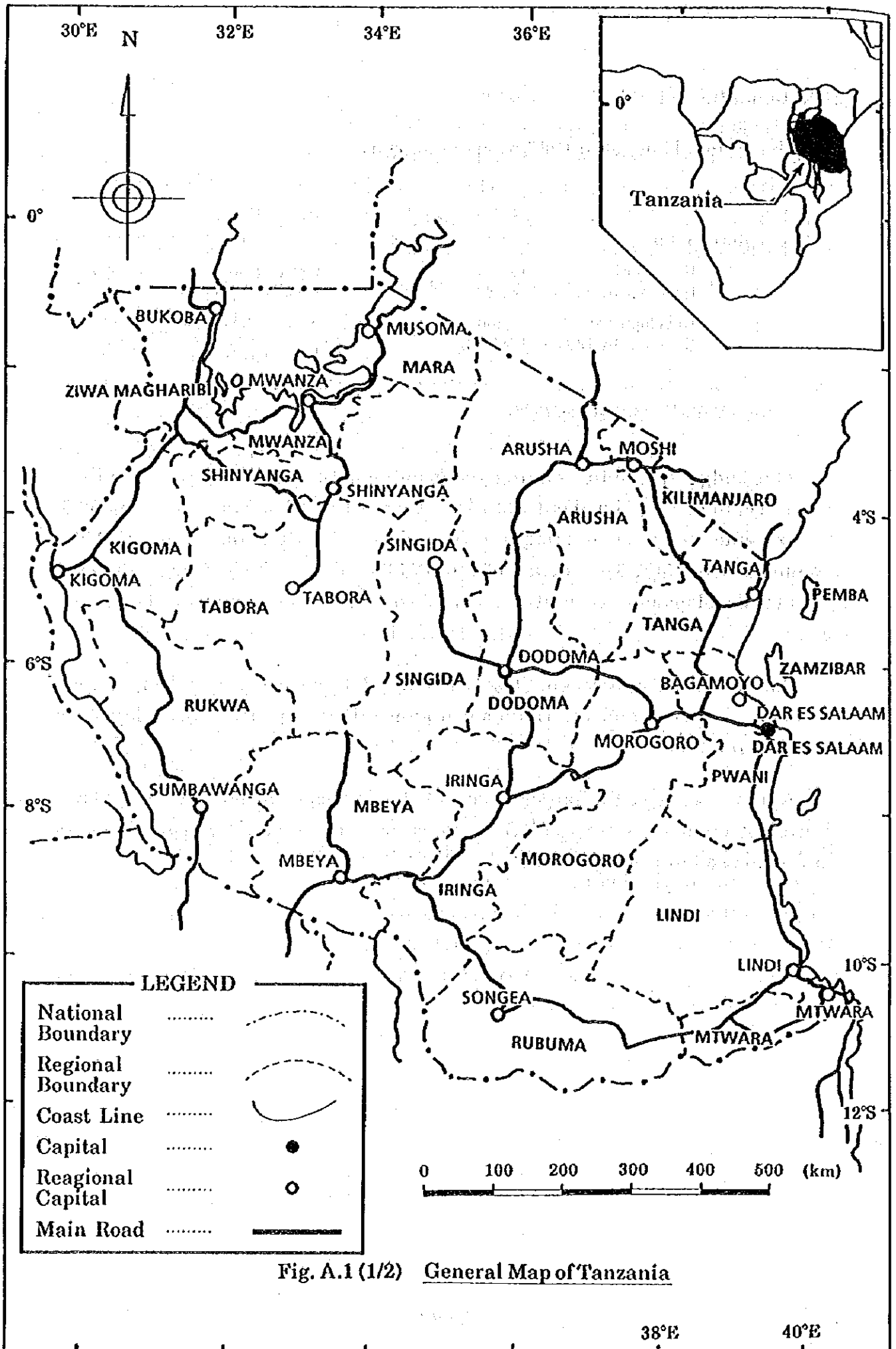
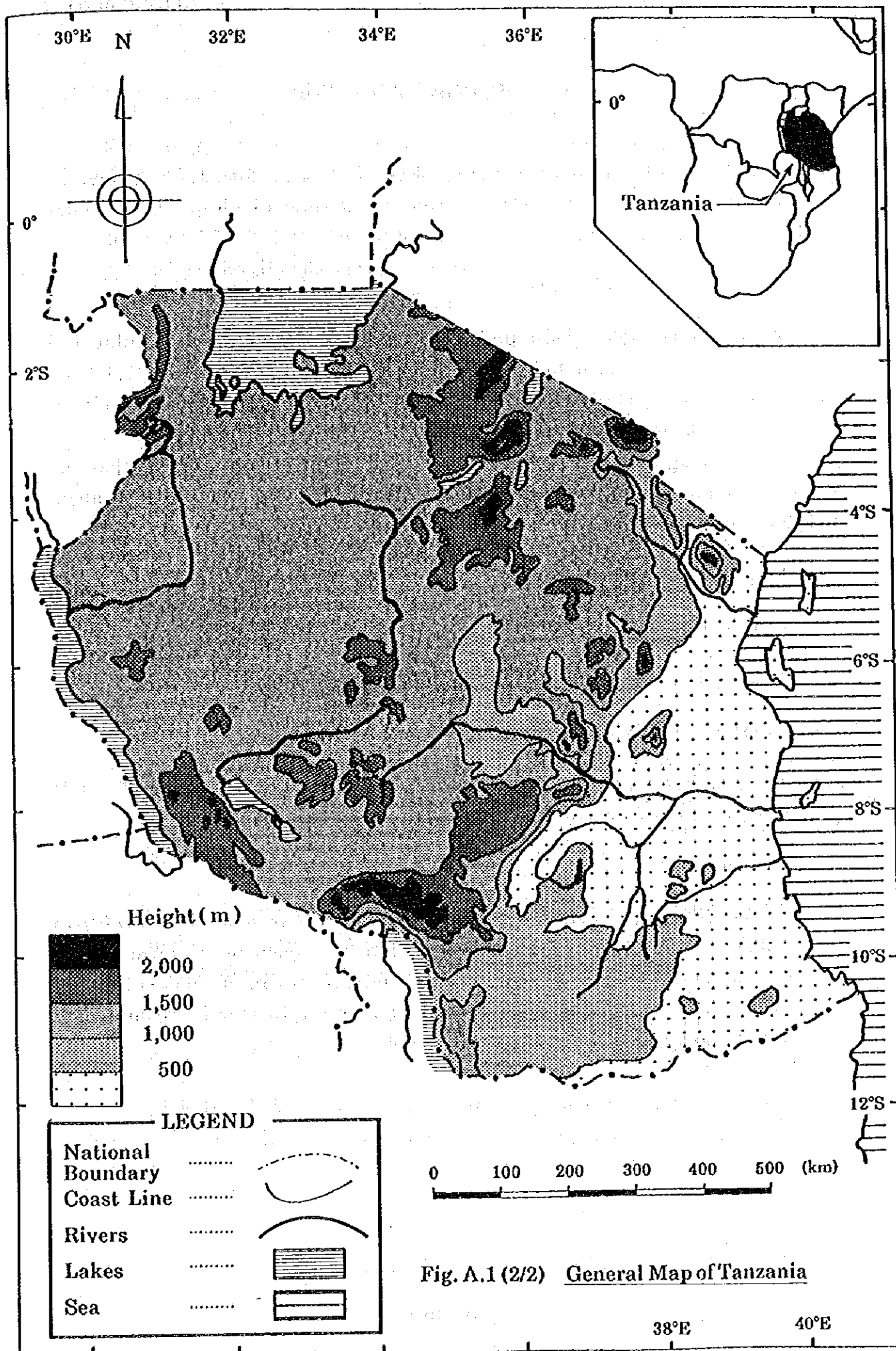


Fig. A.1 (1/2) General Map of Tanzania



FARM BUDGET ANALYSIS

In order to know the degree of the project effect on the farmers' economy, the farm budget analysis is made on the average farmers under both with and without project conditions.

1. Average Farm Holding Size

Average farm holding size under without project condition is calculated at about 0.77 ha/farm household based on the estimated total farm area (1,010 ha) and farm households (1,310) in the project area. Under with the project condition, the number of farm households in the land consolidation area of 680 ha is to be at 1,250 considering the right-of-way of the project facilities such as irrigation and drainage canals and farm roads, and so the average holding size is to be at about 0.54 ha/farm household.

2. Farm Budget Without Project

(1) Crop budget

The crop budget under without project condition is shown in Table A.1.

(2) Crop budget of average farmer

The crop budget of the average farmer is prepared based on the aforesaid table and is as shown in Table A.2.

(3) Farm budget

In addition to the estimated annual gross farm income (Tsh. 9,740) in Table A.2, the average farmer will get Tsh. 3,860/year of off-farm income such as a remittance to be sent by other family members outside the Ndungu area. Accordingly, the gross income of average farmer is estimated at Tsh. 13,600/year in the future without project.

(4) Gross outgo

The gross outgo of the average farmer is estimated at Tsh. 13,600/year (Tsh. 2,450 of the production cost and Tsh. 11,150 of the living expenses). The living expenses are composed of the value of home consumption of farm products (Tsh. 8,090/year), other food expense (Tsh. 800/year) and living expenses other than food (Tsh. 2,260/year).

3. Farm Budget With Project

(1) Crop budget

The crop budget with the project is as shown in Table A.3.

(2) Crop budget of average farmer

The crop budget of the average farmer is as shown in Table A.4 based on Table A.3.

(3) Farm budget

The farm budget with the project is estimated based on the following assumptions:

- The off-farm income is not counted in the gross income, because it is considered that the proportion of off-farm income in the gross income will be decreased due to the introduction of double cropping system under with the project condition,
- The living expenses with the exception of the home consumption of farm products is estimated to be required at 2 times of that under without project condition, and
- The home consumption of farm products is estimated to be 80 kg of rice, 50 kg of maize and 30 kg of beans.

Based on the above assumptions, future farm budget under with and without the project condition has been prepared as shown in the following table.

Farm Budgets With and Without Project

	With Project	Without Project
A) Gross Income	<u>42,740</u>	<u>13,600</u>
(1) Gross farm income	42,740	9,740
(2) Off-farm income	0	3,860
B) Gross Outgo	<u>26,700</u>	<u>13,600</u>
(3) Production cost	10,650	2,450
(4) Living expenses		
- Home consumption of crops	9,930	8,090
- Other foods	1,600	800
- Living expenses other than food	4,520	2,260
C) Net Reserve	<u>16,040</u>	<u>0</u>
D) Net Farm Income (1 - 3)	32,090	7,290

As a result characteristics of the farm budgets in the future with and without the project are summarized as follows:

- The net reserve is not to be expected under the farming without the project, and it can be said that the farm management of the average farmer is at subsistence level. In the conditions with the project, however, net reserve is expected to be Tsh. 16,040 even under the improved living conditions.
- The conditions of the farm management will be remarkably improved. Both the gross and net farm income with the project are expected to be increased 4.4 times of those without the project.

It can be stated, finally, that the water charge to be collected from the farmers in order to cover the O&M cost for the project facilities should be decided within the estimated net reserve of Tsh. 16,040 (Tsh. 29,703/ha), and moreover it should not be a excessive burden on the farmers' economy.

Table A.1 (1/5) FINANCIAL BALANCE OF CROP PRODUCTION WITHOUT THE PROJECT

Cropping Condition:	1st cropping Maize ¹ Irrigated/H.Y.V.			2nd cropping Maize ² Irrigated/L.V.			
	Description	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)
A) Gross Income							
Maize	1,500	6.30	9,450	1,000	6.30	6,300	
Beans	400	14.40	5,760	400	14.40	5,760	
Total			<u>15,210</u>			<u>12,060</u>	
B) Production Cost							
1) Farm Inputs							
- Seed, Maize	25	30.00	750	30	20.00	600	
Beans	25	29.00	725	25	29.00	725	
- Fertilizer	-	-	-	-	-	-	
- Chemicals	-	-	-	-	-	-	
2) Labour Cost²							
- Family Labour	-	-	-	-	-	-	
- Hired Labour	16 M-D	40.00	640	15 M-D	40.00	600	
3) Machinery							
- Tractor			656 ³			656 ³	
4) Sacks	21 Nos.	35.00	735	16 Nos.	35.00	560	
5) Miscellaneous	5% of above		175	5% of above		157	
Total			<u>3,681</u>			<u>3,298</u>	
C) Net Return (A - B)							
			<u>11,529</u>			<u>8,762</u>	

Note: /1: Mixed standing with Beans

/2: Labour force to be decreased by tractor plowing is deducted.

/3: Average tractor plowing area of 42% is counted.
(Tsh. 1,312.50 x 0.5% = Tsh. 656)

Table A.1 (2/5) FINANCIAL BALANCE OF CROP PRODUCTION WITHOUT THE PROJECT

Cropping Condition:	1st cropping Maize ¹ Rainfed/L.V.			2nd cropping Maize ¹ Rainfed/L.V.			
	Description	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)
A) Gross Income							
Maize	600	6.30	3,780	600	6.30	3,780	
Beans	400	14.40	5,760	-	-	-	
Total			<u>9,540</u>			<u>3,780</u>	
B) Production Cost							
1) Farm Inputs							
- Seed, Maize	30	20.00	600	30	20.00	600	
Beans	25	29.00	725	-	-	-	
- Fertilizer	-	-	-	-	-	-	
- Chemicals	-	-	-	-	-	-	
2) Labour Cost²							
- Family Labour	-	-	-	-	-	-	
- Hired Labour	15 M-D	40.00	600	-	-	-	
3) Machinery							
- Tractor	-	-	-	-	-	79 ³	
4) Sacks							
	10 Nos.	35.00	350	6 Nos.	35.00	210	
5) Miscellaneous							
	5% of above		114	5% of above		44	
Total			<u>2,389</u>			<u>933</u>	
C) Net Return (A - B)			<u>7,151</u>			<u>2,847</u>	

Note: /1: Mixed standing with Beans

/2: Labour force to be decreased by tractor plowing is deducted.

/3: Average tractor plowing area of 6% is counted.
(Tsh. 1,312.50 x 6% = Tsh. 79)

Table A.1 (3/5) FINANCIAL BALANCE OF CROP PRODUCTION WITHOUT THE PROJECT

Cropping Condition:	3rd cropping Maize ¹ Irrigated/H.Y.V.			3rd cropping Maize ¹ Irrigated/L.V.			
	Description	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)
A) Gross Income							
Maize	1,500	6.30	9,450	1,000	6.30	6,300	
Beans	400	14.40	5,760	400	14.40	5,760	
Total			<u>15,210</u>			<u>12,060</u>	
B) Production Cost							
1) Farm Inputs							
- Seed, Maize	25	30.00	750	30	20.00	600	
Beans	25	29.00	725	25	29.00	725	
- Fertilizer	-	-	-	-	-	-	
- Chemicals	-	-	-	-	-	-	
2) Labour Cost²							
- Family Labour	-	-	-	-	-	-	
- Hired Labour	17 M-D	40.00	680	16 M-D	40.00	600	
3) Machinery							
- Tractor			276 ³			276 ³	
4) Sacks	21 Nos.	35.00	735	16 Nos.	35.00	560	
5) Miscellaneous	5% of above		158	5% of above		140	
Total			<u>3,324</u>			<u>2,941</u>	
C) Net Return (A - B)							
			<u>11,886</u>			<u>9,119</u>	

Note: ¹: Mixed standing with Beans

²: Labour force to be decreased by tractor plowing is deducted.

³: Average tractor plowing area of 21% is counted.
(Tsh. 1,312.50 x 0.21% = Tsh. 276)

Table A.1 (4/5) FINANCIAL BALANCE OF CROP PRODUCTION WITHOUT THE PROJECT

Cropping Condition:

3rd cropping Maize¹
Rainfed/L.V.

Description	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)
A) Gross Income			
Maize	600	6.30	3,780
Beans	400	14.40	5,760
Total			<u>9,540</u>
B) Production Cost			
1) Farm Inputs			
- Seed, Maize	30	20.00	600
- Beans	25	29.00	725
- Fertilizer	-	-	-
- Chemicals	-	-	-
2) Labour Cost²			
- Family Labour	-	-	-
- Hired Labour	15 M-D	40.00	600
3) Machinery			
- Tractor	-	-	-
4) Sacks	10 Nos.	35.00	350
5) Miscellaneous	5% of above		114
Total			<u>2,389</u>
C) Net Return (A - B)			
			<u>7,151</u>

Note: /1: Mixed standing with Beans

/2: Labour force to be decreased by tractor plowing is deducted.

Table A.1 (5/5) FINANCIAL BALANCE OF CROP PRODUCTION WITHOUT THE PROJECT

Cropping Condition:		3rd cropping Maize ¹ Rainfed/L.V.	
Description	Qty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)
A) Gross Income			
Paddy	1,800	9,60	<u>17,280</u>
B) Production Cost			
1) Farm Inputs			
- Seed	85	24.00	2,040
- Fertilizer	-	-	-
- Chemicals	-	-	-
2) Labour Cost ¹			
- Family Labour	-	-	-
- Hired Labour	26 M-D	40.00	1,040
3) Machinery			
- Tractor	-	-	276 ²
4) Sacks	24 Nos.	35.00	840
5) Miscellaneous	5% of above		210
Total			<u>4,406</u>
C) Net Return (A - B)			<u>12,874</u>

Note: ¹: Labour force to be decreased by tractor plowing is deducted.

²: Average tractor plowing area of 21% is counted.
(TSh 1,312.50 x 21% = TSh 276)

Table A.2 GROSS AND NET PRODUCTION RETURNS AT PRESENT AND WITHOUT THE PROJECT CONDITIONS

	Cropped Area (Tsh.x10 ³)	Unit Gross Income (Tsh./ha)	Total Gross Income (Tsh.x10 ³)	Unit Production Cost (Tsh./ha)	Total Production Cost (Tsh.x10 ³)	Unit Net Return (Tsh./ha)	Total Net Return (Tsh.x10 ³)
I. Maize							
1st cropping maize ¹							
Irrigated/H.Y.V.	30	15,210	456	3,681	110	11,529	346
Irrigated/L.V.	70	12,060	844	3,298	231	8,762	613
Rainfed/L.V.	210	9,540	2,003	2,389	502	7,151	1,502
2nd cropping maize ²							
Rainfed/L.V.	40	3,780	151	933	37	2,847	114
Rainfed/L.V. ⁴	170	3,780	643	933	159	2,847	484
3rd cropping maize ³							
Irrigated/H.Y.V.	4	15,210	608	3,324	133	11,886	475
Irrigated/L.V.	100	12,060	1,206	2,941	294	9,119	912
Rainfed/L.V. ⁴	30	9,540	286	2,389	72	7,151	215
H. Paddy							
Irrigated/L.V.	170	17,280	2,938	4,406	749	12,874	2,189
Rainfed/L.V.	210	17,280	3,629	4,406	925	12,874	2,703
Total			12,764		3,212		9,553
Average Figures per Farm Household			9,744		2,452		7,292

Note: 1: Rainy season maize, mixed cropping with Beans
2: Rainy season maize
3: Dry season maize, mixed cropping with Beans
4: Cropping in the lowlying land

Table A.3 (1/2) FINANCIAL BALANCE OF CROP PRODUCTION WITH THE PROJECT

Cropping Condition:	Irrigated Paddy/H.Y.V. In Dry Season			Irrigated Paddy/H.Y.V. In Rainy Season		
	Description	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)	Q'ty (kg/ha)	Unit Price (Tsh./kg)
A) Gross Income	4,500	9.60	<u>43,200</u>	5,000	9.60	<u>48,000</u>
B) Production Cost						
1) Farm Inputs						
- Seed 40	28.00	1,120	40	28.00	1,120	-
- Fertilizer N	80	20.00	1,600	90	20.00	1,800
P	60	10.00	600	70	10.00	700
K	-	-	-	-	-	-
- Chemicals						
Insecticides	12	78.00	936	12	78.00	936
Fungicides	2	76.00	152	2	76.00	152
2) Labour Cost	236 M-D	-	-	241 M-D	-	-
3) Machinery						
- Tractor						
Plowing			1,313			1,313
Harrowing			1,125			1,125
- Spraying	4 times	130.00	520	4 times	130	520
4) Sacks	60 Nos.	35.00	2,100	67 Nos.	35.00	2,345
5) Miscellaneous	5% of above		473	5% of above		501
Total			<u>9,939</u>			<u>10,512</u>
C) Net Return (A - B)			<u>333,261</u>			<u>37,488</u>

Table A.3 (2/2) FINANCIAL BALANCE OF CROP PRODUCTION WITH THE PROJECT

Cropping Condition:		Rainfed Maize ¹		
Description	Q'ty (kg/ha)	Unit Price (Tsh./kg)	Amount (Tsh./ha)	
A) Gross Income				
Maize	2,000	6.30	12,600	
Beans	800	14.40	11,520	
Beans	800	14.40	11,520	
B) Production Cost				
1) Farm Inputs				
- Seed, Maize	25	30.00	750	
Beans	30	29.00	870	
- Fertilizer N	70	20.00	1,400	
P	60	10.00	600	
K	-	-	-	
- Chemicals				
Insecticides	8	78.00	624	
Fungicides	1	76.00	76	
2) Labour Cost	149 M-D			
3) Machinery				
- Tractor				
Plowing			1,313	
Harrowing			1,125	
- Spraying	3 times	130.00	390	
4) Sacks	30 Nos.		1,050	
5) Miscellaneous	5% of above		410	
Total			<u>8,608</u>	
C) Net Return (A - B)			<u>15,512</u>	

Note: ¹: Mixed standing with Beans

Table A.4 GROSS AND NET PRODUCTION RETURNS WITH THE PROJECT

Scheme Production	Area (Tsh./ha)	Unit Gross Income (Tsh./ha)	Gross Income (Tsh.x10 ³)	Unit Production Cost (Tsh./ha)	Total Production Cost (Tsh.x10 ³)	Unit Net Return (Tsh./ha)	Total Net Return (Tsh.x10 ³)
Paddy							
(dry season)	230	43,200	9,936	9,939	2,286	33,261	7,650
(rainy season)	680	48,000	32,640	10,512	7,148	37,488	25,242
Maize with Beans	450	24,120	10,854	8,608	3,874	15,512	6,980
Total			<u>53,430</u>		<u>13,308</u>		<u>40,122</u>
Average Figures per Farm Household			<u>42,744</u>		<u>10,646</u>		<u>32,098</u>

DRAWINGS

LIST OF DRAWINGS

<u>Plate No.</u>	<u>Drawing No.</u>	<u>Title</u>
GENERAL		
1	100 - 01	General Map
2	100 - 02	General Layout
IRRIGATION AND DRAINAGE SYSTEM		
3	200 - 01	Yongoma Diversion Weir (1/2)
4	200 - 02	Yongoma Diversion Weir (2/2)
5	200 - 03	Typical Cross Sections
6	200 - 04	Profile of Right Main Canal (RMC) (1/2)
7	200 - 05	Profile of Right Main Canal (RMC) (2/2)
8	200 - 06	Profile of Left Main Canal (LMC)
9	200 - 07	Profile of Secondary Canal, RSC 1 and LSC 2
10	200 - 08	Profile of Main and Secondary Drain, RMD and LSD 1
11	200 - 09	Profile of Yongoma Floodway
12	200 - 10	Profile of Main Farm Road and Flood Dike, MR - 3
13	200 - 11	Location Map of Structures
14	200 - 12	Canal Lining (1/2)
15	200 - 13	Canal Lining (2/2)
16	200 - 14	Check and Turnout
17	200 - 15	Spillway and Parshall Flume
18	200 - 16	Aqueduct and Bridge
19	200 - 17	Irrigation Drop and Culvert
20	200 - 18	Cross Drain and Drainage Culvert
21	200 - 19	Drainage Gate and Bridge
22	200 - 20	Gates and Hoists (1/2)
23	200 - 21	Gates and Hoists (2/2)
24	200 - 22	Drainage Drop
25	200 - 23	Foot Path and Miscellaneous
26	200 - 24	Typical Farm Layout
27	200 - 25	On - farm Facilities

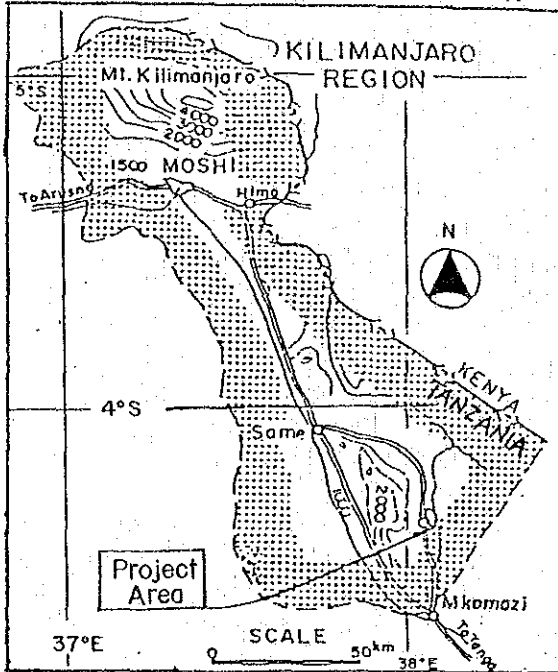
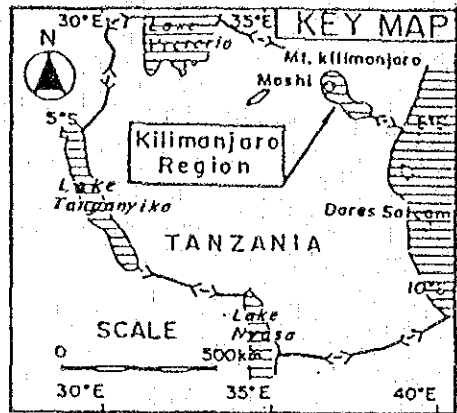
<u>Plate No.</u>	<u>Drawing No.</u>	<u>Title</u>
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BUILDINGS

28	300 - 01	Plot Plan
29	300 - 02	O & M Office
30	300 - 03	O & M Workshop
31	300 - 04	Multi - purpose Warehouse
32	300 - 05	Drying House
33	300 - 06	Rice Mill House and Guard House
34	300 - 07	O & M Dormitory and Postharvest Office

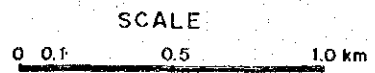
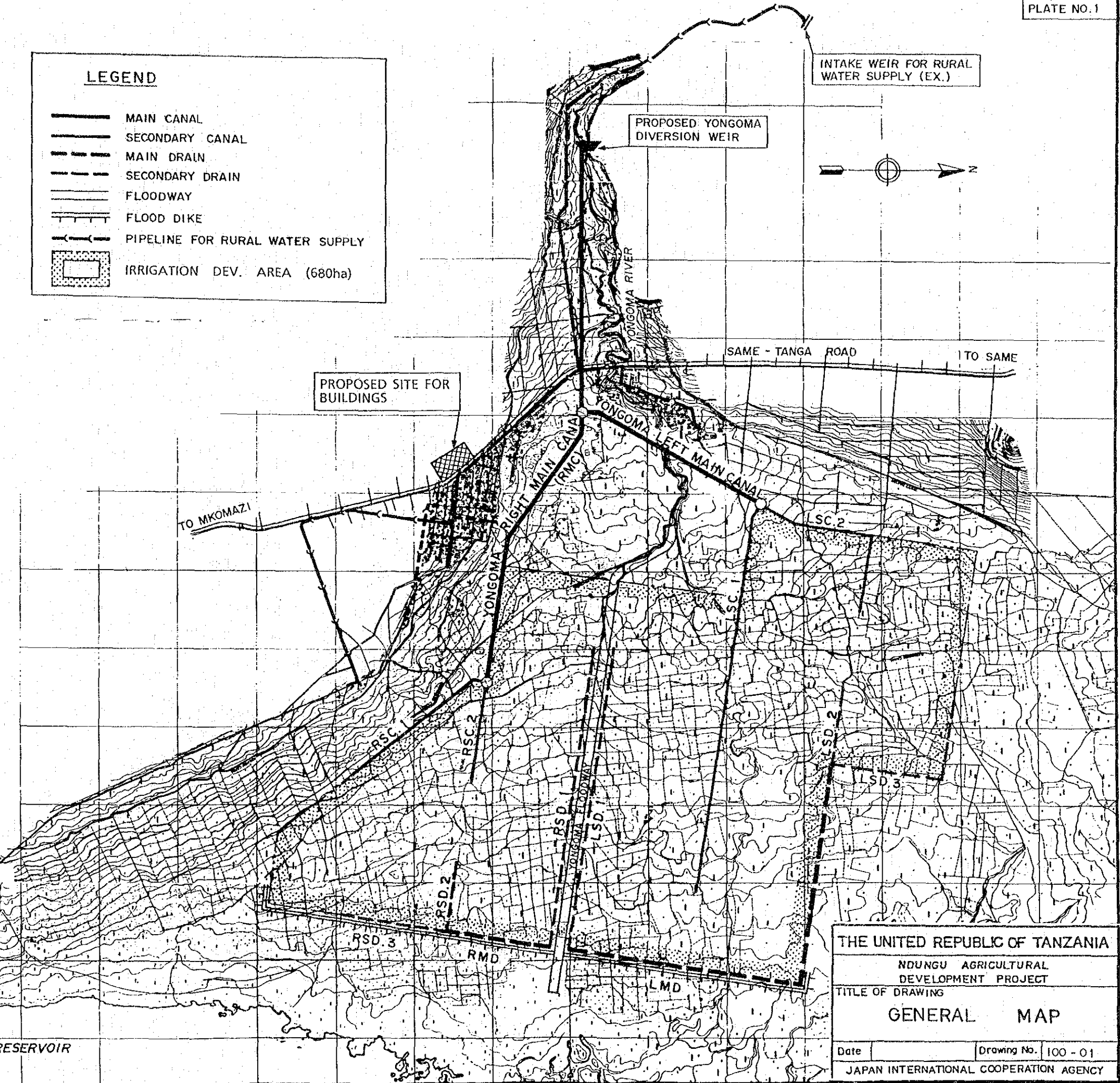
WATER SUPPLY SYSTEM

35	400 - 01	Layout of Water Supply System
36	400 - 02	Water Supply Facilities (1/2)
37	400 - 03	Water Supply Facilities (2/2)



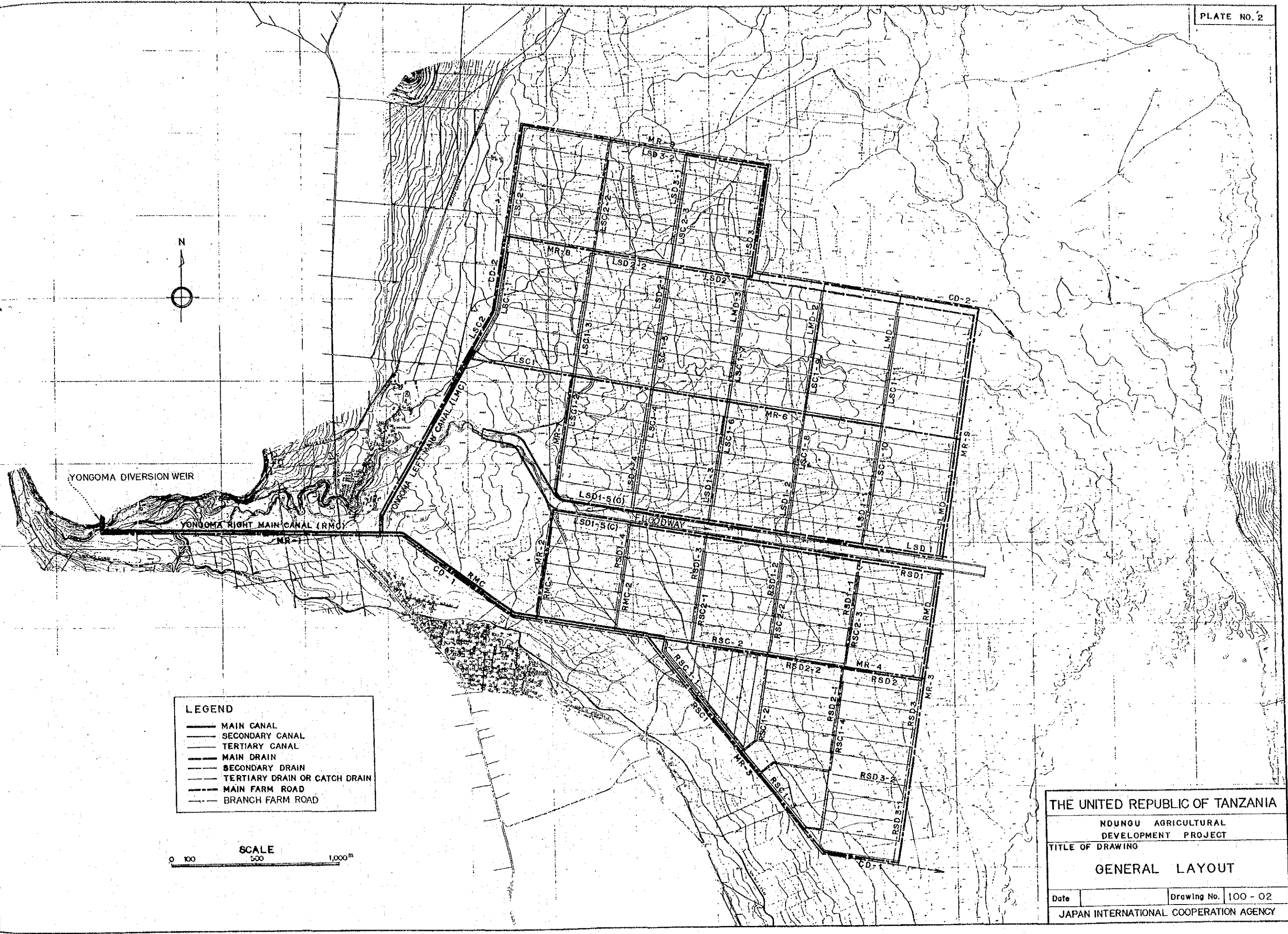
LEGEND

- MAIN CANAL
- SECONDARY CANAL
- MAIN DRAIN
- SECONDARY DRAIN
- FLOODWAY
- FLOOD DIKE
- PIPELINE FOR RURAL WATER SUPPLY
- IRRIGATION DEV. AREA (680ha)



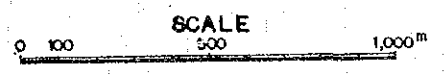
THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL
 DEVELOPMENT PROJECT
 TITLE OF DRAWING
GENERAL MAP
 Date _____ Drawing No. 100 - 01
 JAPAN INTERNATIONAL COOPERATION AGENCY

KALIMAWE RESERVOIR

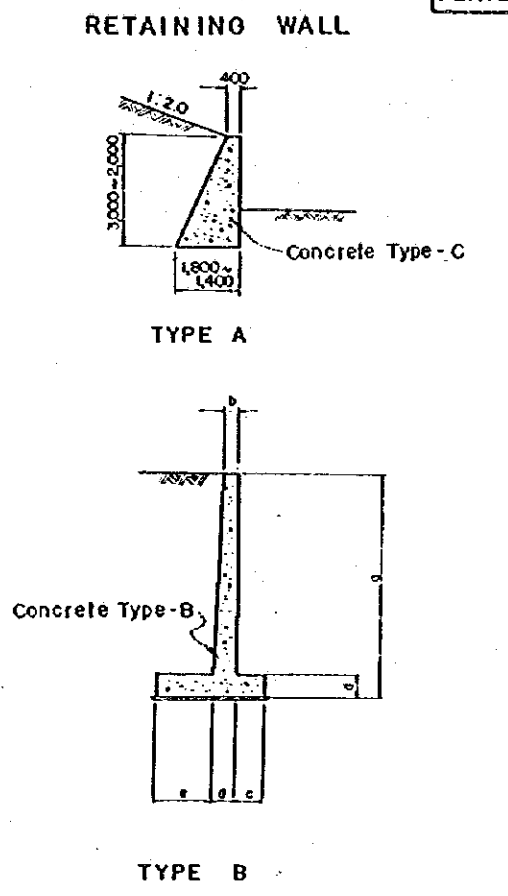
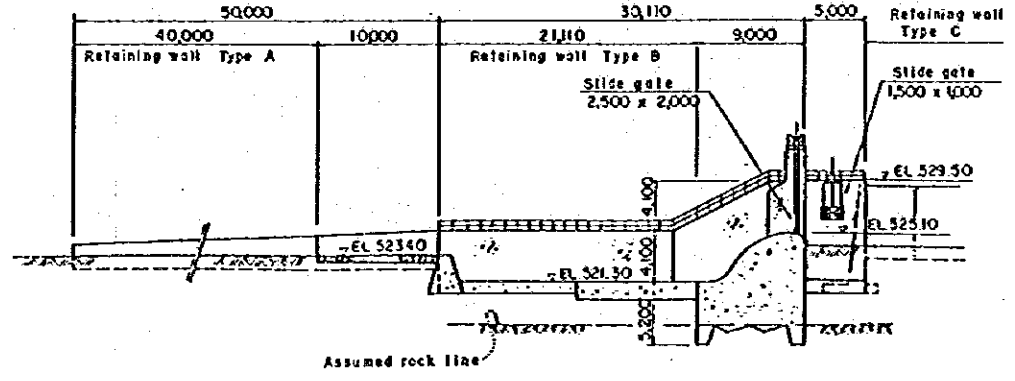
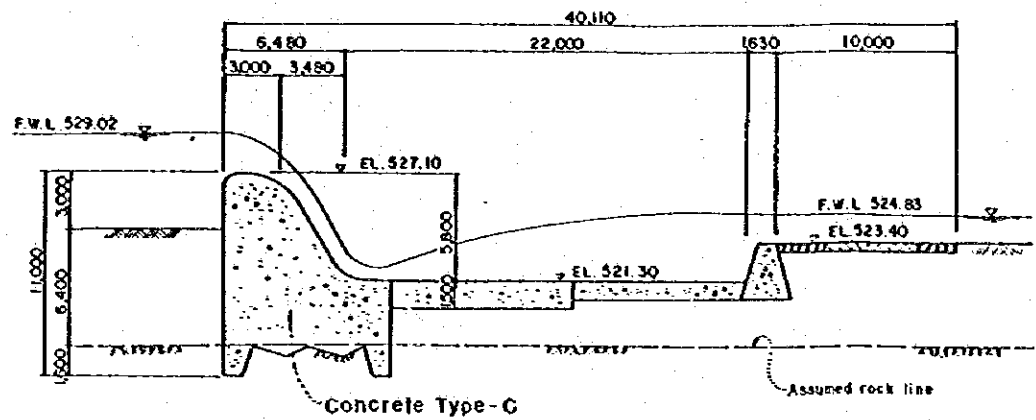
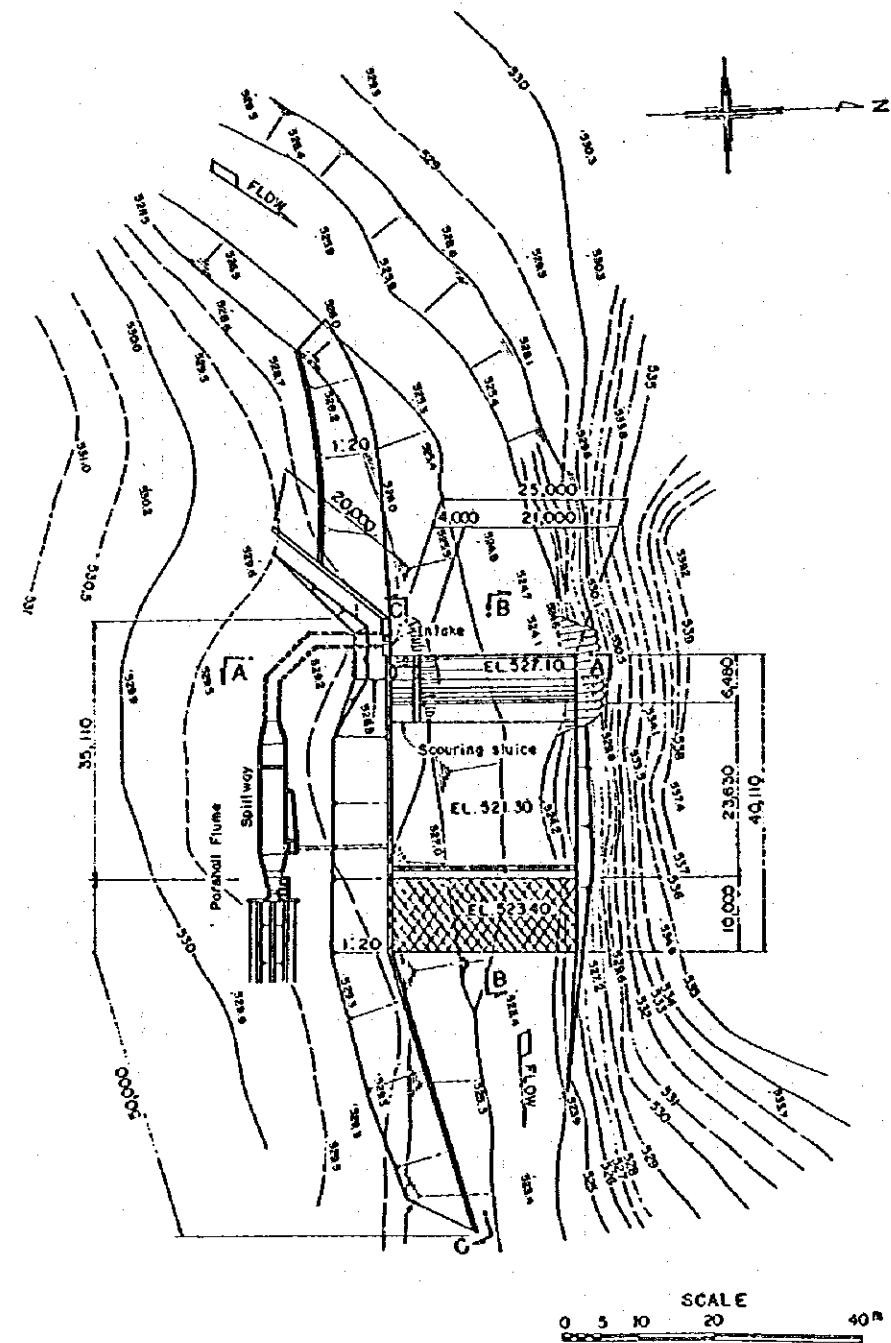


LEGEND

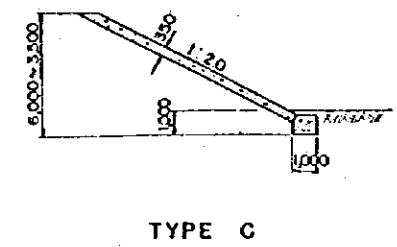
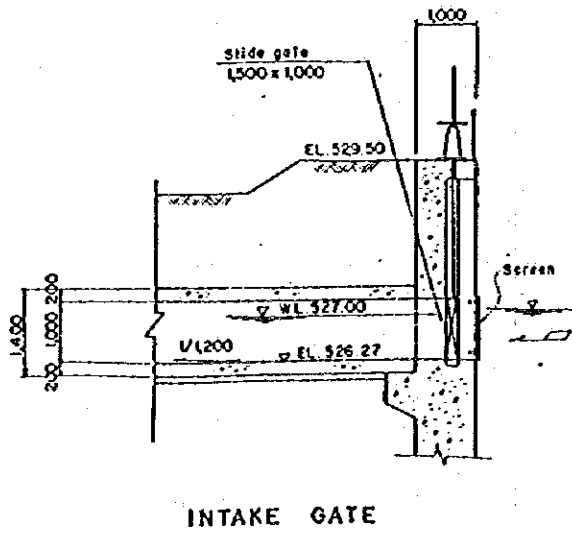
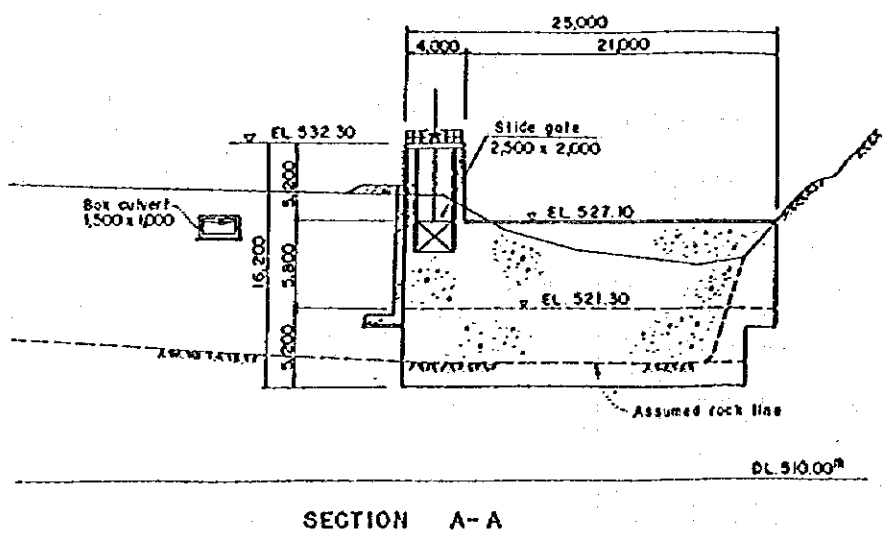
	MAIN CANAL
	SECONDARY CANAL
	TERTIARY CANAL
	MAIN DRAIN
	SECONDARY DRAIN
	TERTIARY DRAIN OR CATCH DRAIN
	MAIN FARM ROAD
	BRANCH FARM ROAD



THE UNITED REPUBLIC OF TANZANIA	
NUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
GENERAL LAYOUT	
Date	Drawing No. 100 - 02
JAPAN INTERNATIONAL COOPERATION AGENCY	

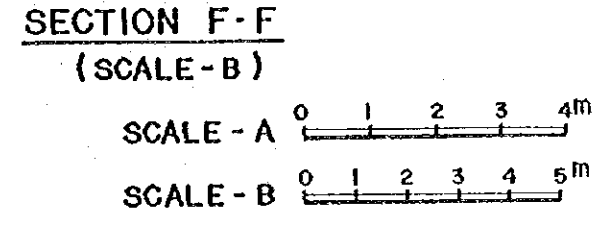
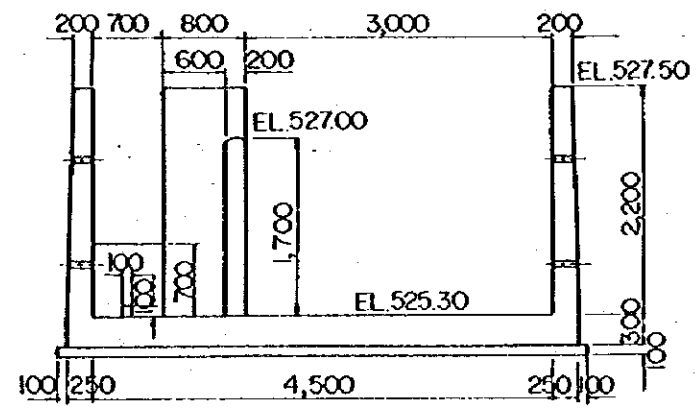
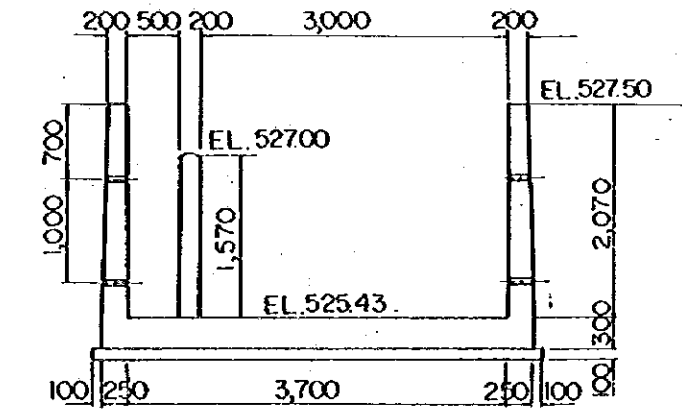
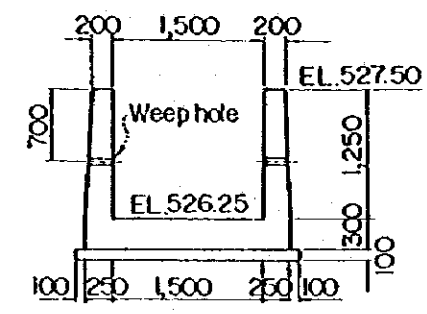
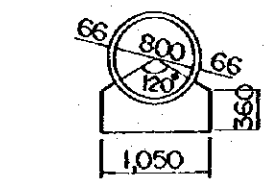
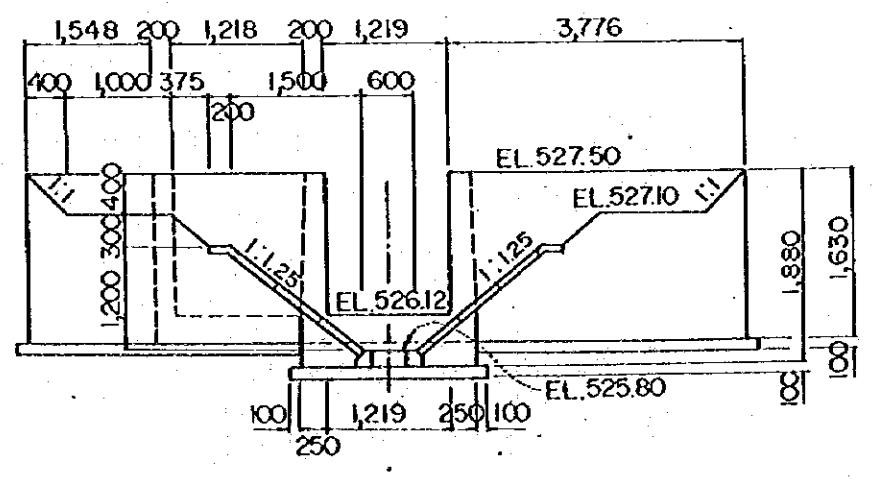
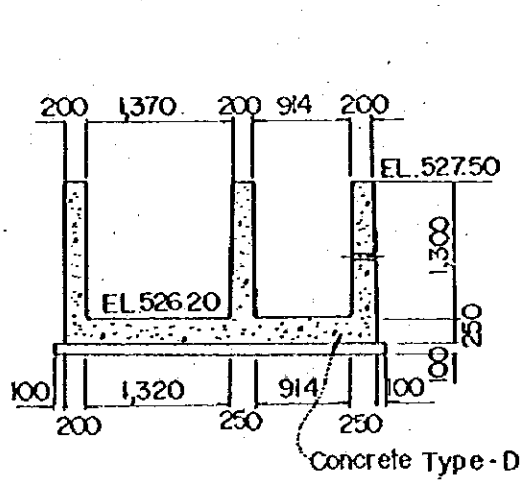
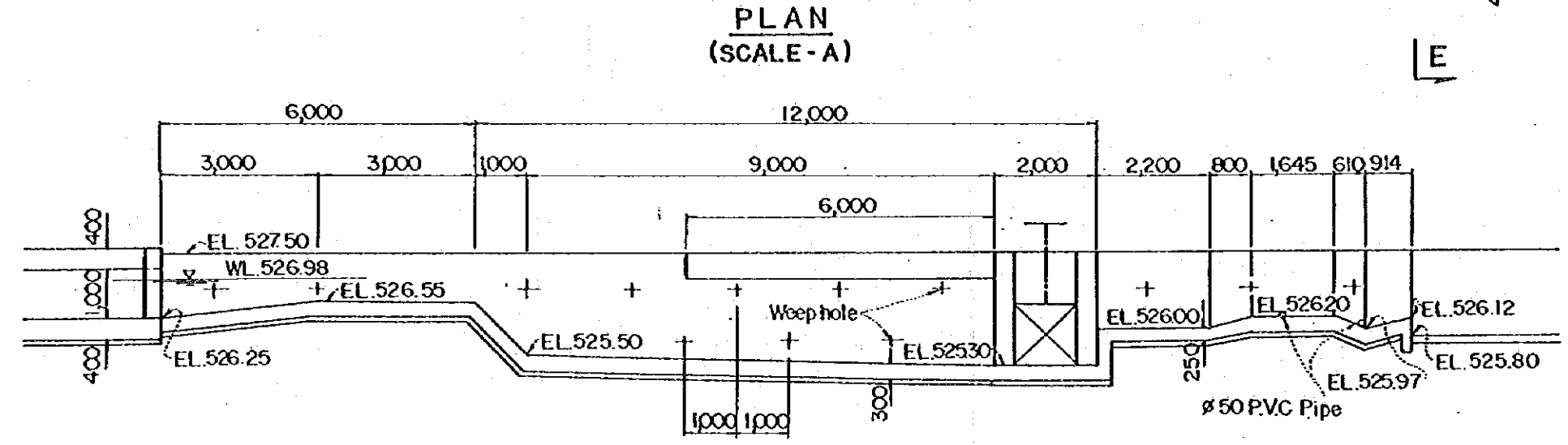
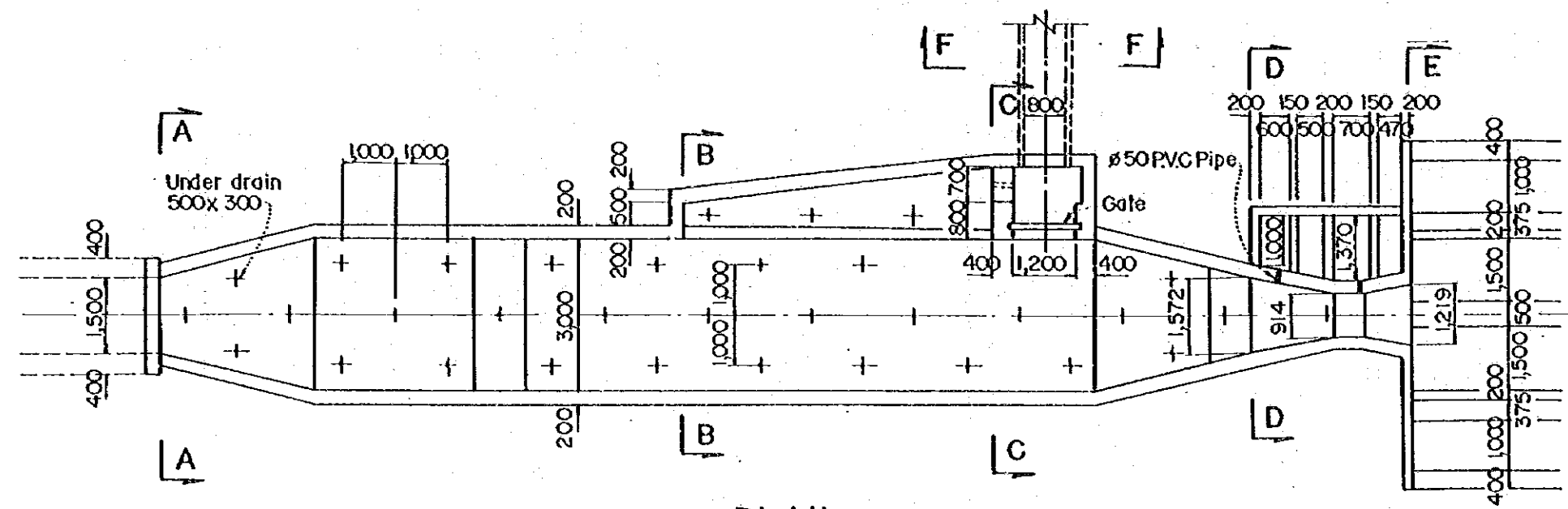


TYPE	(mm)				
	a	b	c	d	e
B-1	9,200-5,500	400	1,000-500	700-500	1,800-1,000
B-2	9,200	1,000	1,000	1,000	1,500
B-3	9,200	400	-	600	2,000
B-4	9,200-5,100	400	-	600	2,000
B-5	5,100	350	-	500	1,500



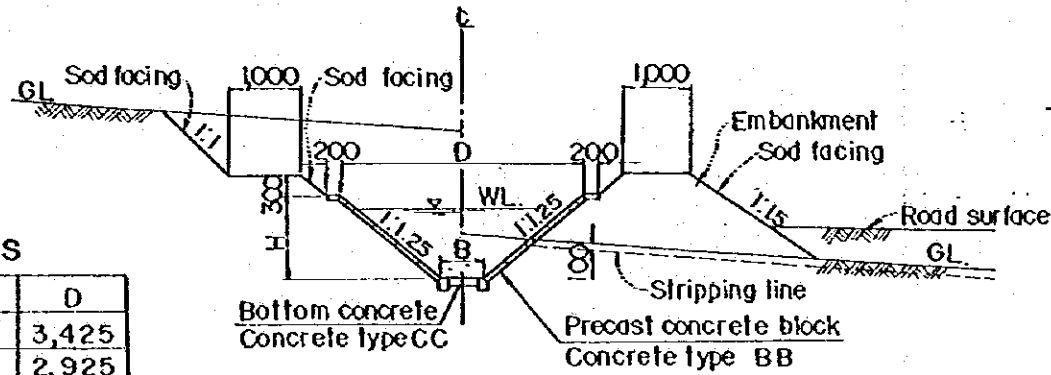
THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL
 DEVELOPMENT PROJECT
 TITLE OF DRAWING
YONGOMA DIVERSION WEIR
 (1/2)

Date: _____ Drawing No. 200-01
 JAPAN INTERNATIONAL COOPERATION AGENCY



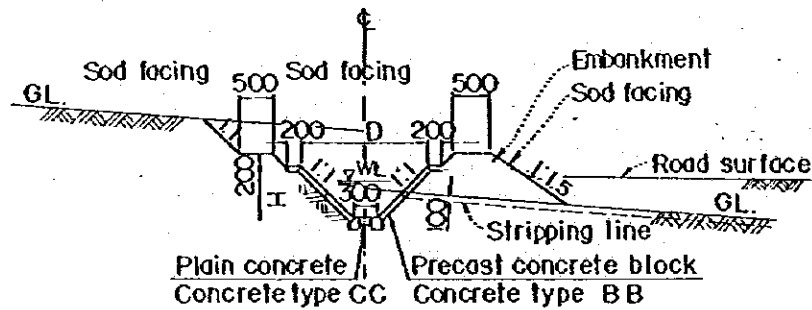
THE UNITED REPUBLIC OF TANZANIA	
NOUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING YONGOMA DIVERSION WEIR (2/2)	
Date	Drawing No. 200-02
JAPAN INTERNATIONAL COOPERATION AGENCY	

IRRIGATION CANAL



DIMENSIONS

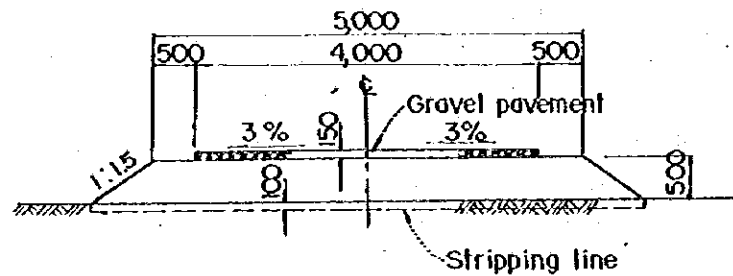
TYPE	B	H	D
A	600	1,130	3,425
B	500	970	2,925
C	400	780	2,350



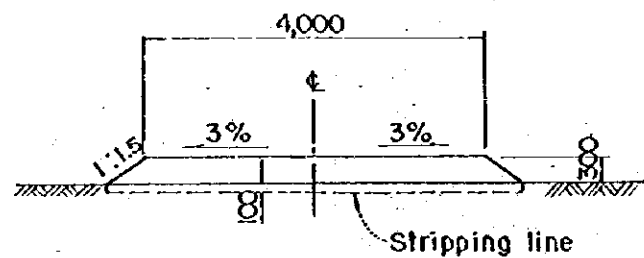
DIMENSIONS

TYPE	H	D
D1	660	1,620
D2	550	1,400
D3	440	1,180

FARM ROAD

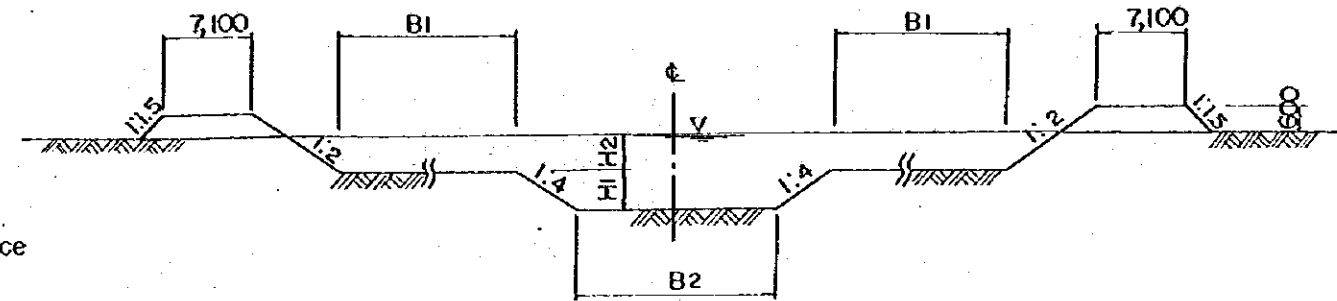


MAIN FARM ROAD

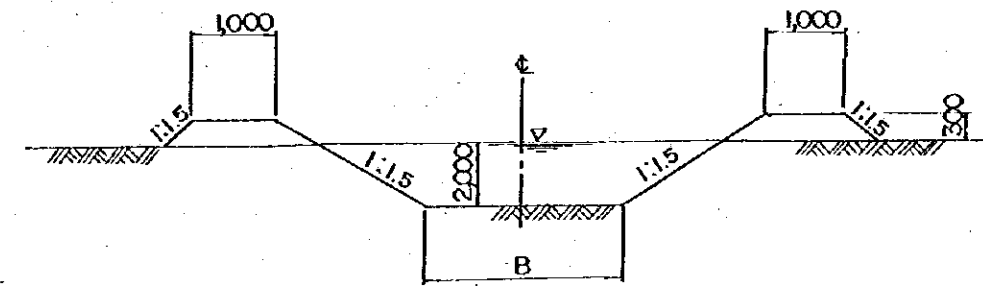


BRANCH FARM ROAD

FLOODWAY & DRAINAGE CANAL

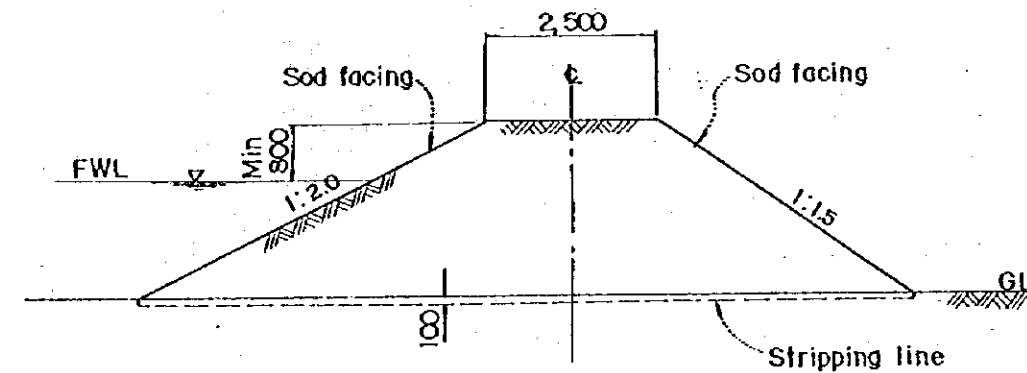


FLOODWAY



MAIN & SECONDARY DRAINAGE CANAL

FLOOD DIKE



THE UNITED REPUBLIC OF TANZANIA

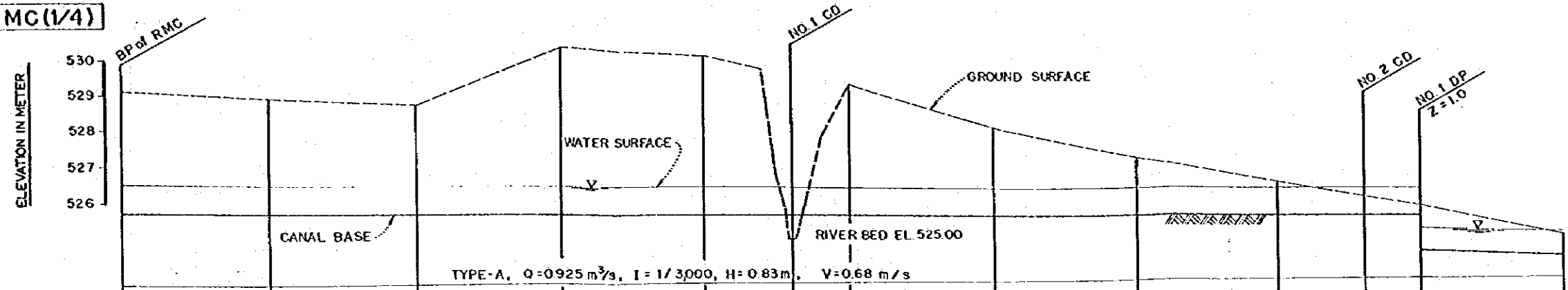
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING

TYPICAL CROSS SECTIONS

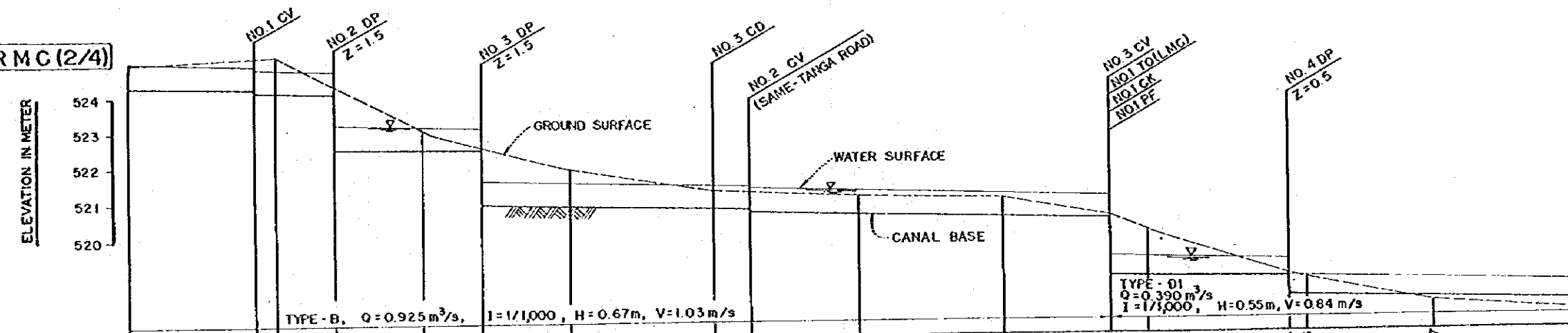
Date _____ Drawing No. 200-03
JAPAN INTERNATIONAL COOPERATION AGENCY

RMC(1/4)



CANAL BASE ELEVATION	525.82	525.79	525.75	525.72	525.69	525.67	525.65	525.62	525.63	525.55	525.53	525.52	524.42
WATER SURFACE ELEVATION	526.65	526.62	526.58	526.55	526.52	526.50	526.48	526.45	526.46	526.38	526.36	526.35	525.09
GROUND SURFACE ELEVATION	529.20	529.0	529.6	530.4	530.1	529.6	529.3	528.1	527.2	526.5	526.1	525.8	525.0
REDUCED DISTANCE	0	100	200	300	400	460	500	600	700	800	860	900	1,000
DISTANCE	0	100	100	100	100	60	40	100	100	100	60	40	100
STATION	0	1	2	3	4	4+60	5	6	7	8	8+60	9	10
HORIZONTAL CURVE													

RMC(2/4)



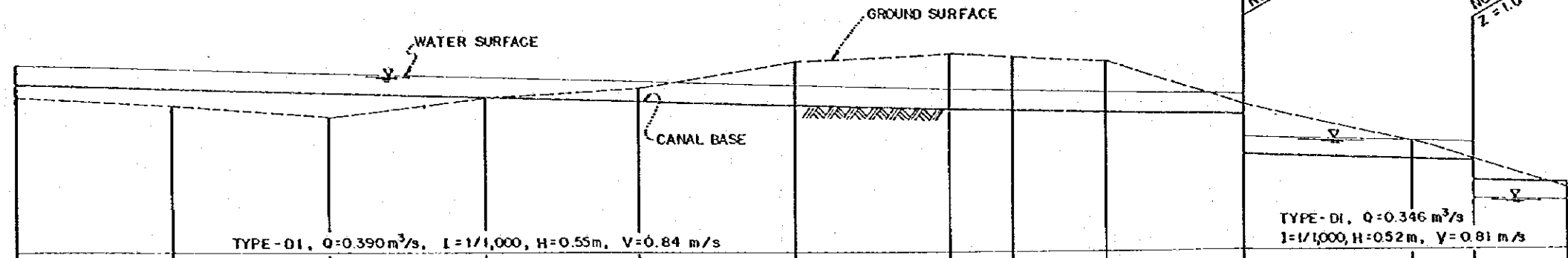
CANAL BASE ELEVATION	524.42	524.33	524.25	524.19	522.63	522.59	521.03	520.93	520.90	520.82	520.74	520.64	520.57	518.87	518.72	518.17	
WATER SURFACE ELEVATION	525.09	525.00	524.92	524.86	523.30	523.26	521.70	521.60	521.57	521.49	521.41	521.31	521.24	519.42	518.92	518.36	
GROUND SURFACE ELEVATION	525.0	525.20	524.91	524.40	523.10	522.60	522.0	521.4	521.35	521.35	521.2	521.1	520.60	519.50	518.90	518.27	
REDUCED DISTANCE	1,000	1,085	1,100	1,140	1,200	1,240	1,300	1,400	1,425	1,500	1,500	1,600	1,675	1,700	1,800	1,900	
DISTANCE	100	85	15	40	60	40	60	100	25	75	100	100	75	25	100	10	
STATION	10	10+85	11	11+40	12	12+40	13	14	14+25	15	16	16	16+75	17	18	18+10	19
HORIZONTAL CURVE																	

IP.1
IA = 35-00-00

THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
PROFILE OF RIGHT MAIN CANAL (RMC) (1/2)
 Date _____ Drawing No. 200-04
 JAPAN INTERNATIONAL COOPERATION AGENCY

RMC(3/4)

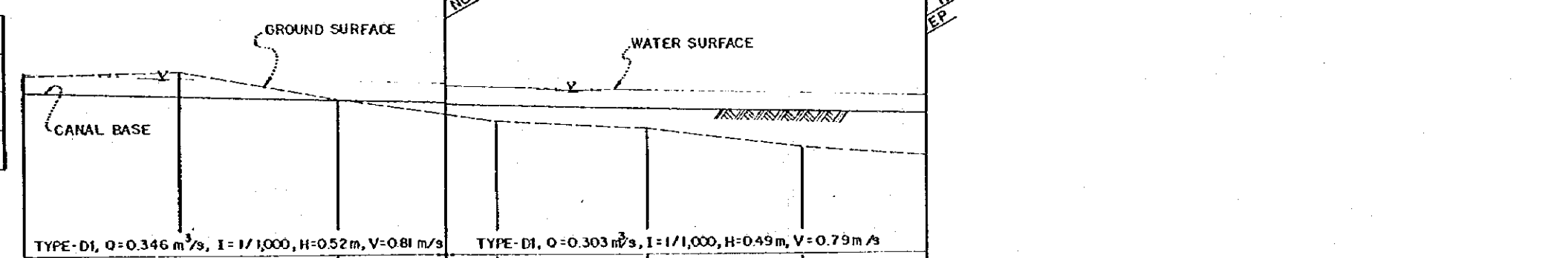
ELEVATION IN METER
520
519
518
517
516



CANAL BASE ELEVATION	518.17	518.07	517.97	517.87	517.77	517.67	517.57	517.53	517.47	517.38	516.12	516.08	515.02
WATER SURFACE ELEVATION	518.72	518.62	518.52	518.42	518.32	518.22	518.12	518.08	518.02	517.93	516.64	516.60	515.54
GROUND SURFACE ELEVATION	517.80	517.60	517.50	517.80	518.10	518.80	519.00	519.90	518.80	517.70	516.70	516.20	515.50
REDUCED DISTANCE	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,640	2,700	2,790	2,900	2,940	3,000
DISTANCE	100	100	100	100	100	100	100	40	60	90	100	40	60
STATION	20	21	22	23	24	25	26	26+40	27	27+90 28	29	29+40	30
HORIZONTAL CURVE	IA = 26 - 30 - 00 IP. 2												

RMC(4/4)

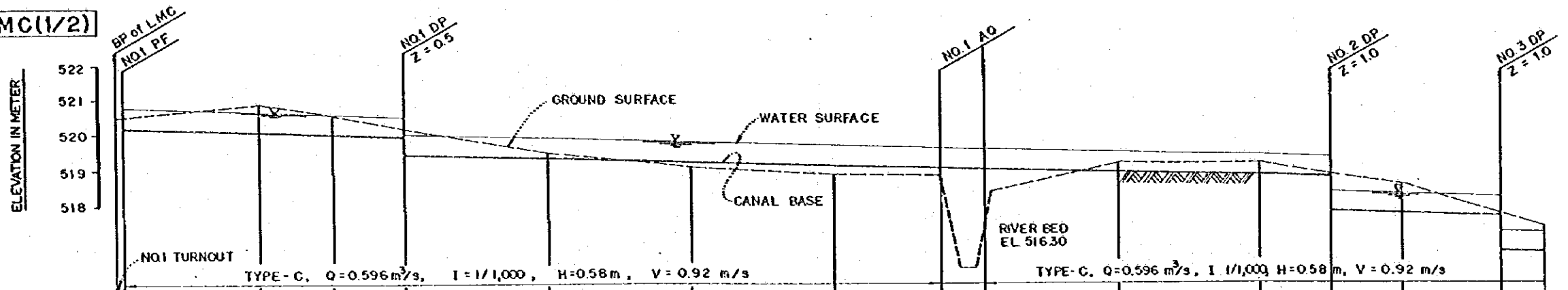
ELEVATION IN METER
517
516
515
514
513



CANAL BASE ELEVATION	515.02	514.92	514.82	514.75	514.70	514.60	514.50	514.42
WATER SURFACE ELEVATION	515.54	515.44	515.34	515.27	515.19	515.09	514.99	514.91
GROUND SURFACE ELEVATION	515.50	515.60	514.90	514.50	514.30	514.10	513.60	513.40
REDUCED DISTANCE	3,000	3,100	3,200	3,270	3,300	3,400	3,500	3,580
DISTANCE	60	100	100	70	30	100	100	80
STATION	30	31	32	32+70 33	33	34	35	35+80
HORIZONTAL CURVE								

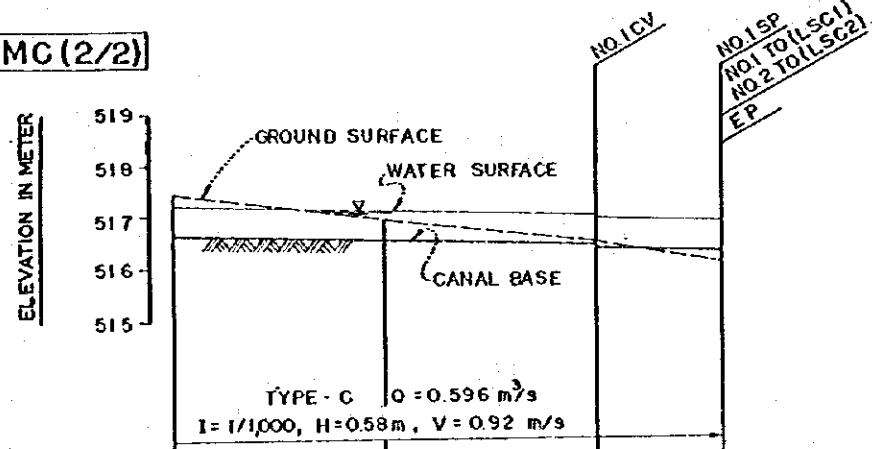
THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
 PROFILE OF RIGHT MAIN CANAL (RMC) (2/2)
 Date _____ Drawing No. 200 - 05
 JAPAN INTERNATIONAL COOPERATION AGENCY

LMC(1/2)



CANAL BASE ELEVATION	520.25	520.16	520.11	520.06	519.46	519.36	519.26	519.18	519.16	519.07	518.97	518.91	518.86	517.79	516.76
WATER SURFACE ELEVATION	520.83	520.74	520.69	520.64	520.04	519.94	519.84	519.76	519.74	519.65	519.55	519.49	518.44	517.37	516.34
GROUND SURFACE ELEVATION	520.60	521.00	520.70	520.30	519.60	519.20	519.00	518.30	518.30	519.30	519.30	519.00	518.70	517.90	517.50
REDUCED DISTANCE	0	100	150	200	300	400	500	575	600	700	800	850	900	970	1,000
DISTANCE	0	90	50	50	100	100	100	75	25	95	100	50	50	70	30
STATION	0+10	1	1+50	2	3	4	5	5+75	6+05	7	8	8+50	9	9+70	10
HORIZONTAL CURVE															

LMC(2/2)

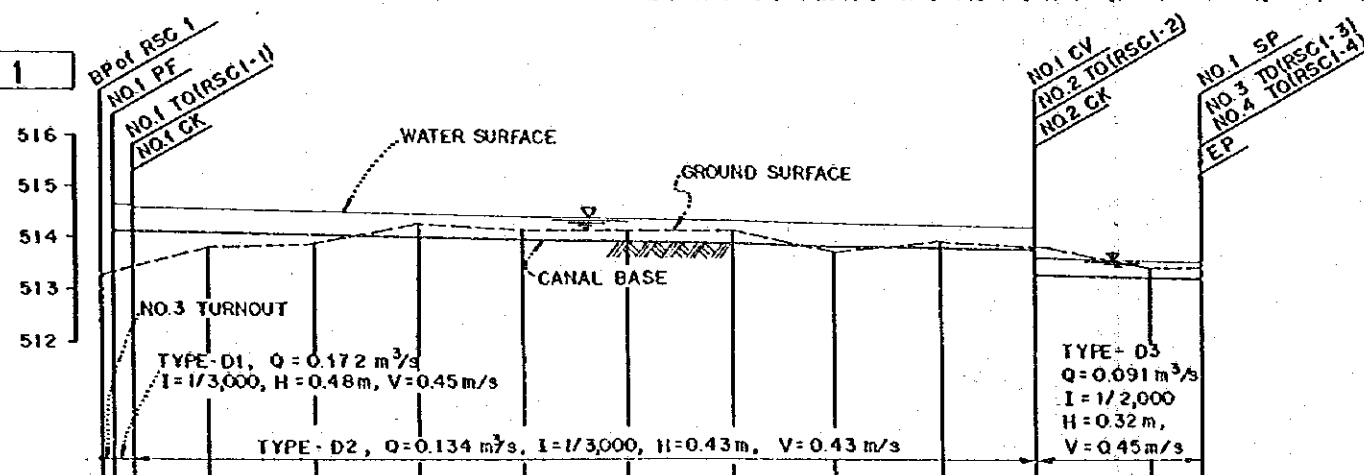


CANAL BASE ELEVATION	516.76	516.66	516.56	516.42
WATER SURFACE ELEVATION	517.34	517.24	517.14	517.00
GROUND SURFACE ELEVATION	517.5	517.00	516.60	516.20
REDUCED DISTANCE	1,000	1,000	1,200	1,260
DISTANCE	30	100	100	60
STATION	10	11	12	12+60
HORIZONTAL CURVE				

THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL
 DEVELOPMENT PROJECT
 TITLE OF DRAWING
**PROFILE OF LEFT MAIN CANAL
 (LMC)**
 Date _____ Drawing No. 200-06
 JAPAN INTERNATIONAL COOPERATION AGENCY

RSC 1

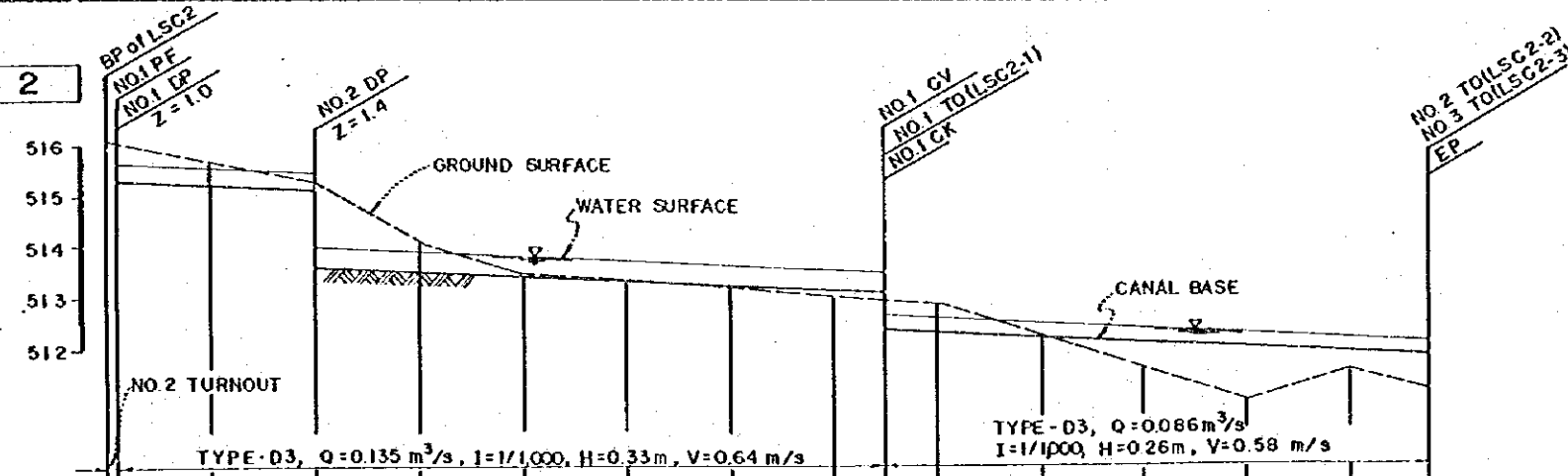
ELEVATION IN METER



CANAL BASE ELEVATION	514.28	514.25	514.21	514.18	514.15	514.11	514.08	514.05	514.03	513.98	513.98	513.98	513.95
WATER SURFACE ELEVATION	514.76	514.68	514.64	514.61	514.58	514.54	514.51	514.48	514.46	514.41	513.75	513.70	513.67
GROUND SURFACE ELEVATION	513.40	513.40	514.00	514.40	514.30	514.30	514.00	513.90	514.10	514.00	514.60	513.60	513.60
REDUCED DISTANCE	0	100	200	300	400	500	600	700	800	890	900	1000	1050
DISTANCE	0	10	20	70	100	100	100	100	100	90	10	100	50
STATION	0+0	0+50	1	2	3	4	5	6	7	8	8+90	9	10
HORIZONTAL CURVE													

LSC 2

ELEVATION IN METER

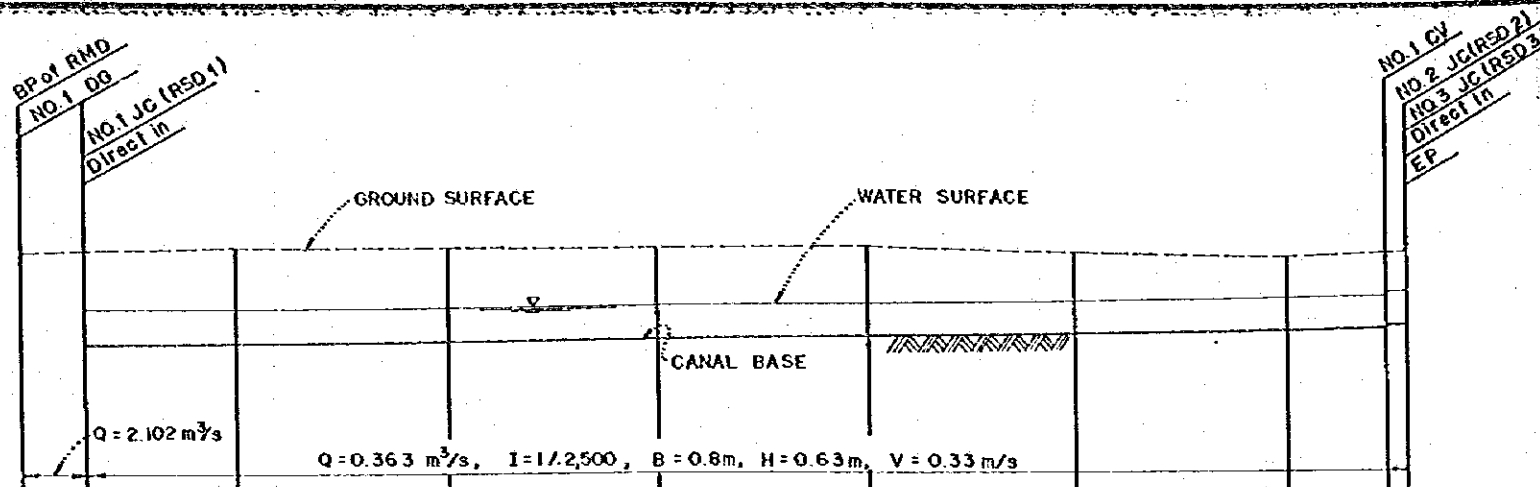


CANAL BASE ELEVATION	516.43	515.54	515.24	513.74	513.64	513.54	513.44	513.34	512.49	512.39	512.29	512.19	512.09	512.01
WATER SURFACE ELEVATION	516.76	515.67	515.57	514.07	513.97	513.87	513.77	513.67	512.75	512.65	512.55	512.45	512.35	512.27
GROUND SURFACE ELEVATION	516.20	515.80	515.40	514.20	513.60	513.50	513.30	513.10	513.00	512.40	511.90	511.10	511.70	511.30
REDUCED DISTANCE	0	100	200	265	300	400	500	600	700	750	800	900	1,000	1,100
DISTANCE	0	10	90	100	65	35	100	100	100	100	50	50	100	100
STATION	0+0	0+10	1	2	2+65	3	4	5	6	7	7+50	8	9	10
HORIZONTAL CURVE				IA=21-00-00 V.P.1						IP.2 IA=90-00-00				

THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
 PROFILE OF SECONDARY CANAL
 RSC1 AND LSC 2
 Date _____ Drawing No. 200-07
 JAPAN INTERNATIONAL COOPERATION AGENCY

R M D

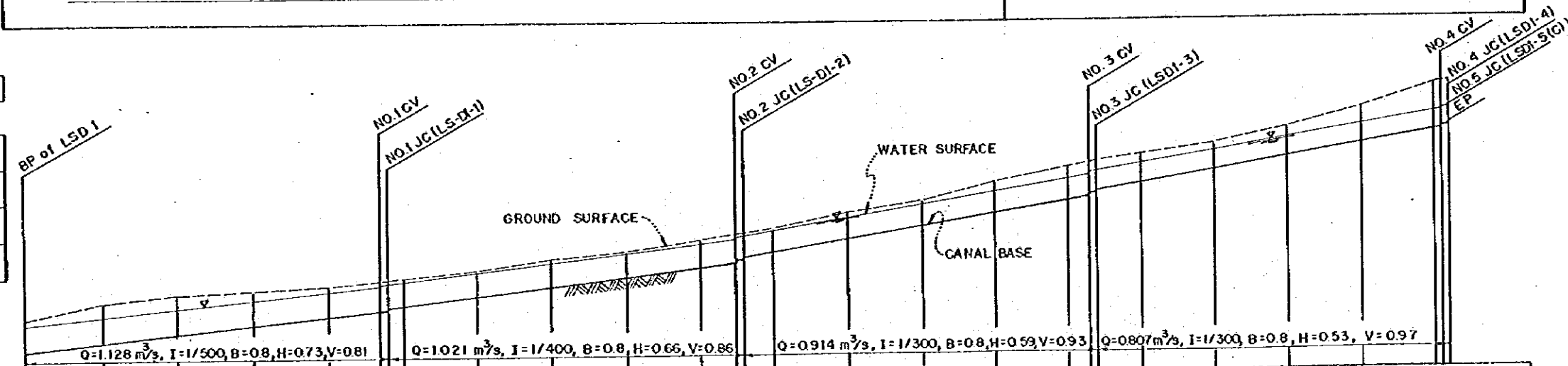
ELEVATION IN METER
509
508
507
506
505



CANAL BASE ELEVATION		505.37	505.40	505.44	505.48	505.52	505.56	505.60	505.62	505.67
WATER SURFACE ELEVATION		506.00	506.03	506.07	506.11	506.15	506.19	506.23	506.30	506.30
GROUND SURFACE ELEVATION		507.10	507.20	507.20	507.20	507.20	507.10	507.00	507.10	507.10
REDUCED DISTANCE	0	30	101	200	300	400	500	600	650	660
DISTANCE	0	30	70	100	100	100	100	100	50	10
STATION	0	0+30	1	2	3	4	5	6	6+50	6+60
HORIZONTAL CURVE										

LSD 1

ELEVATION IN METER
512
511
510
509
508



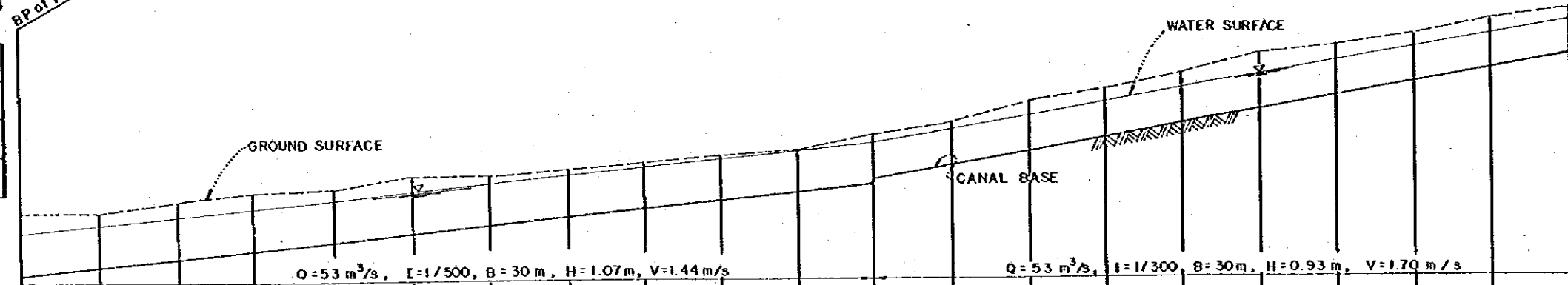
CANAL BASE ELEVATION		506.12	506.32	506.52	506.72	506.92	507.06	507.11	507.15	507.23	507.50	507.75	508.00	508.25	508.37	508.42	508.44	508.51	508.64	508.99	509.31	509.64	509.98	510.08	510.13	510.16	510.22	510.42	510.75	511.09	511.42	511.75	511.83	511.87	
WATER SURFACE ELEVATION		506.95	507.05	507.25	507.45	507.65	507.79	507.84	507.88	507.93	508.16	508.36	508.66	508.91	509.03	509.08	509.10	509.15	509.23	509.57	509.90	510.20	510.53	510.98	510.67	510.72	510.75	511.00	511.28	511.62	511.95	512.28	512.32	512.37	512.40
GROUND SURFACE ELEVATION		507.00	507.40	507.60	507.70	507.80	507.90	507.90	507.90	507.90	508.20	508.50	508.70	508.90	509.00	509.00	509.00	509.00	509.00	509.30	509.70	510.00	510.50	511.00	511.50	512.00	512.50	513.00	513.50	514.00	514.50	515.00	515.50	516.00	516.50
REDUCED DISTANCE	0	100	200	300	400	470	480	500	600	700	800	900	950	960	1,000	1,100	1,200	1,300	1,400	1,430	1,440	1,500	1,600	1,700	1,800	1,900	1,910	1,920	1,930	1,940	1,950	1,960	1,970		
DISTANCE	0	100	100	100	100	70	10	20	100	100	100	100	50	10	40	100	100	100	100	30	10	60	100	100	100	100	100	10	10	10	10	10	10	10	
STATION	0	1	2	3	4	4+70	4+80	5	6	7	8	9	9+50	9+60	10	11	12	13	14	14+30	14+40	15	16	17	18	19	19+10	19+20	19+30	19+40	19+50	19+60	19+70	19+80	
HORIZONTAL CURVE																																			

THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
PROFILE OF MAIN & SECONDARY DRAIN RMD & LSD 1
 Date _____ Drawing No. 200-08
 JAPAN INTERNATIONAL COOPERATION AGENCY

FLOOD WAY (1/2)

ELEVATION IN METER
511
510
509
508
507

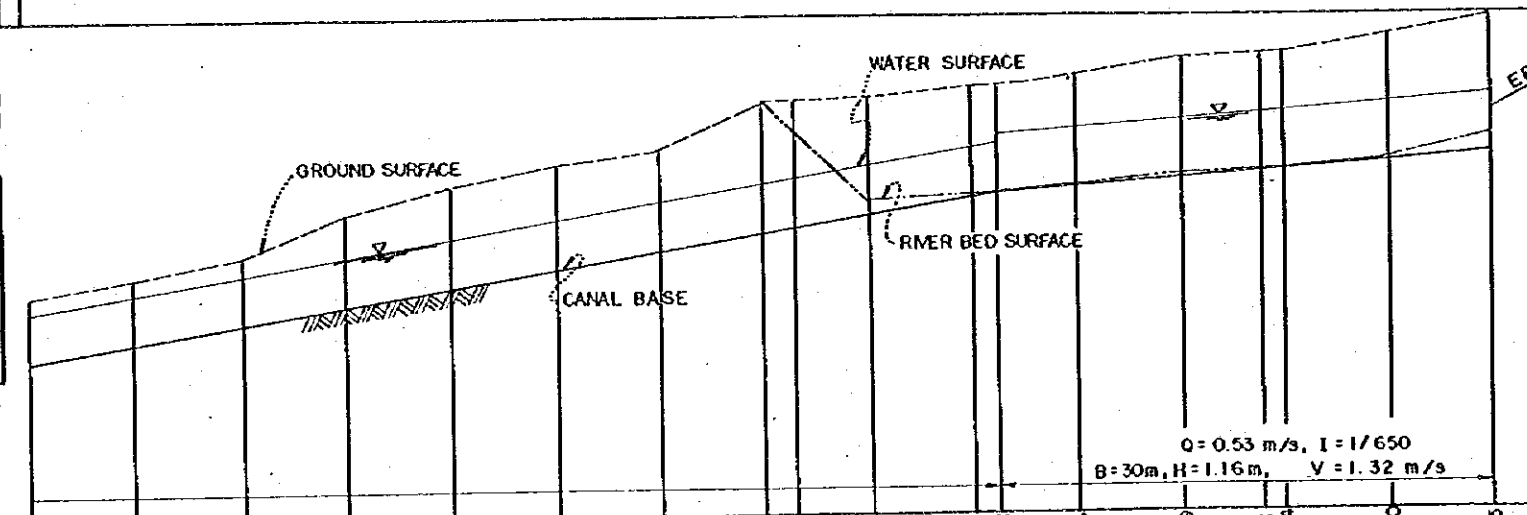
BP of FLOOD WAY



CANAL BASE ELEVATION	505.00	505.20	505.40	505.60	505.80	506.00	506.20	506.40	506.60	506.80	507.00	507.20	507.34	507.67	508.00	508.34	508.67	509.01	509.34	509.67	510.01	510.34	
WATER SURFACE ELEVATION	506.07	506.27	506.47	506.67	506.87	507.07	507.27	507.47	507.67	507.87	508.07	508.27	508.54	508.67	508.74	508.84	508.90	509.01	509.10	509.17	509.24	509.31	509.38
GROUND SURFACE ELEVATION	506.60	506.60	506.90	507.10	507.20	507.50	507.50	507.60	507.80	508.00	508.10	508.50	508.60	508.60	509.30	509.60	510.00	510.50	510.70	510.60	510.94	511.30	511.60
REDUCED DISTANCE	0	100	200	300	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000		
DISTANCE	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
STATION	-5	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
HORIZONTAL CURVE																							

FLOOD WAY (2/2)

ELEVATION IN METER
512
511
510
509
508



NOTE; () IN GROUND SURFACE MEANS RIVER BED ELEVATION

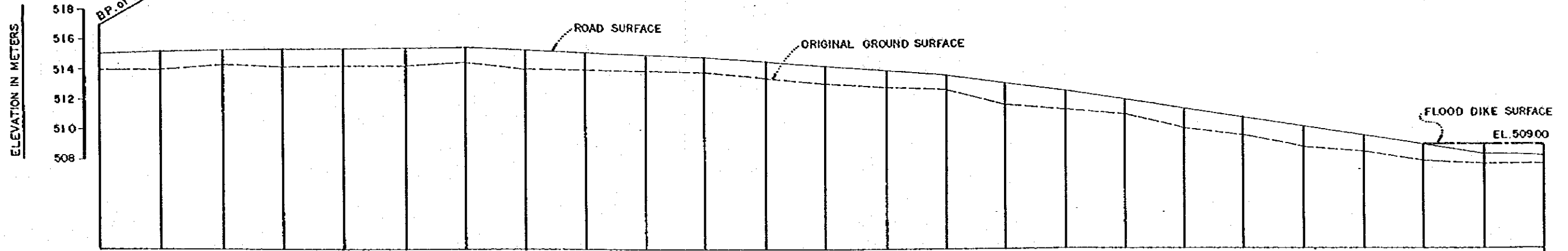
CANAL BASE ELEVATION	510.34	510.67	511.01	511.34	511.67	512.01	512.34	512.67	512.77	513.01	513.34	513.42	513.69	513.81	513.84	514.00	514.15						
WATER SURFACE ELEVATION	511.27	511.60	511.94	512.27	512.60	512.94	513.27	513.60	513.70	513.94	514.27	514.35	514.85	514.97	515.00	515.16	515.31						
GROUND SURFACE ELEVATION	511.60	511.90	512.30	513.10	513.60	514.00	514.30	515.00	515.20	515.30	516.00	516.20	516.00	516.10	516.10	516.50	516.80						
REDUCED DISTANCE	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,730	2,800	2,900	2,925	3,000	3,100	3,180	3,200	3,300						
DISTANCE	100	100	100	100	100	100	100	100	30	70	100	25	100	80	20	100	100						
STATION	17	18	19	20	21	22	23	24	24+30	25	26	26+25	27	28	28+80	29	30						
HORIZONTAL CURVE																							

IP:1
IA = 50-00-00
IP:2
IA = 50-00-00

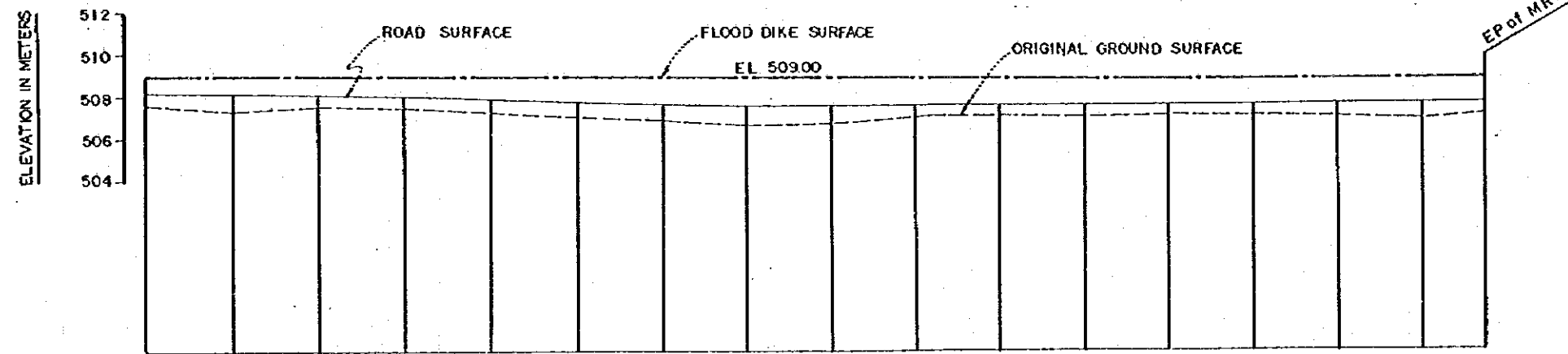
THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
 PROFILE OF YONGOMA FLOODWAY
 Date _____ Drawing No. 200-09
 JAPAN INTERNATIONAL COOPERATION AGENCY

MR-3

PLATE NO. 12



ROAD SURFACE ELEVATION	515.00	515.15	515.30	515.35	515.40	515.45	515.50	515.35	515.20	515.05	514.90	514.60	514.30	514.00	513.70	513.13	512.57	512.00	511.40	510.80	510.20	509.60	509.00	508.35	508.25
GROUND SURFACE ELEVATION	513.9	513.9	514.3	514.2	514.3	514.3	514.5	514.1	514.1	514.0	513.9	513.5	513.1	512.9	512.7	511.7	511.3	511.0	510.1	509.6	508.8	508.5	507.9	507.7	507.5
REDUCED DISTANCE	0	100	200	300	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400
DISTANCE	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
STATION NO.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24



ROAD SURFACE ELEVATION	508.25	508.18	508.10	508.00	507.90	507.80	507.70	507.60	507.65	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70	507.70
GROUND SURFACE ELEVATION	507.6	507.3	507.6	507.5	507.3	507.1	506.9	506.7	506.8	507.1	507.2	507.2	507.2	507.2	507.2	507.1	507.0	507.0	507.0	507.0	507.0	507.0	507.0	507.2
REDUCED DISTANCE	2,400	2,500	2,600	2,700	2,800	2,900	3,000	3,100	3,200	3,300	3,400	3,500	3,600	3,700	3,800	3,800	3,800	3,800	3,800	3,800	3,870	3,870	3,870	3,870
DISTANCE	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	70	70	70	70
STATION NO.	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
 PROFILE OF MAIN FARM ROAD & FLOOD DIKE, MR-3
 Date _____ Drawing No. 200-10
 JAPAN INTERNATIONAL COOPERATION AGENCY

LEGEND

- O TURNOUT (TO)
- X CHECK (CK)
- (X) PARSHALL FLUME (PF)
- CV CULVERT (CV)
- SP SPILLWAY (SP)
- CD GROSS DRAIN (CD)
- BR BRIDGE (BR) OR FOOT PATH (FP)
- AQ AQUEDUCT (AQ)
- DP DROP (DP)
- DG DRAINAGE GATE (DG)

LEGEND

- MAIN CANAL
- SECONDARY CANAL
- TERTIARY CANAL
- MAIN DRAIN
- SECONDARY DRAIN
- TERTIARY DRAIN OR CATCH DRAIN
- MAIN FARM ROAD
- BRANCH FARM ROAD



THE UNITED REPUBLIC OF TANZANIA

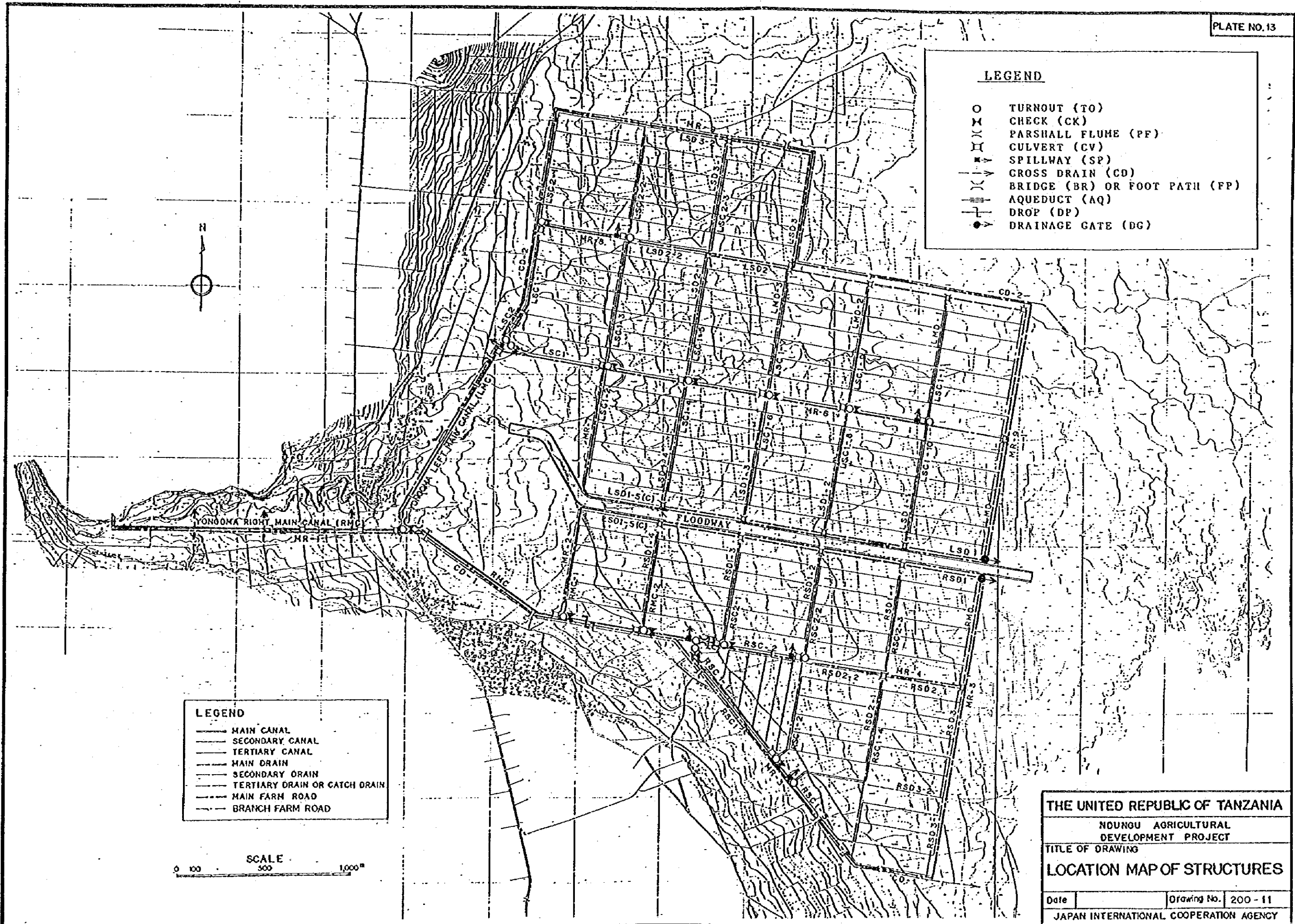
NOUNOU AGRICULTURAL DEVELOPMENT PROJECT

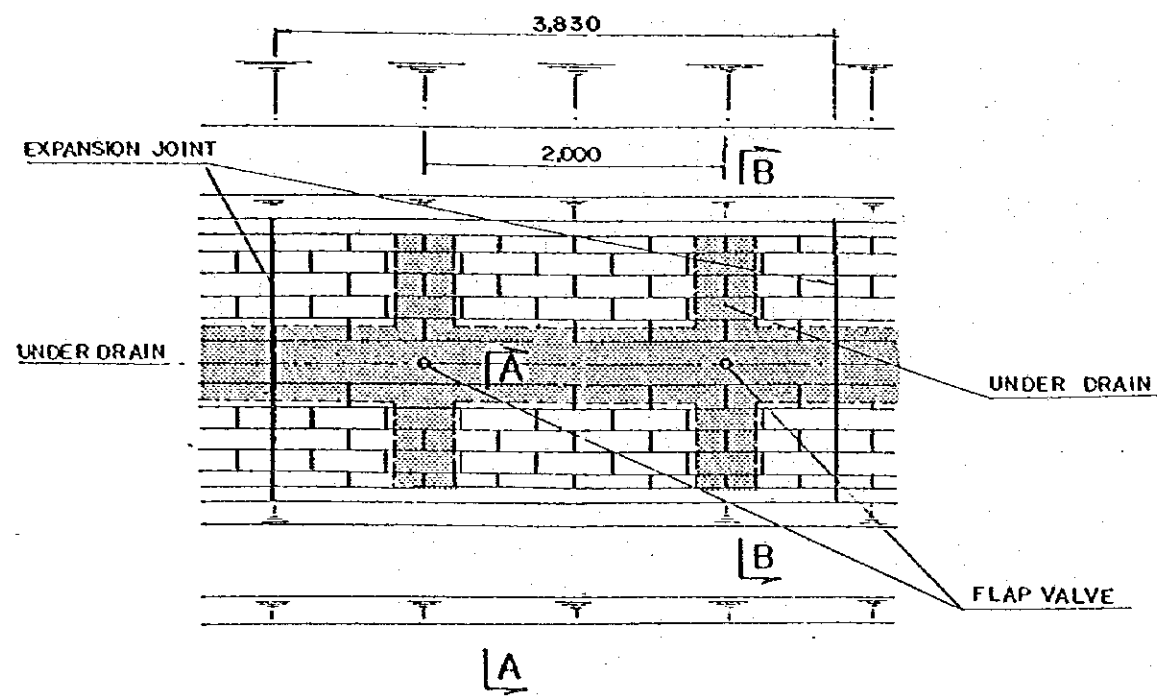
TITLE OF DRAWING

LOCATION MAP OF STRUCTURES

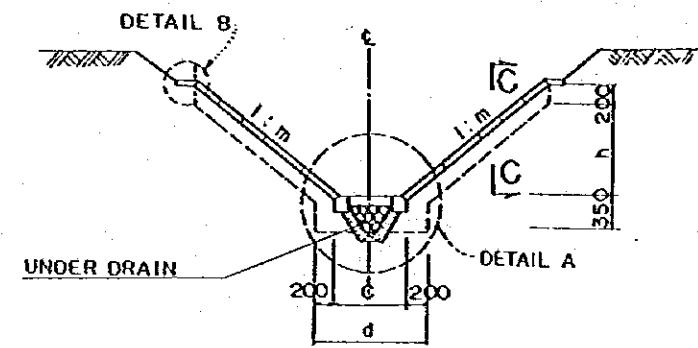
Date Drawing No. 200-11

JAPAN INTERNATIONAL COOPERATION AGENCY

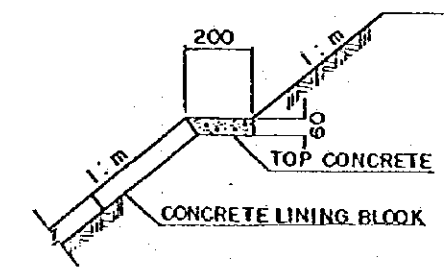




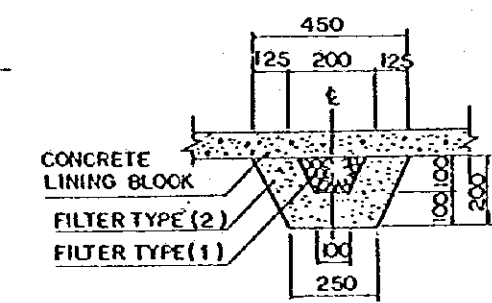
PLAN
SCALE: A



SECTION B-B
SCALE: B



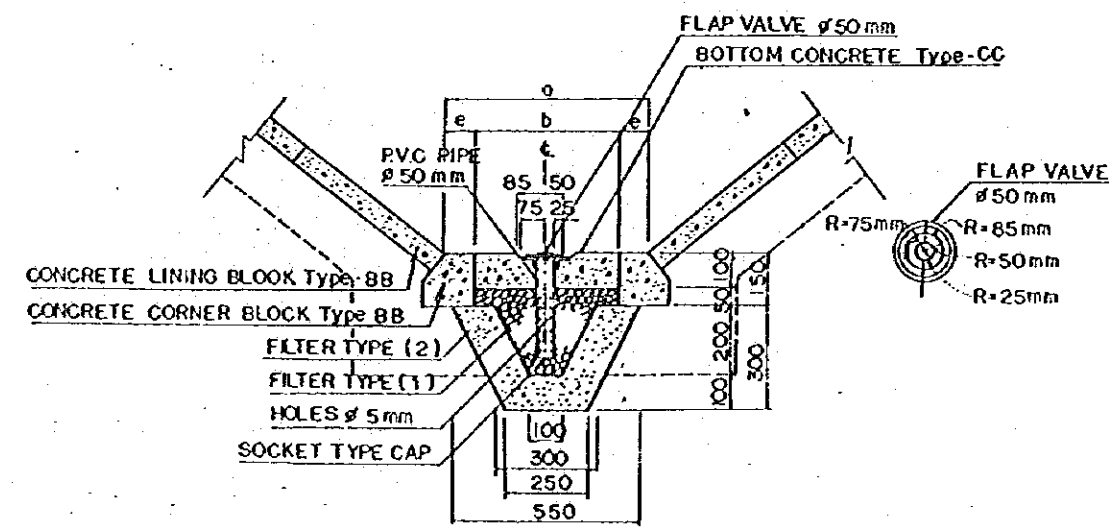
DETAIL B
SCALE: B



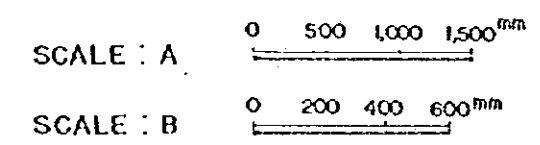
SECTION C-C
SCALE: B

DIMENSION OF UNDERDRAIN

CANAL TYPE	a	b	c	d	e	h
A	1.25	600	420	720	1,120	930
B	1.25	500	320	620	1,020	770
C	1.25	400	220	520	920	580
D1	1.00	300	150	450	850	460
D2	1.00	300	150	450	850	350
D3	1.00	300	150	450	850	240



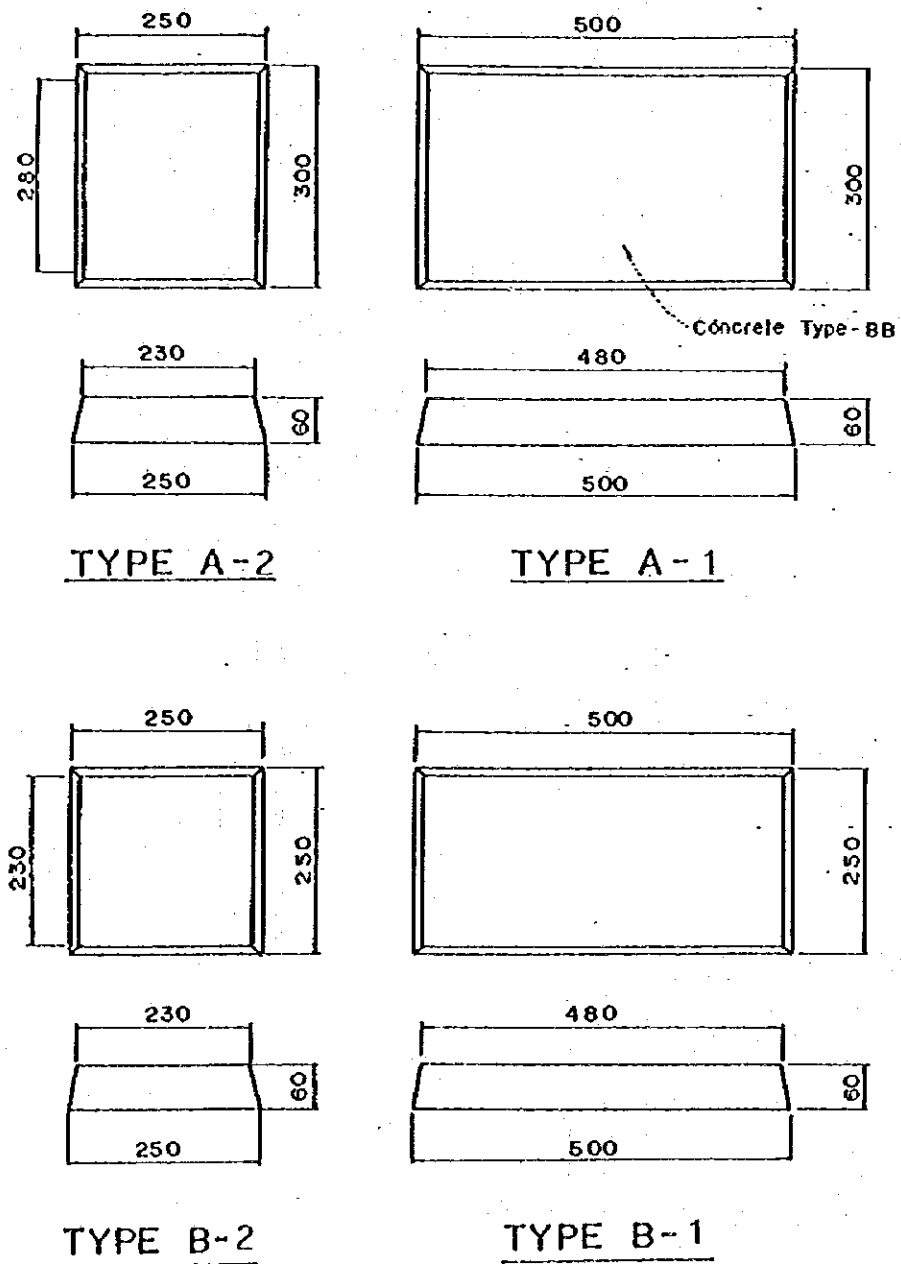
DETAIL A
SCALE: B



THE UNITED REPUBLIC OF TANZANIA
 NOUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
CANAL LINING (1/2)
 Date _____ Drawing No. | 200 - 12
 JAPAN INTERNATIONAL COOPERATION AGENCY

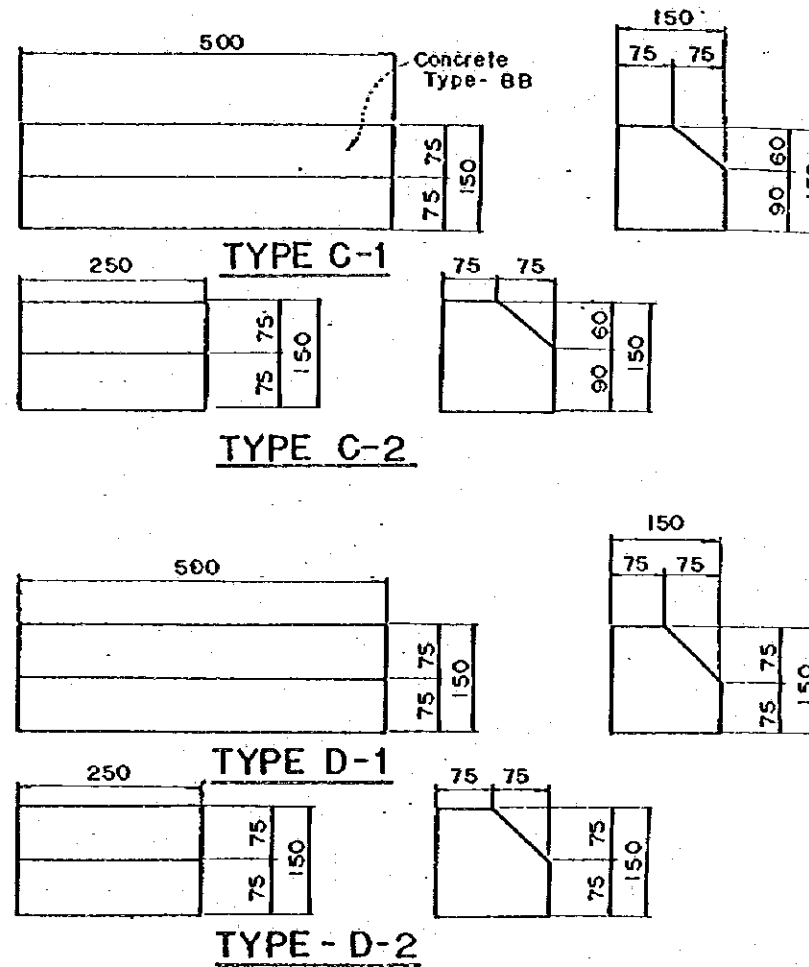
CONCRETE LINING BLOCK

SCALE : A



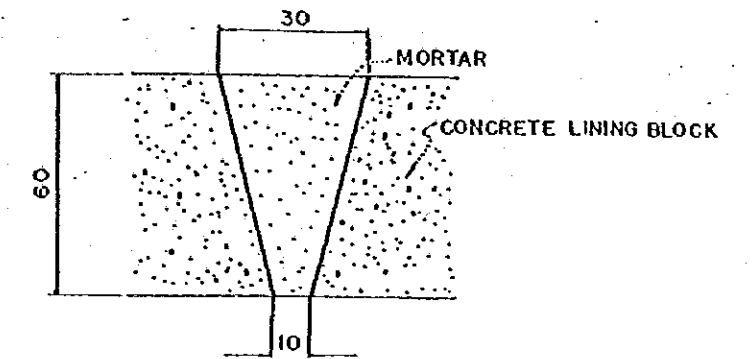
CONCRETE CORNER BLOCK

SCALE : A



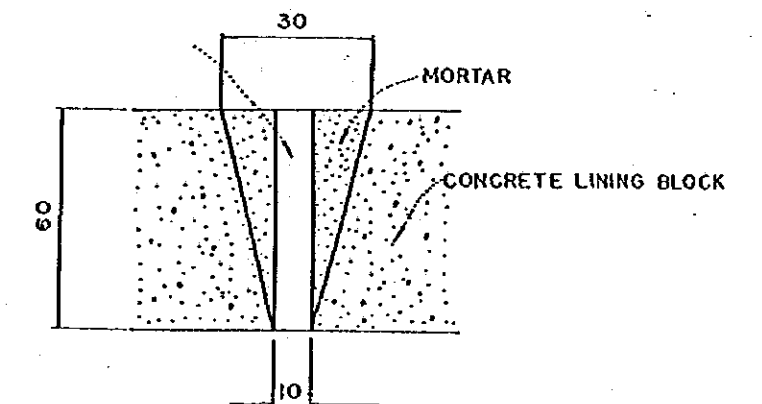
JOINT

SCALE : B



EXPANSION JOINT

SCALE : B

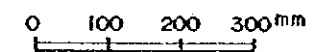


REQUIRED NOS. OF BLOCKS

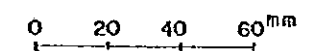
PER 3.83 meters

CANAL TYPE	CANAL HEIGHT	SLOPE LENGTH	PC LINING BLOCK				PC CORNER BLOCK			
			A-1	A-2	B-1	B-2	C-1	C-2	D-1	D-2
A	1,130	1,810	70	10	14	2	14	2	-	-
B	970	1,550	70	10	-	-	14	2	-	-
C	780	1,240	56	8	-	-	14	2	-	-
D1	660	930	42	6	-	-	-	-	14	2
D2	550	780	-	-	42	6	-	-	14	2
D3	440	620	28	4	-	-	-	-	14	2

SCALE : A



SCALE : B



THE UNITED REPUBLIC OF TANZANIA

NDUNGU AGRICULTURAL DEVELOPMENT PROJECT

TITLE OF DRAWING

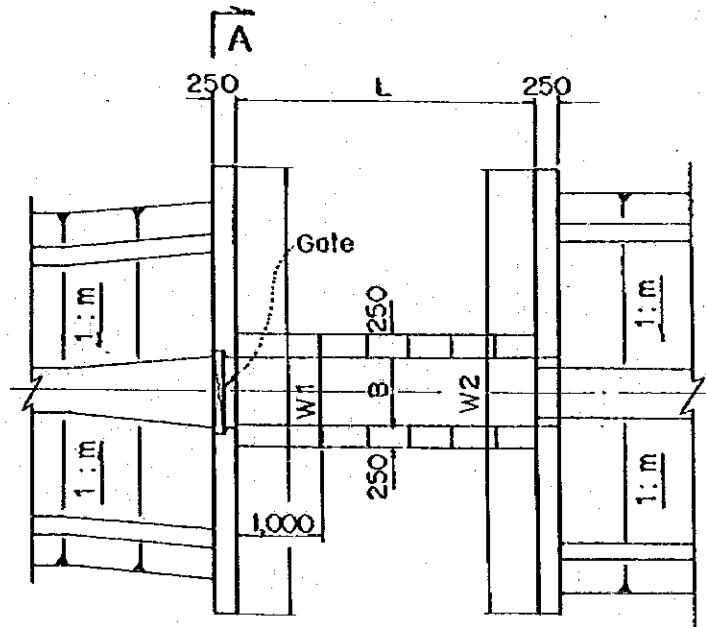
CANAL LINING (2/2)

Date

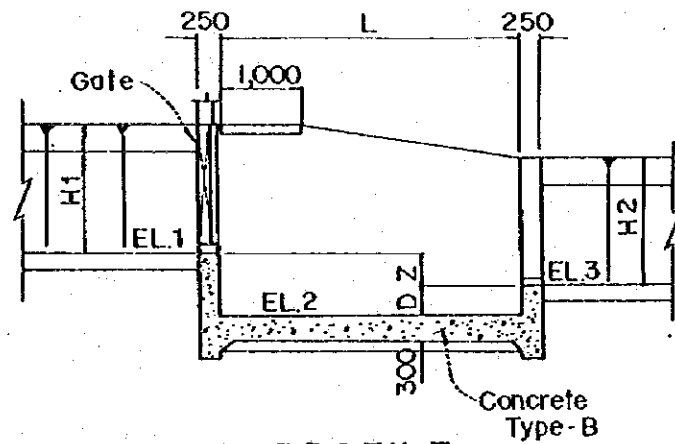
Drawing No. 200-13

JAPAN INTERNATIONAL COOPERATION AGENCY

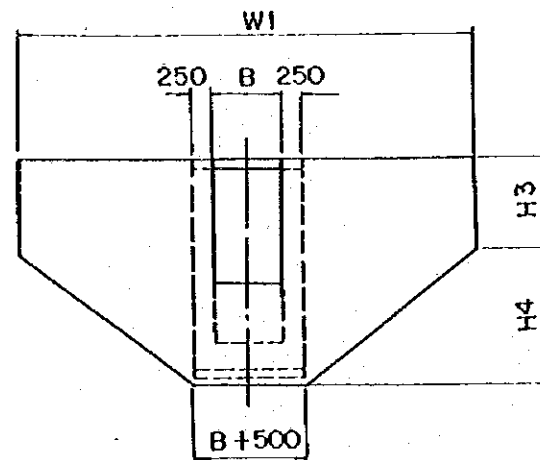
CHECK



PLAN



PROFILE

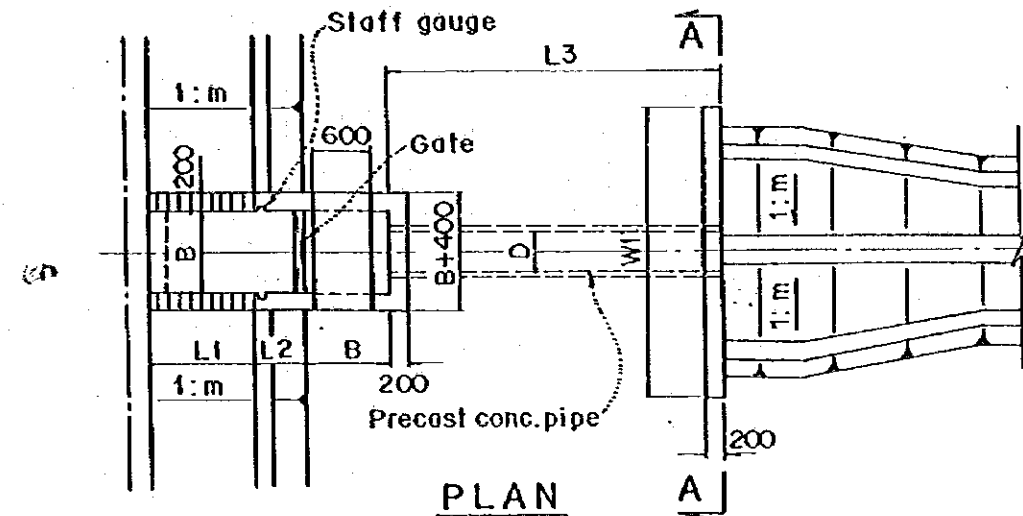


SECTION A-A

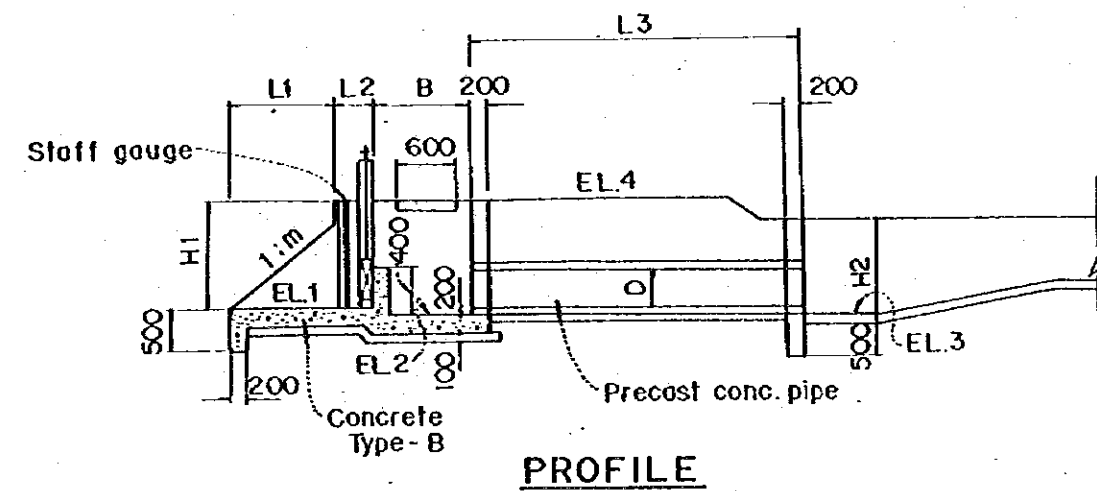
DIMENSION OF CHECK
Unit : mm

TYPE	Q (m ³ /s)	B	L
I	~0.10	400	1,500
II	0.10 ~ 0.25	500	1,500
III	0.25 ~ 0.50	600	2,000
IV	0.50 ~	700	2,000

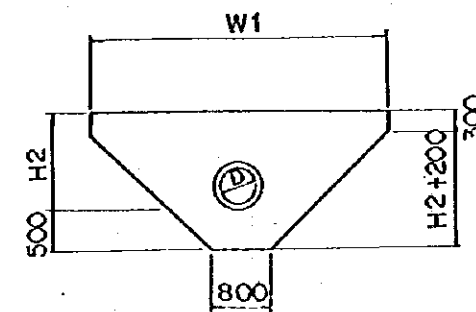
TURNOUT



PLAN



PROFILE



SECTION A-A

DIMENSION OF TURNOUT
Unit : mm

TYPE	Q (m ³ /s)	D	B
I	~0.06	300	700
II	0.06 ~ 0.10	400	700
III	0.10 ~ 0.20	500	1,000
IV	0.20 ~ 0.35	600	1,200
V	0.35 ~ 0.60	800	1,400
VI	0.60 ~	1,000	1,600

SCALE



THE UNITED REPUBLIC OF TANZANIA

NOUNGU AGRICULTURAL
DEVELOPMENT PROJECT

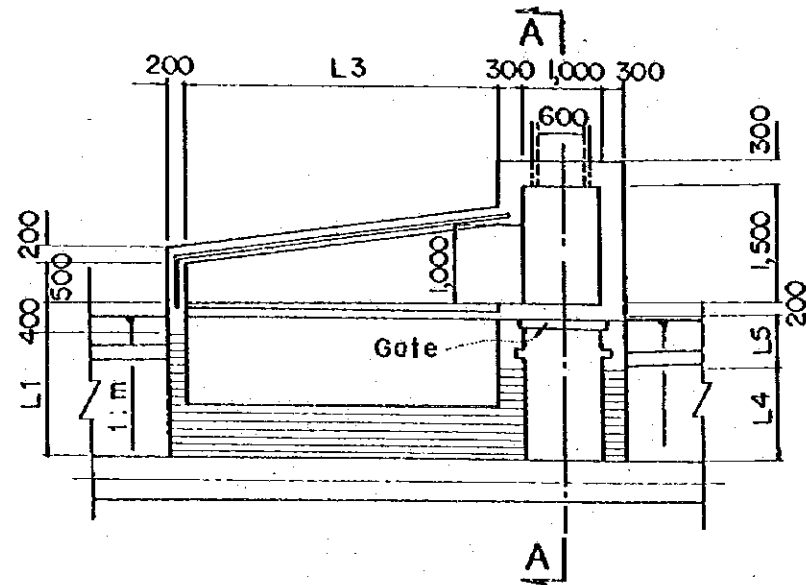
TITLE OF DRAWING

CHECK AND TURNOUT

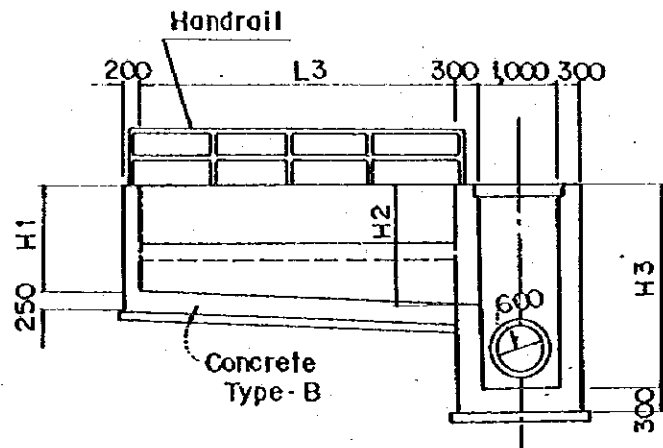
Date _____ Drawing No. 200 - 14

JAPAN INTERNATIONAL COOPERATION AGENCY

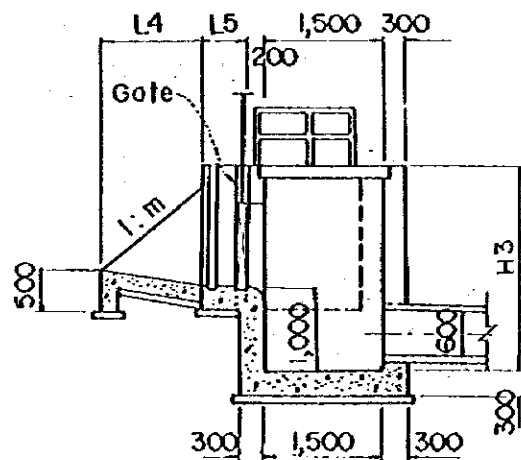
SPILLWAY



PLAN
(SCALE - B)



PROFILE
(SCALE - B)

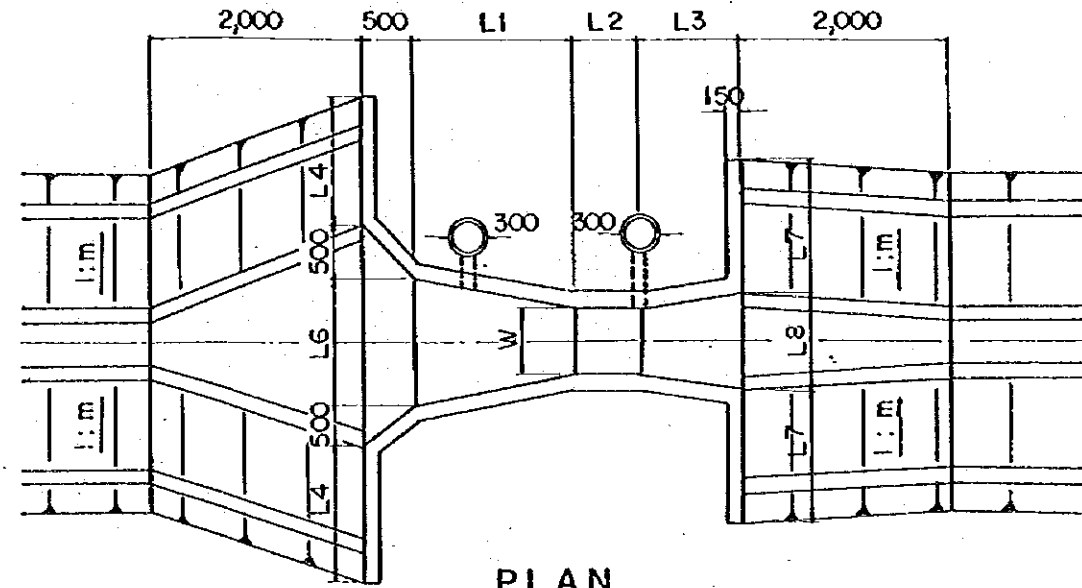


SECTION A-A
(SCALE - B)

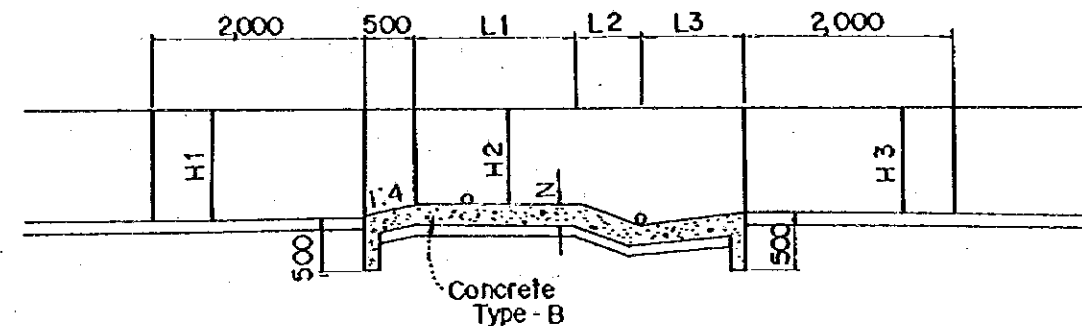
DIMENSION OF SPILLWAY
Unit : mm

TYPE	Q(m ³ /s)	L3
I	~ 0.5	3,000
II	0.5 ~ 0.8	6,000
III	0.8 ~	10,000

PARSHALL FLUME



PLAN
(SCALE - A)



PROFILE
(SCALE - A)

DIMENSION OF PARSHALL FLUME

Unit : mm

TYPE	W	L1	L2	L3	L6	L8	H2	H3
I	152	610	305	610	397	394	610	114
II	229	864	305	457	575	381	762	114
III	305	1,348	610	714	845	610	914	229
IV	610	1,495	610	914	1,206	914	914	229

SCALE - A 0 1 2 3m

SCALE - B 0 1 2 3 4 5m

THE UNITED REPUBLIC OF TANZANIA

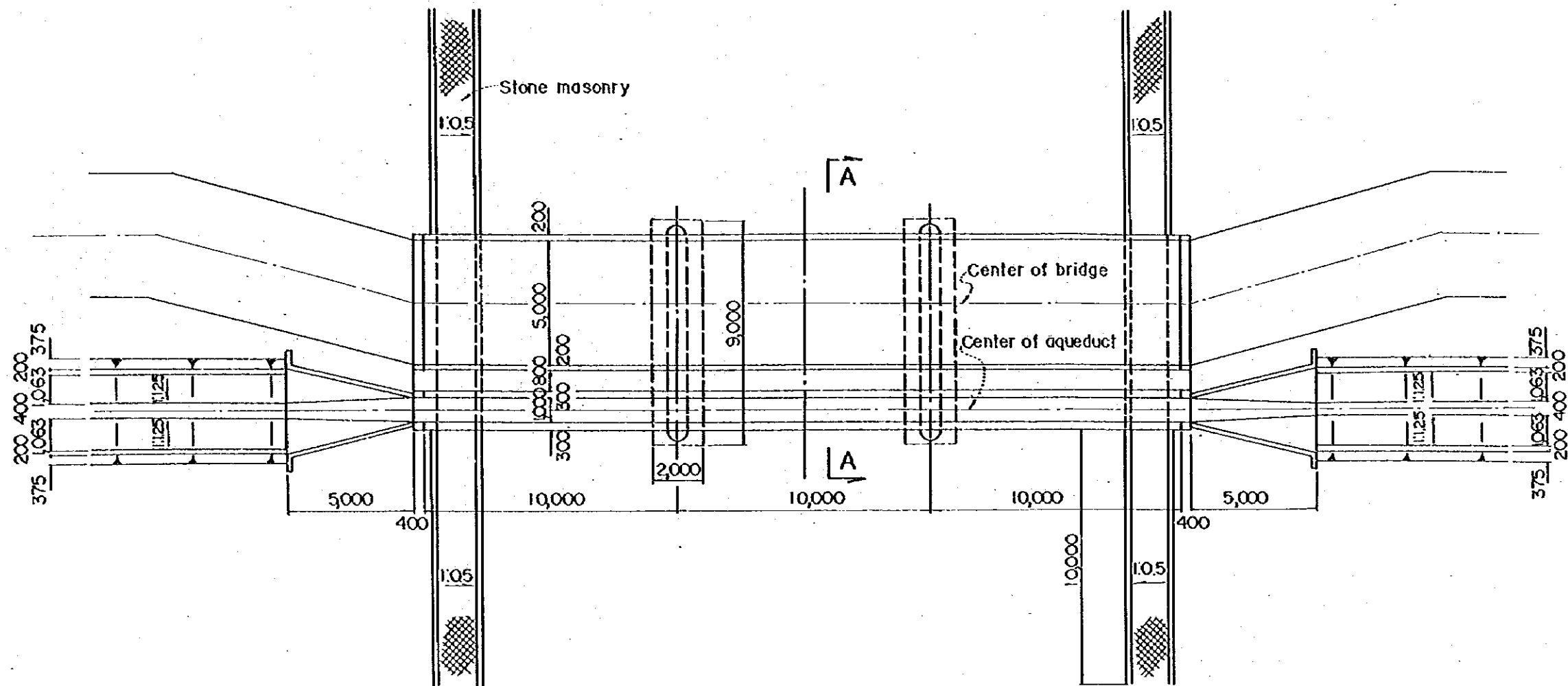
NDUNGU AGRICULTURAL
DEVELOPMENT PROJECT

TITLE OF DRAWING

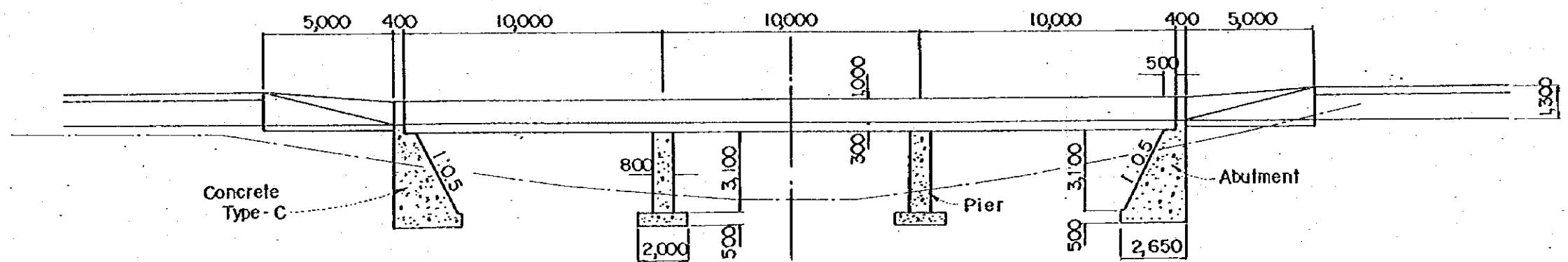
SPILLWAY AND PARSHALL FLUME

Date Drawing No. 200 - 15

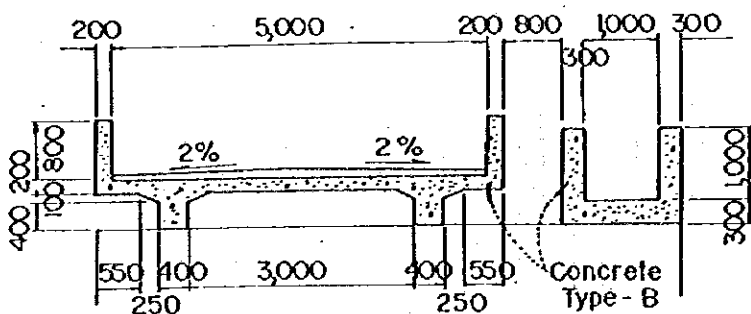
JAPAN INTERNATIONAL COOPERATION AGENCY



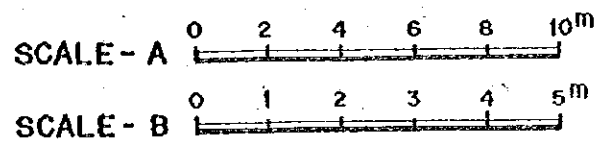
PLAN
(SCALE - A)



PROFILE
(SCALE - A)

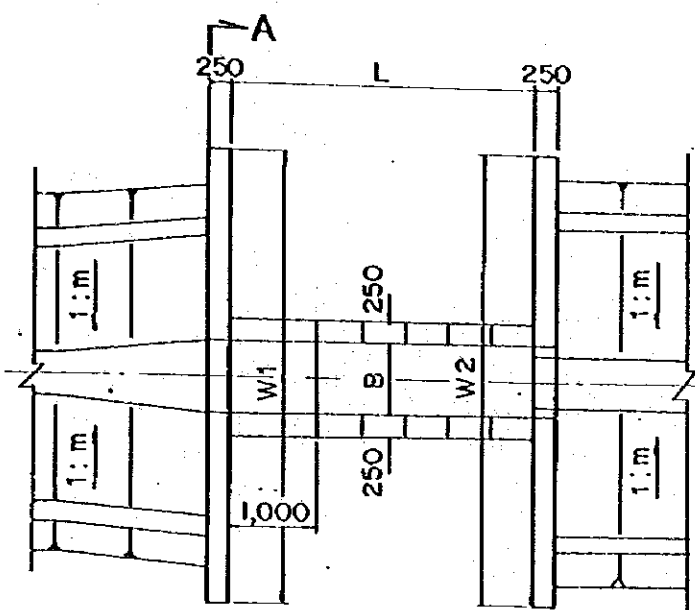


SECTION A-A
(SCALE - B)

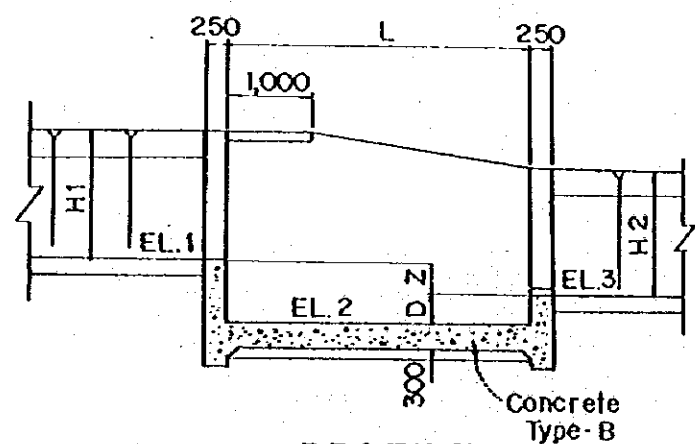


THE UNITED REPUBLIC OF TANZANIA	
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
AQUEDUCT AND BRIDGE	
Date	Drawing No. 200 - 16
JAPAN INTERNATIONAL COOPERATION AGENCY	

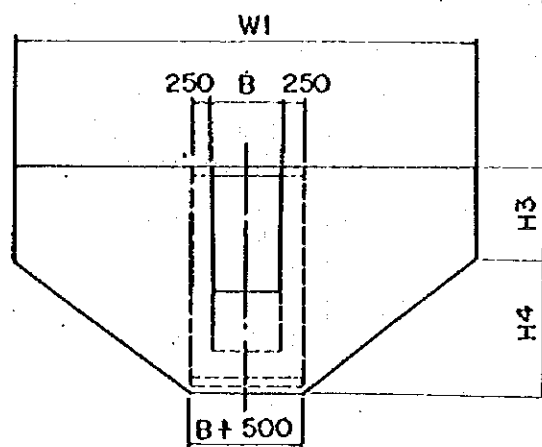
DROP



PLAN
(SCALE - B)



PROFILE
(SCALE - B)

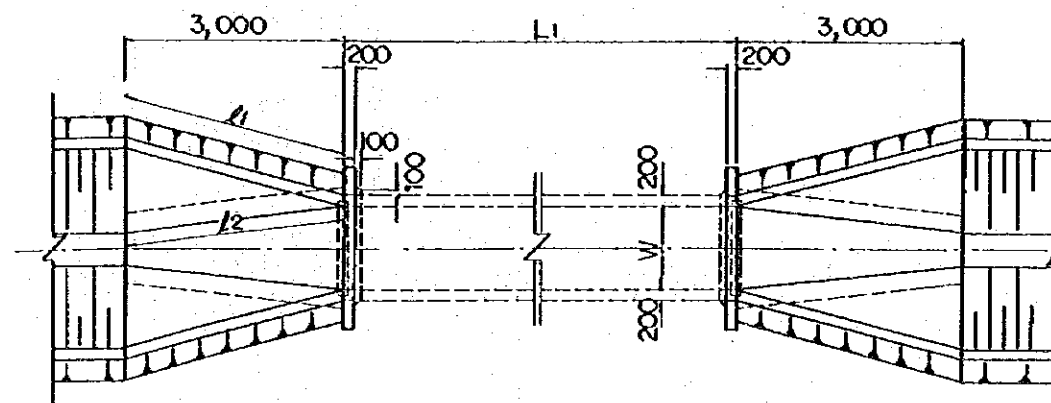


SECTION A-A
(SCALE - B)

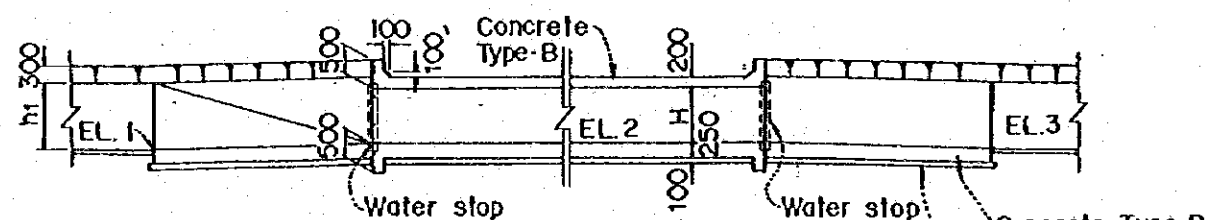
DIMENSION OF DROP
Unit : mm

TYPE	Q (m ³ /s)	B	L
I	~ 0.10	400	1,500
II	0.10 ~ 0.25	500	1,500
III	0.25 ~ 0.50	600	2,000
IV	0.50 ~	700	2,000

BOX TYPE



PLAN
(SCALE - A)



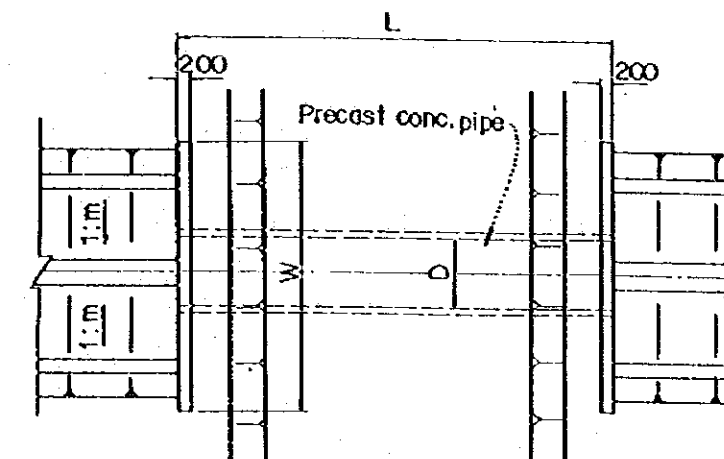
PROFILE
(SCALE - A)

DIMENSION OF BOX CULVERT
Unit : mm

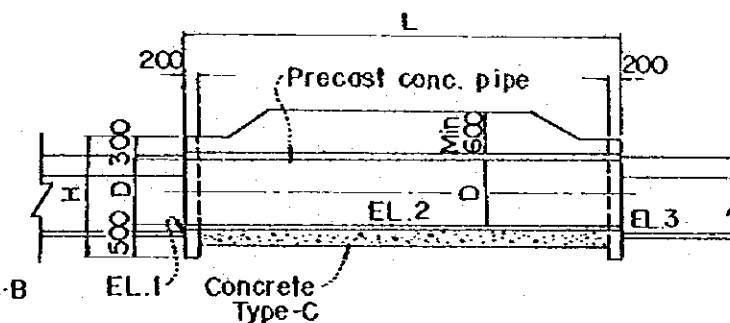
TYPE	Q (m ³ /s)	H	W
I	0.6 ~ 1.3	1,000	1,000
II	1.3 ~	1,000	1,500

IRRIGATION CULVERT

PIPE TYPE



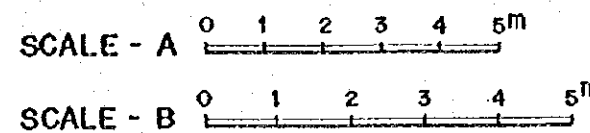
PLAN
(SCALE - B)



PROFILE
(SCALE - B)

DIMENSION OF PIPE CULVERT
Unit : mm

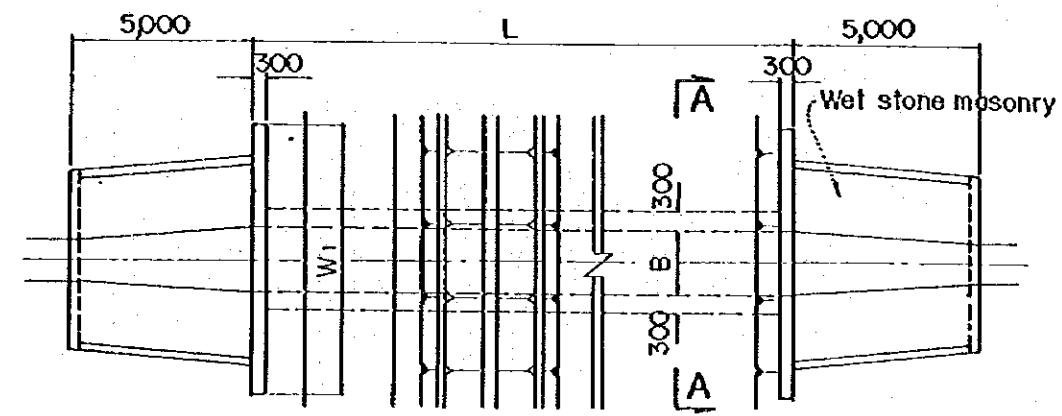
TYPE	Q (m ³ /s)	D	W
I	~ 0.2	500	2,400
II	0.2 ~ 0.3	600	2,600
III	0.3 ~ 0.5	800	3,000
IV	0.5 ~ 0.6	1,000	4,000



THE UNITED REPUBLIC OF TANZANIA
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
TITLE OF DRAWING
IRRIGATION DROP AND CULVERT
Date _____ Drawing No. 200 - 17
JAPAN INTERNATIONAL COOPERATION AGENCY

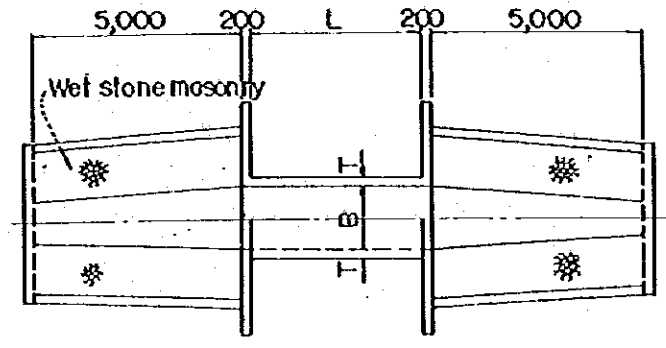
DRAINAGE CULVERT

CROSSDRAIN



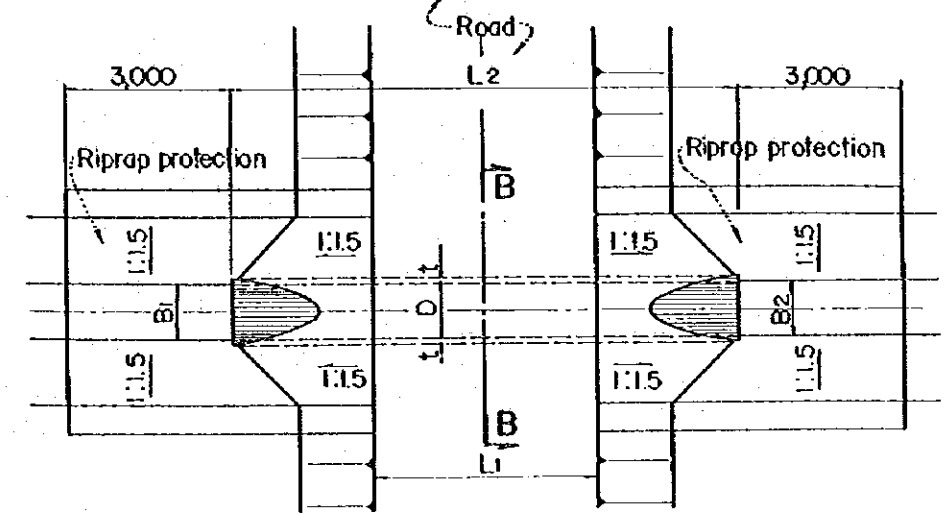
PLAN (SCALE - A)

BOX TYPE

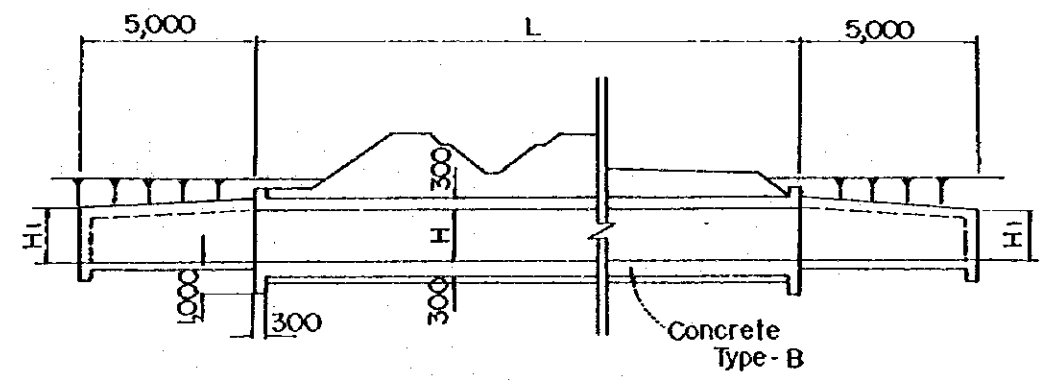


PLAN (SCALE - B)

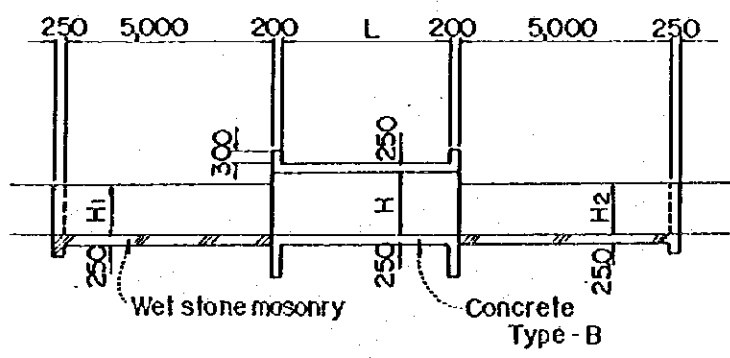
PIPE TYPE



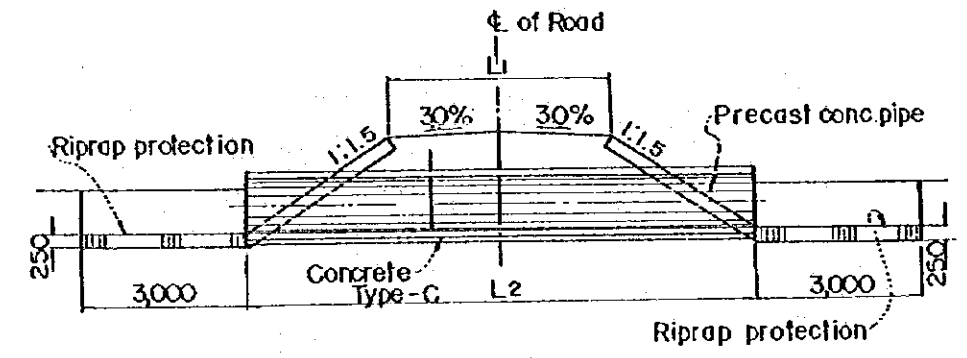
PLAN (SCALE - C)



PROFILE (SCALE - A)



PROFILE (SCALE - B)



PROFILE (SCALE - C)

DIMENSION OF CROSSDRAIN & BOX CULVERT

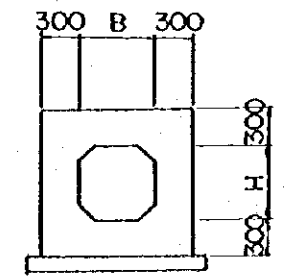
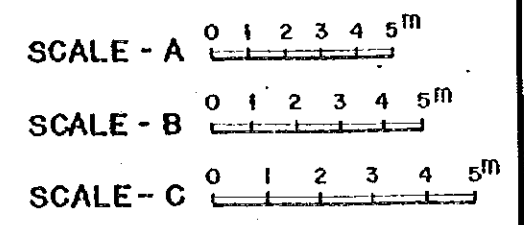
Unit : mm

TYPE	Barrel No.	Q (m ³ /s)	B	H
I	1	1.0 ~ 1.2	1,000	1,000
II	1	1.2 ~ 1.6	1,500	1,000
III	2	1.6 ~ 2.4	1,000	1,000
IV	1	2.4 ~ 3.6	2,000	1,500
V	2	3.6 ~ 5.4	1,500	1,500
VI	2	5.4 ~	2,000	1,500

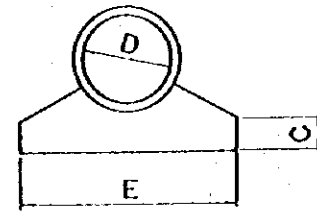
DIMENSION OF PIPE CULVERT

Unit : mm

TYPE	Q (m ³ /s)	D
I	~ 0.5	600
II	0.5 ~ 0.8	800
III	0.8 ~ 1.0	1,000



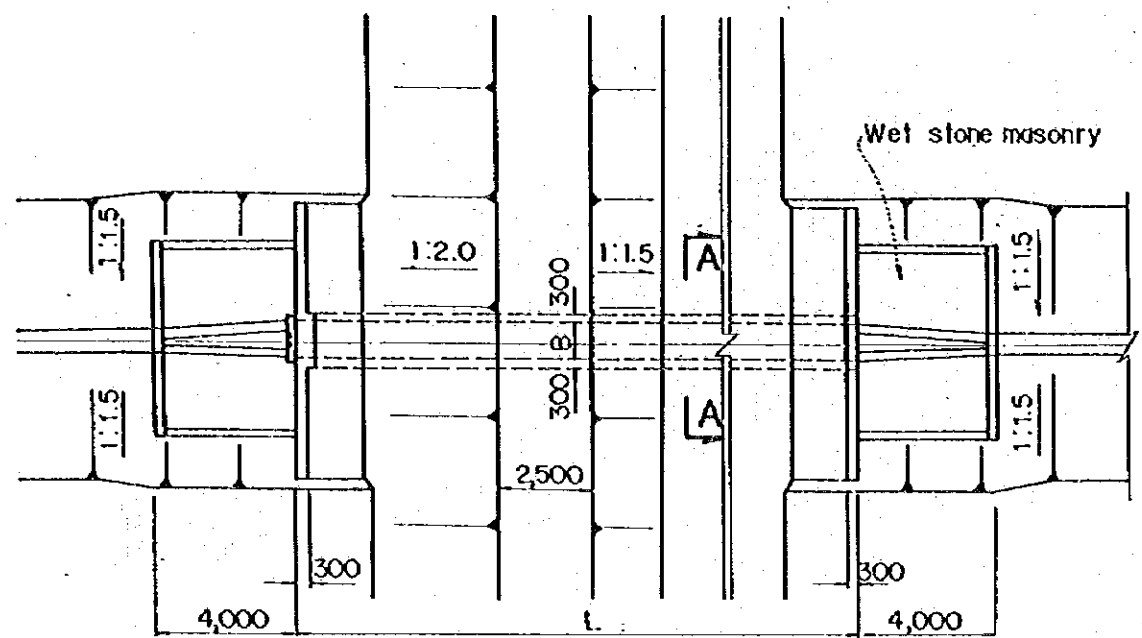
SECTION A-A



SECTION B-B

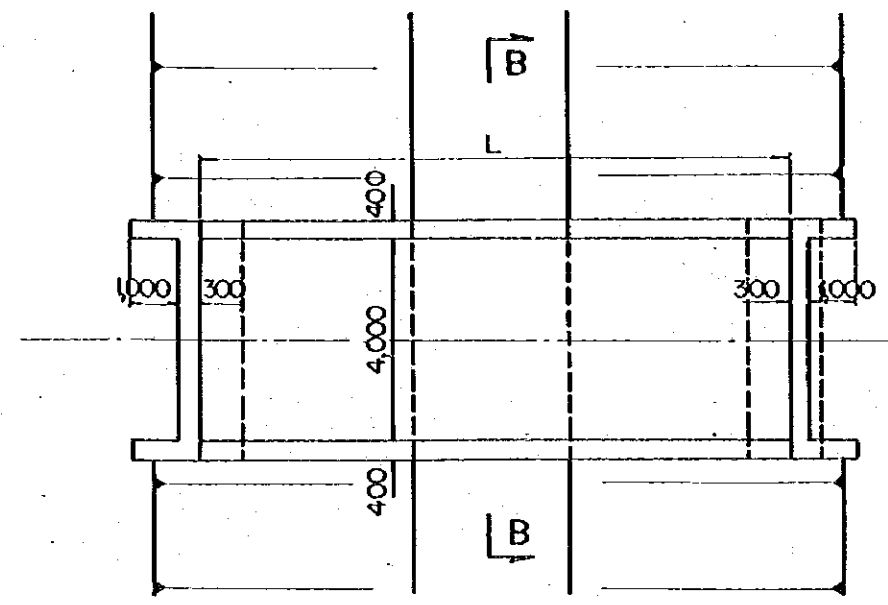
THE UNITED REPUBLIC OF TANZANIA
 NOUNOU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
CROSS DRAIN AND DRAINAGE CULVERT
 Date _____ Drawing No. 200-18
 JAPAN INTERNATIONAL COOPERATION AGENCY

DRAINAGE GATE

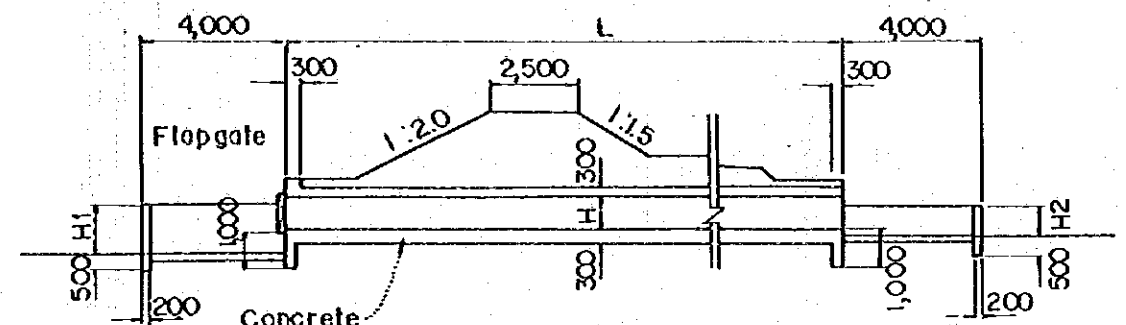


PLAN
(SCALE - A)

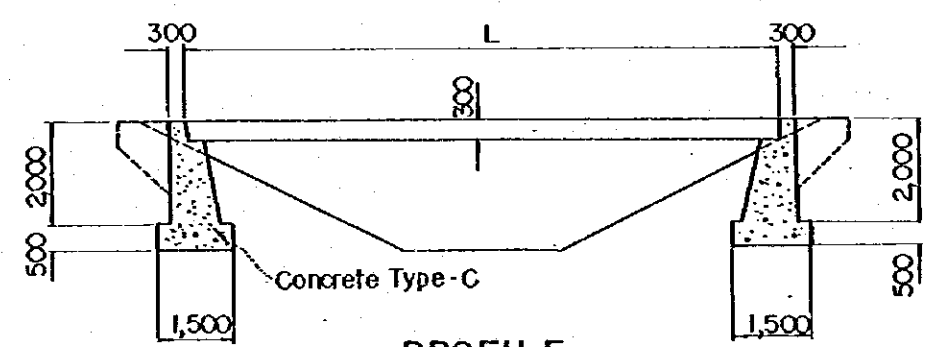
BRIDGE



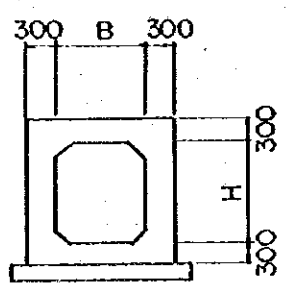
PLAN
(SCALE - B)



PROFILE
(SCALE - A)



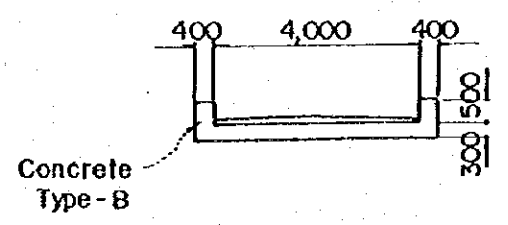
PROFILE
(SCALE - B)



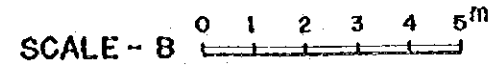
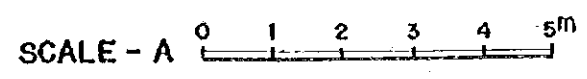
SECTION A-A

DIMENSION OF DRAINAGE GATE

TYPE	Q (m ³ /S)	B	H
I	~ 1.2	1,000	1,000
II	1.2 ~ 1.6	1,500	1,000
III	1.6 ~	2,000	1,500

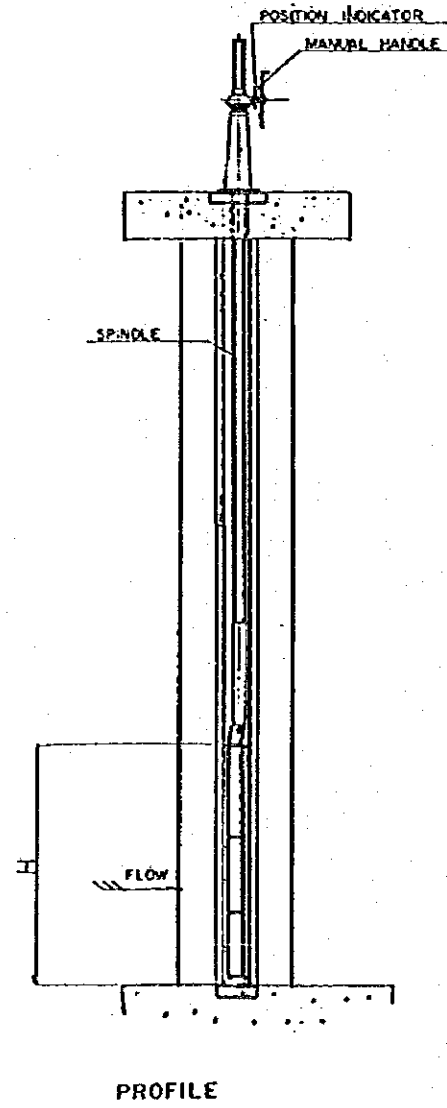
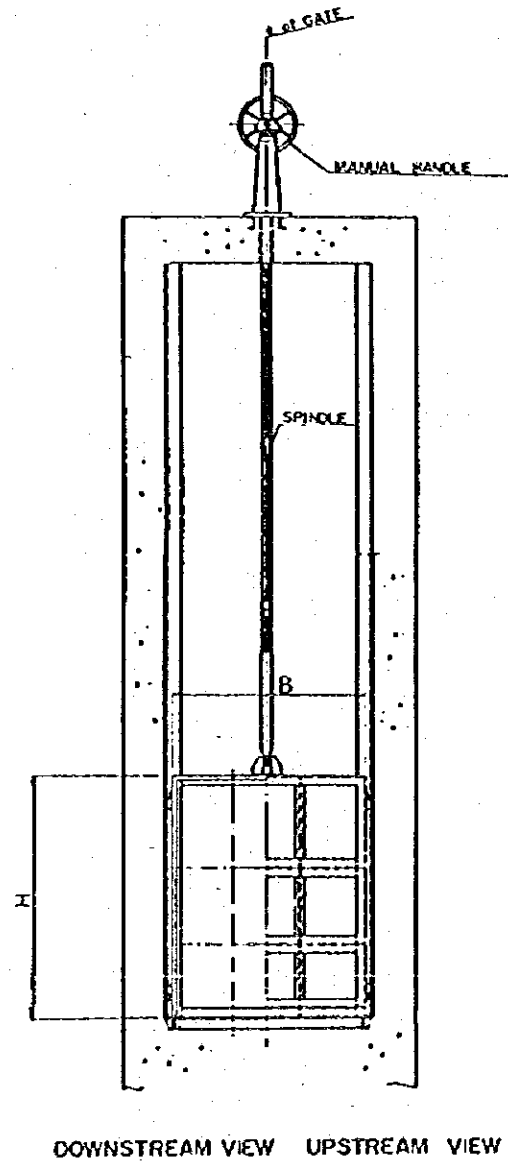


SECTION B-B
(SCALE - B)

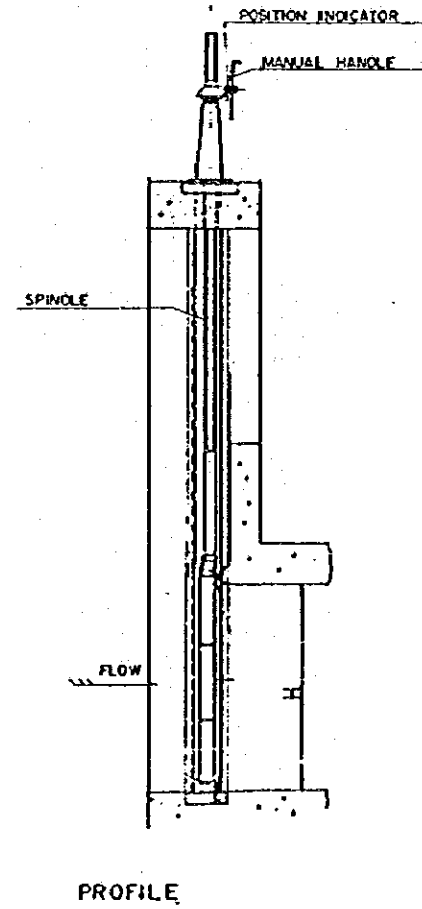


THE UNITED REPUBLIC OF TANZANIA
 NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
DRAINAGE GATE AND BRIDGE
 Date _____ Drawing No. 200-19
 JAPAN INTERNATIONAL COOPERATION AGENCY

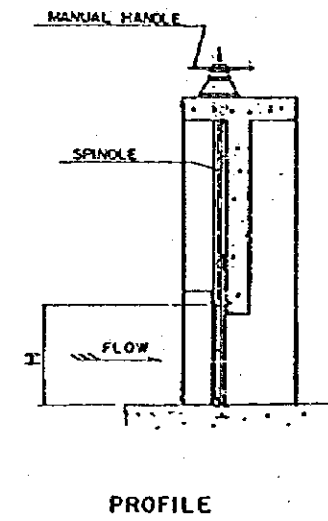
SCOURING SLUICE GATE



INLET GATE

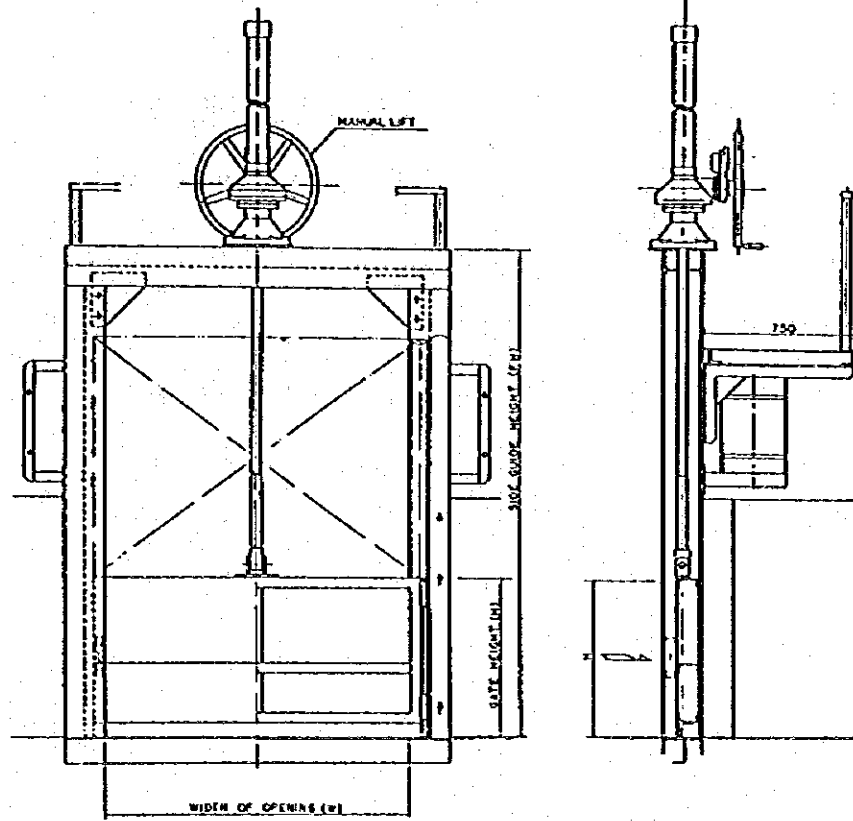


WASTE WAY GATE



THE UNITED REPUBLIC OF TANZANIA	
NOUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
GATE AND HOISTS (1/2)	
Date	Drawing No. 200-20
JAPAN INTERNATIONAL COOPERATION AGENCY	

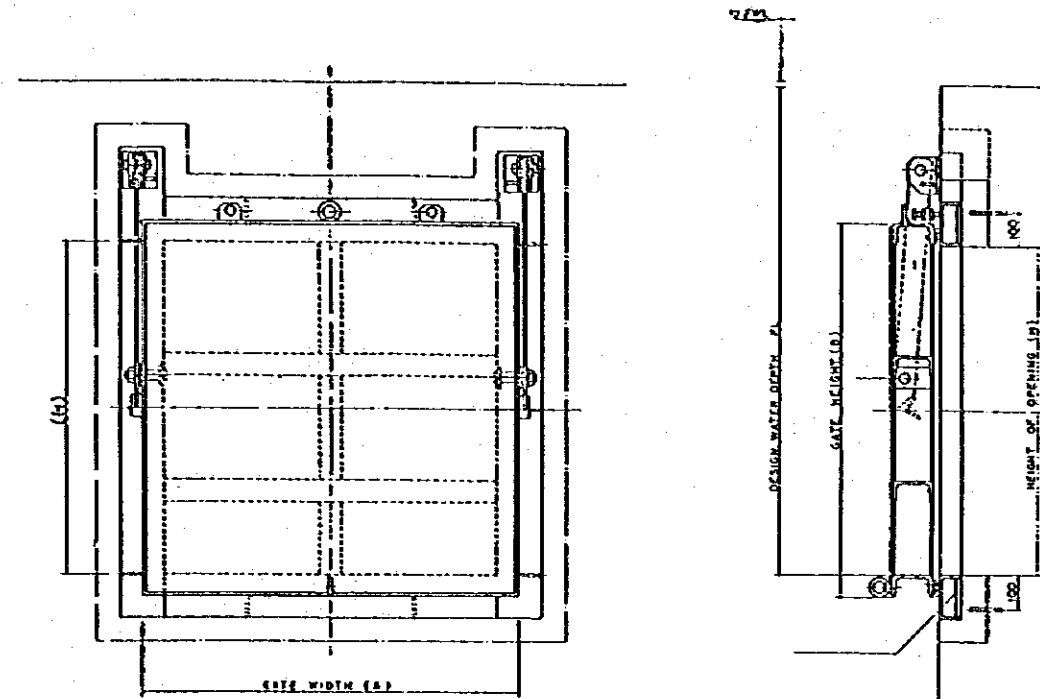
SLIDE GATE -TYPE A-



FRONT VIEW

SECTION

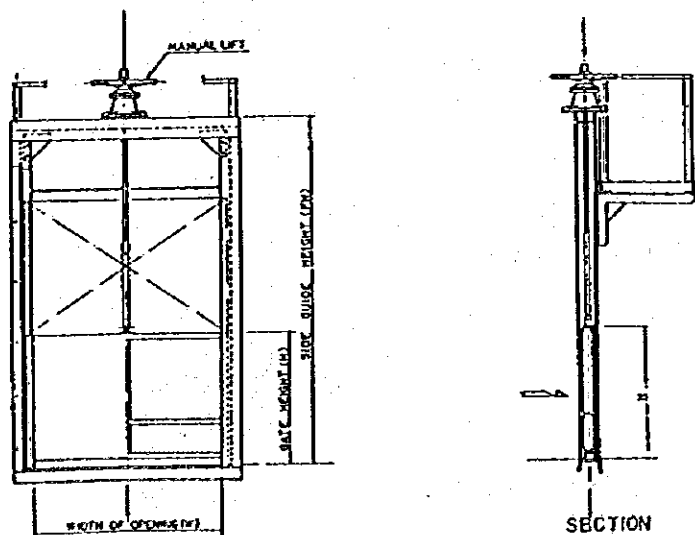
FLAP GATE



FRONT VIEW

SECTION

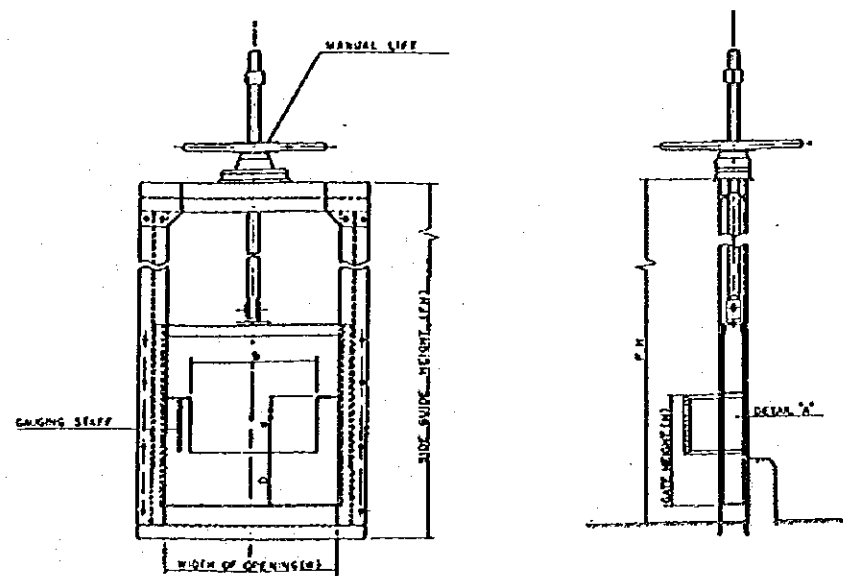
SLIDE GATE -TYPE B-



FRONT VIEW

SECTION

SLIDE GATE -TYPE T-



FRONT VIEW

SECTION

THE UNITED REPUBLIC OF TANZANIA

NDUNGU AGRICULTURAL
DEVELOPMENT PROJECT

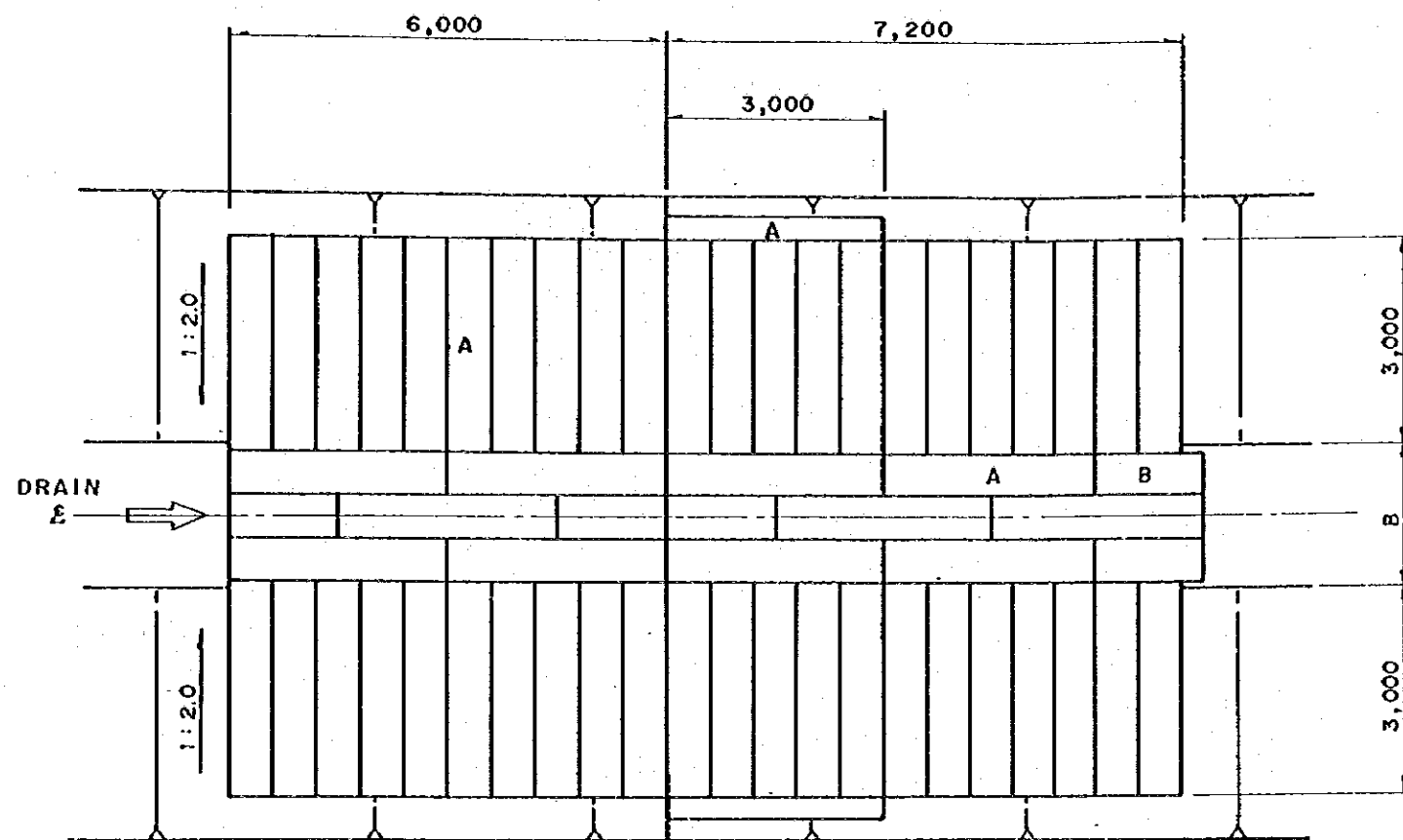
TITLE OF DRAWING

GATES AND HOISTS (2/2)

Date Drawing No. 200 - 21

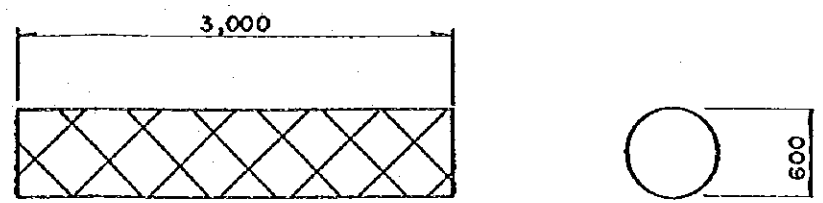
JAPAN INTERNATIONAL COOPERATION AGENCY

DRAINAGE DROP

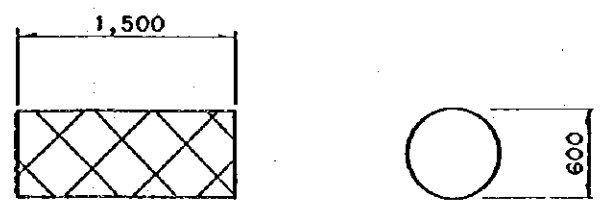


PLAN
SCALE A

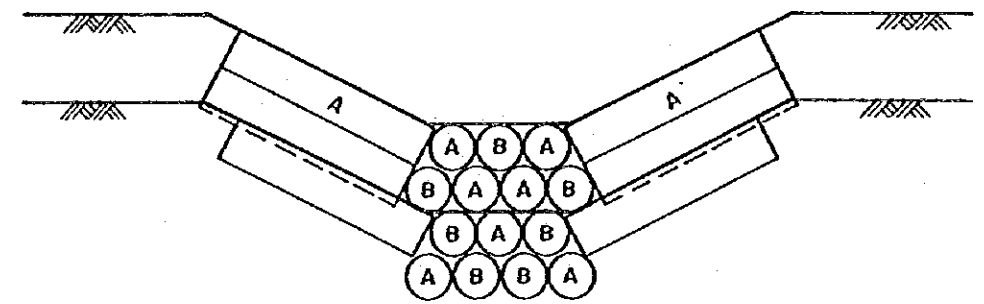
CYLINDER GABION



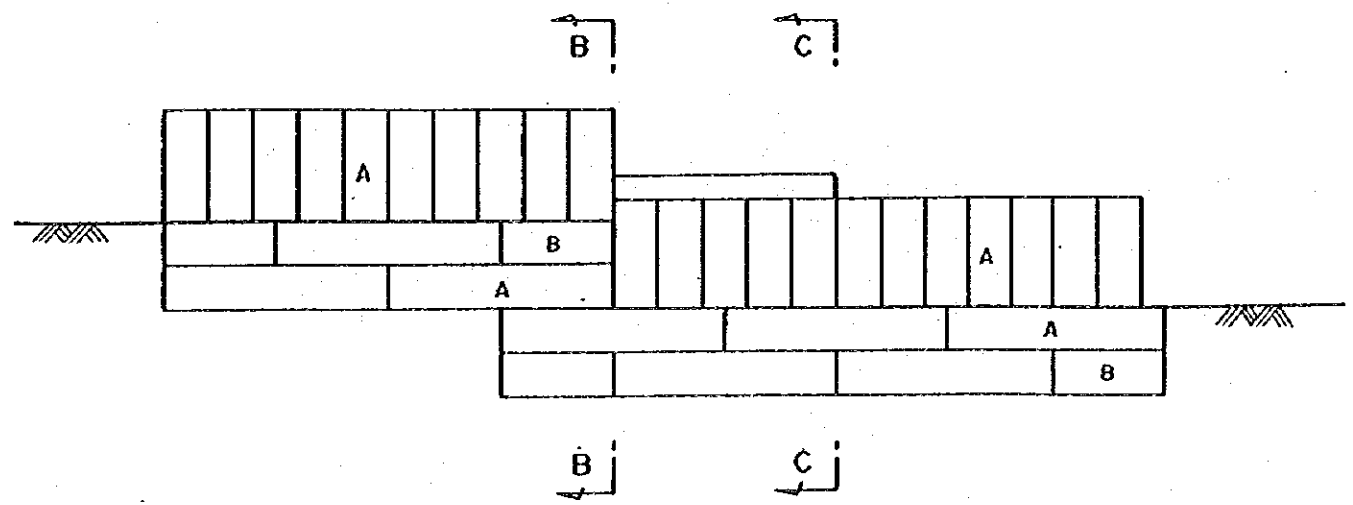
TYPE A



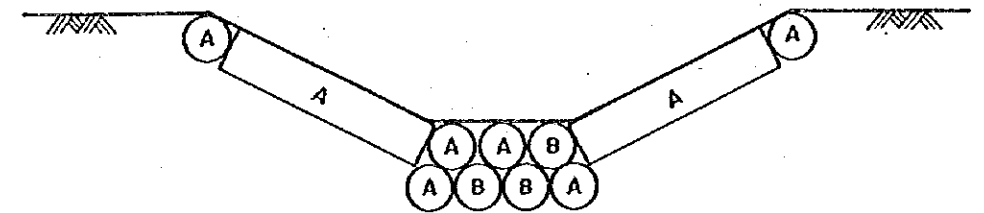
TYPE B



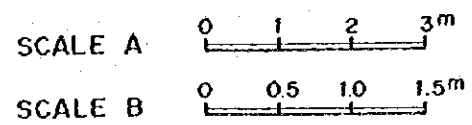
SECTION B - B
SCALE A



SECTION A - A
SCALE A

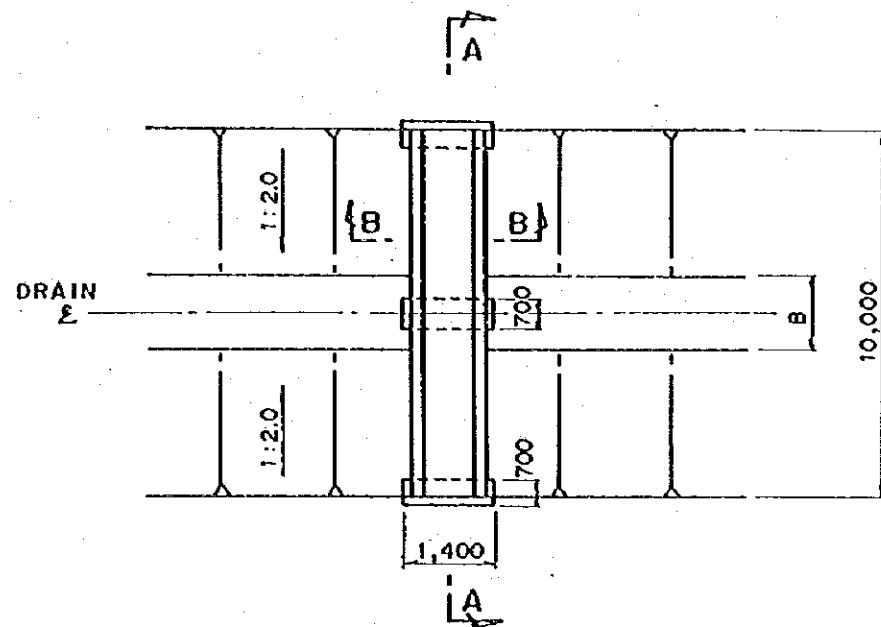


SECTION C - C
SCALE A

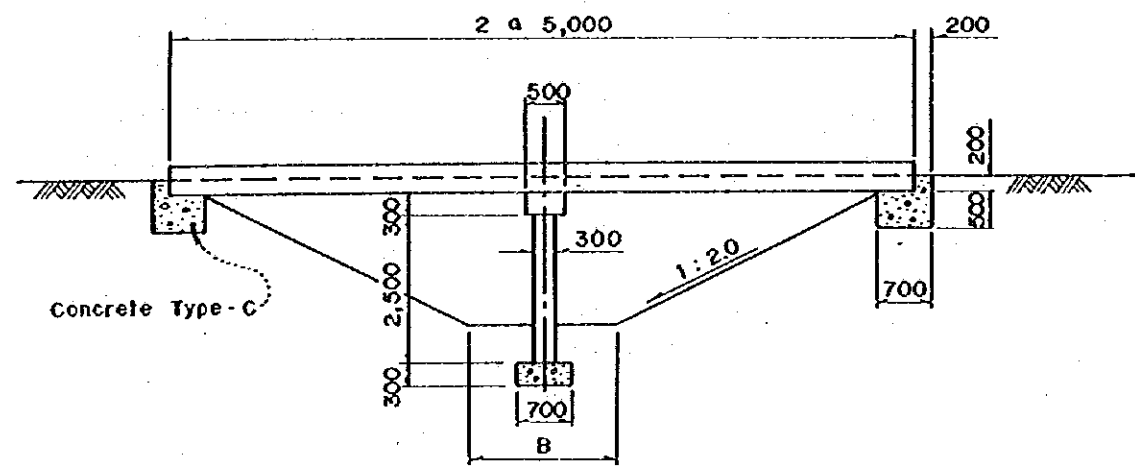


THE UNITED REPUBLIC OF TANZANIA	
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
DRAINAGE DROP	
Date	Drawing No. 200 - 22
JAPAN INTERNATIONAL COOPERATION AGENCY	

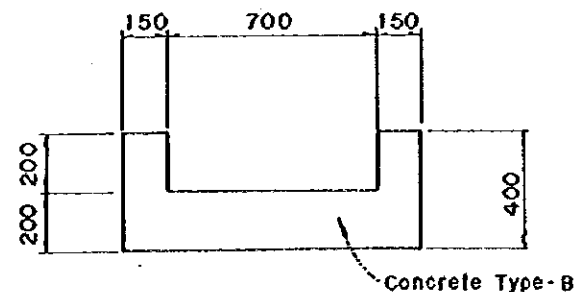
FOOT PATH



PLAN
SCALE A



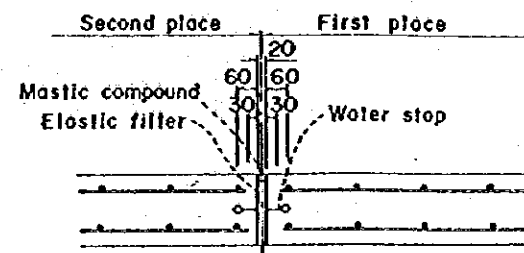
SECTION A - A
SCALE B



SECTION B - B
SCALE C

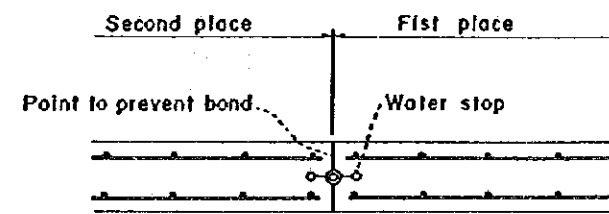
EXPANSION JOINT

SCALE B



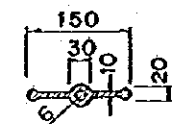
CONTRACTION JOINT

SCALE C



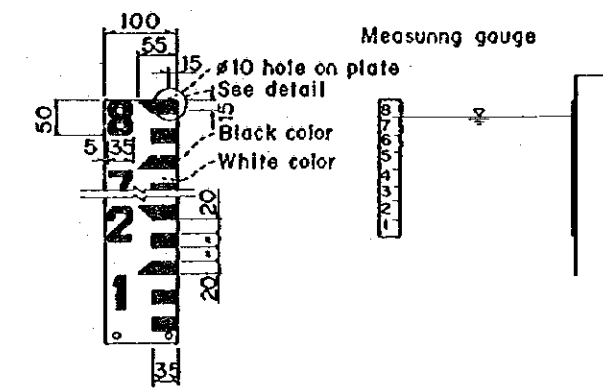
DETAIL OF WATER STOP

SCALE D



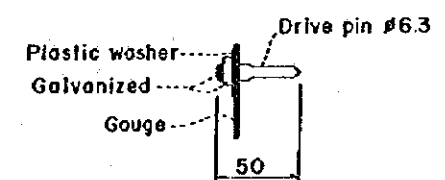
STAFF GAUGE

SCALE D

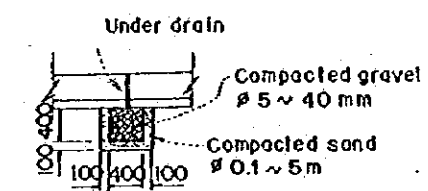


DETAIL - A

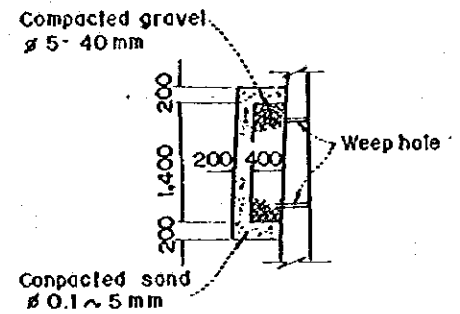
SCALE E



UNDER DRAIN

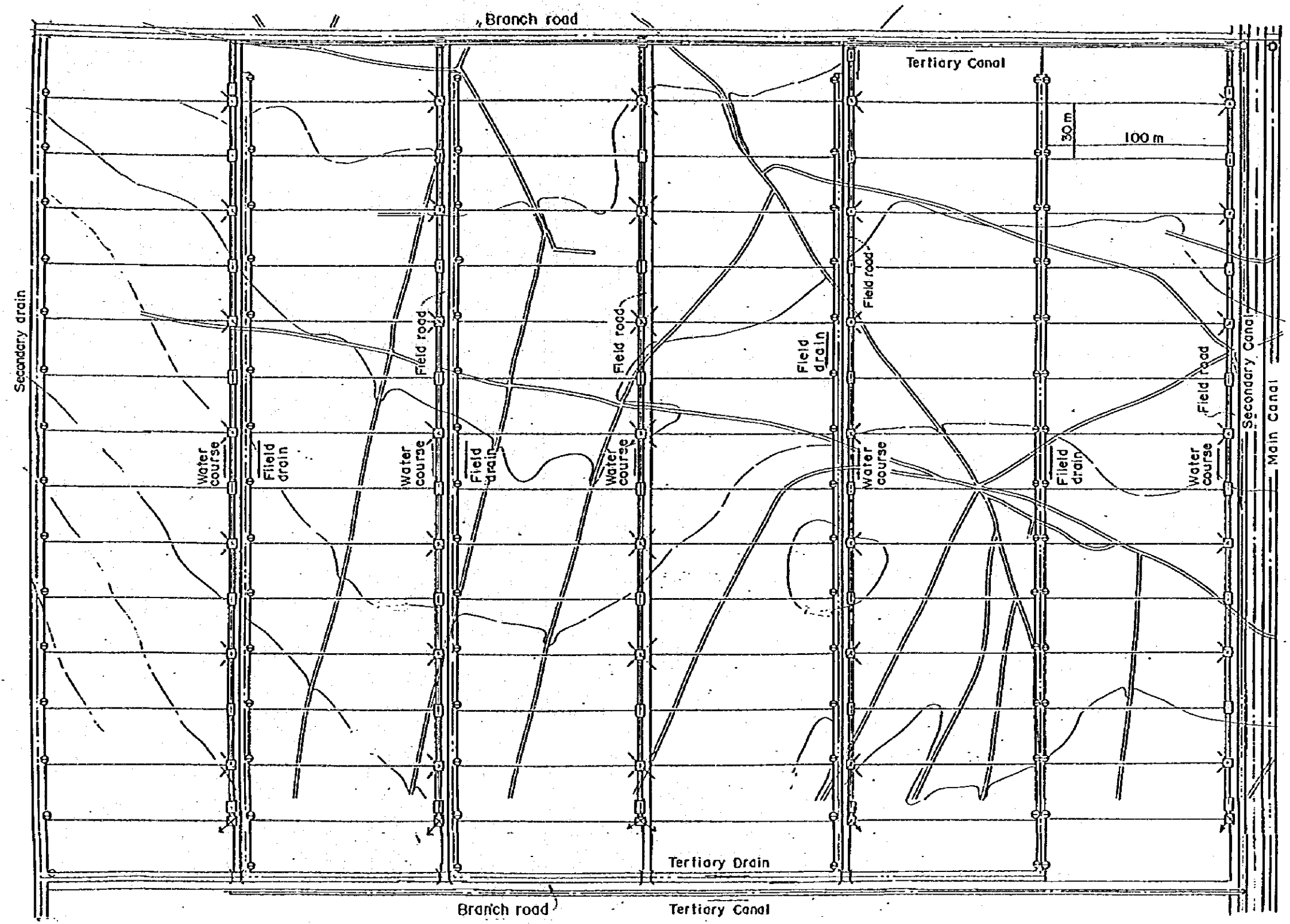


WEEP HOLE



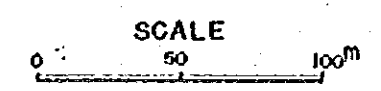
- SCALE : A 0 2 4 6m
- SCALE : B 0 1 2 3m
- SCALE : C 0 0.5 1m
- SCALE : D 0 0.1 0.2 0.3m
- SCALE : E 0 0.05 0.1m

THE UNITED REPUBLIC OF TANZANIA		
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT		
TITLE OF DRAWING		
FOOT PATH		AND
MISCELLANEOUS		
Date	Drawing No.	200 - 23
JAPAN INTERNATIONAL COOPERATION AGENCY		

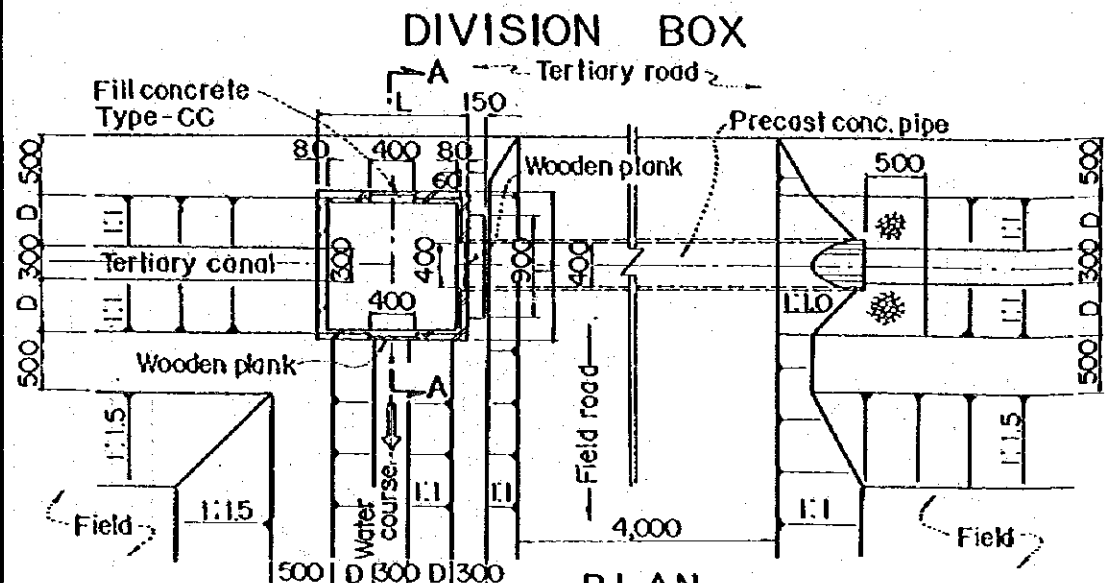


LEGEND

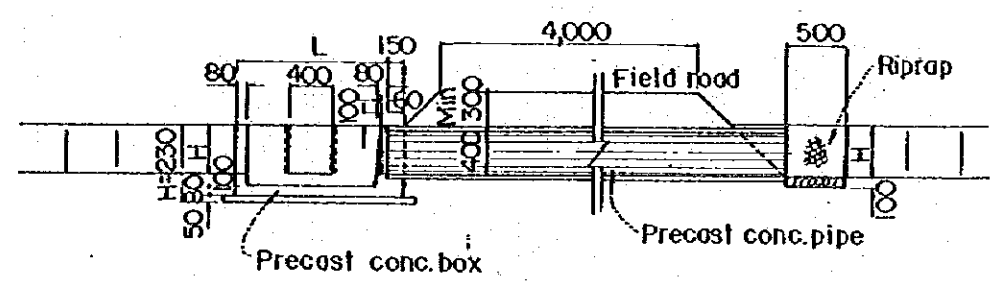
- | | | | |
|--|---|--|---------------------------|
| | Tertiary canal (TC) & water course (WC) | | Farm outlet (WC to Field) |
| | Tertiary drain (TD) & Field drain (FD) | | Irrigation culvert |
| | Field road | | Drainage culvert |
| | Field border | | Drain pipe |
| | Turnout | | Field access |
| | Division box (TC to WC) | | |



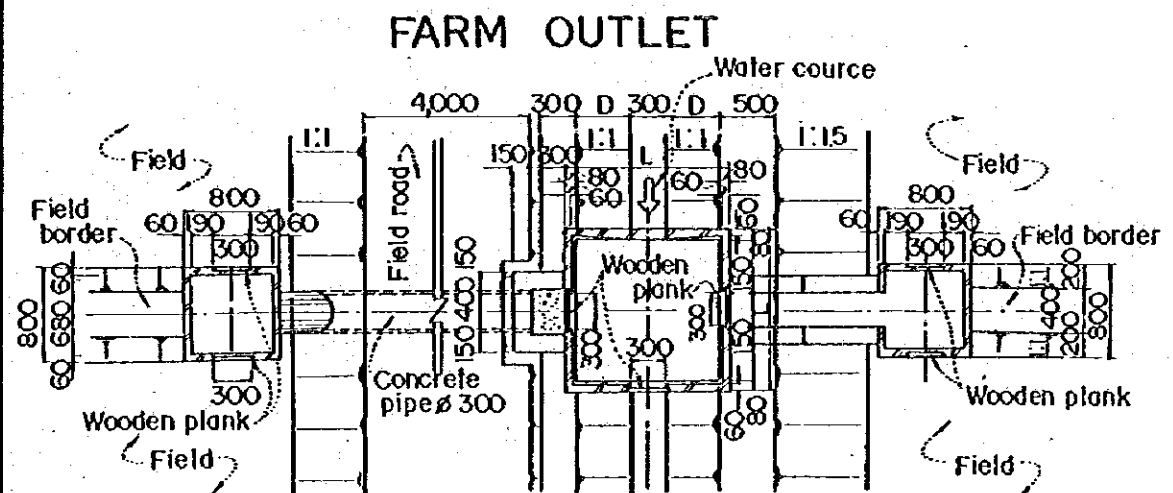
THE UNITED REPUBLIC OF TANZANIA	
NOUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
TYPICAL FARM LAYOUT	
Date	Drawing No. 200 - 24
JAPAN INTERNATIONAL COOPERATION AGENCY	



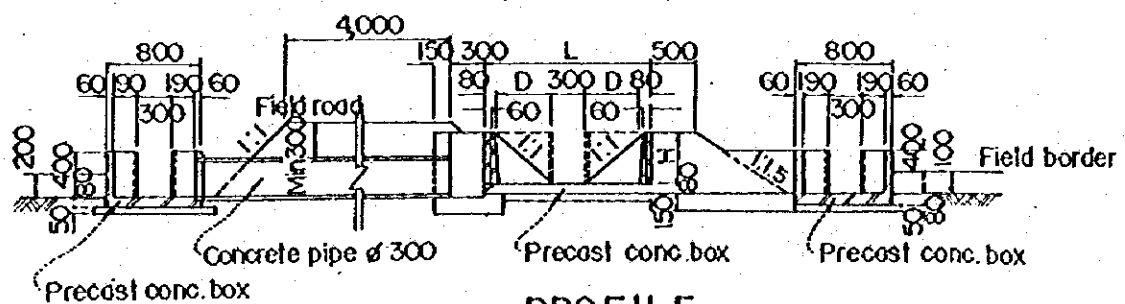
PLAN (SCALE - A)



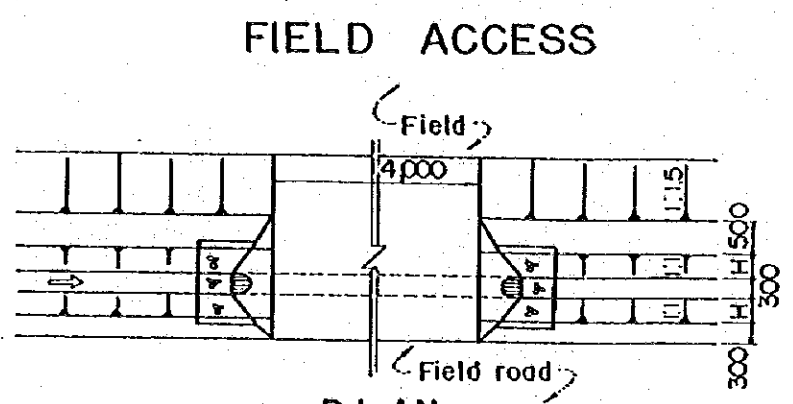
PROFILE (SCALE - A)



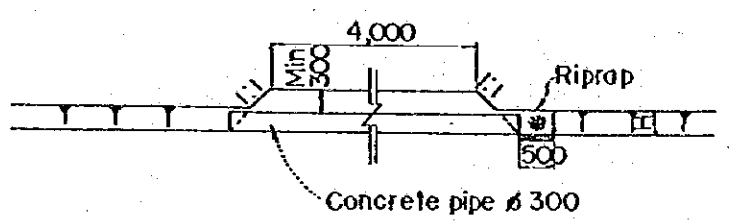
PLAN (SCALE - A)



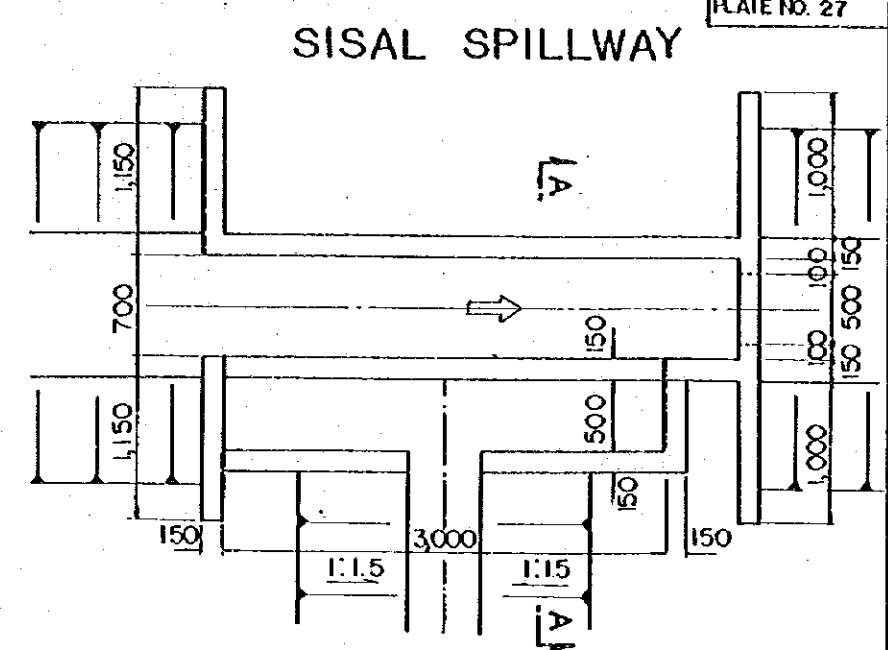
PROFILE (SCALE - A)



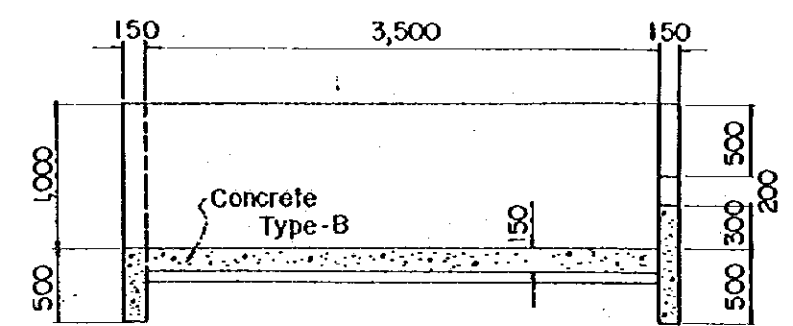
PLAN (SCALE - B)



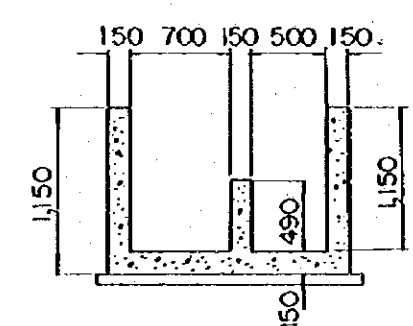
PROFILE (SCALE - B)



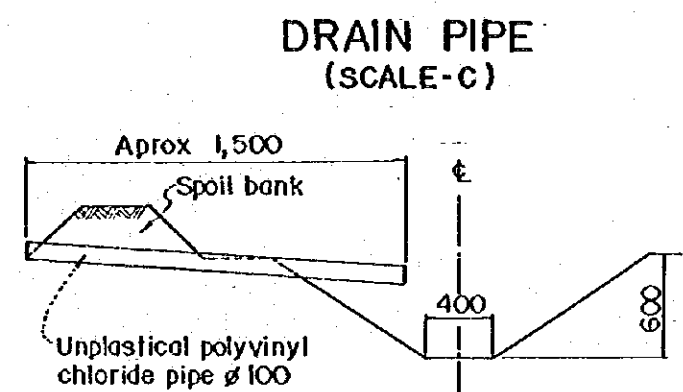
PLAN (SCALE - D)



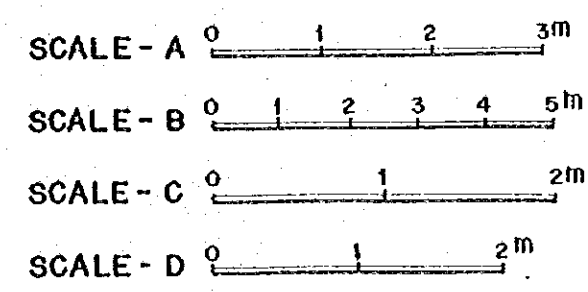
PROFILE (SCALE - D)



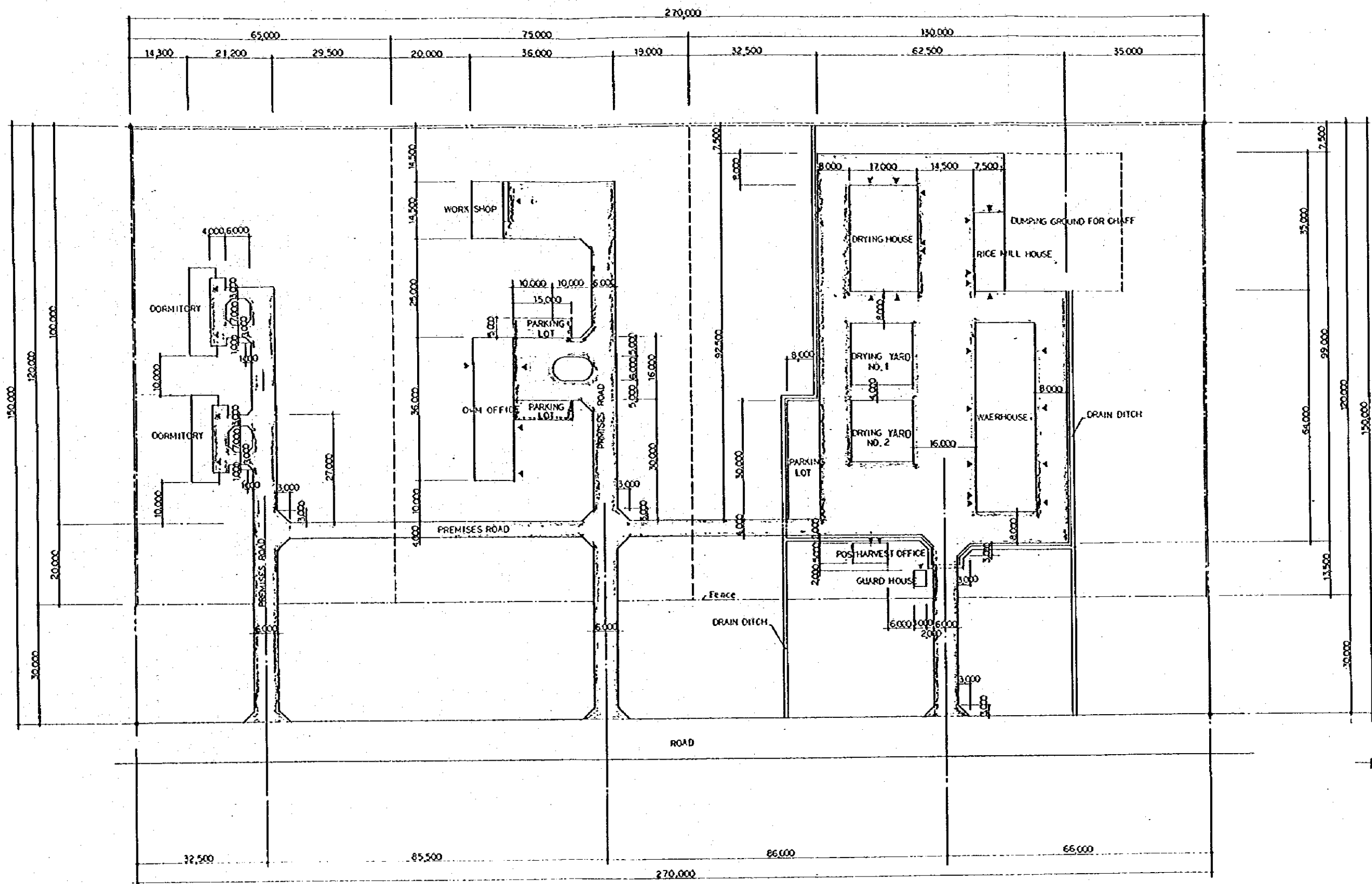
SECTION A-A (SCALE - D)



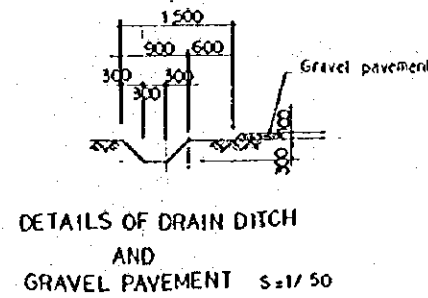
SCALE - C



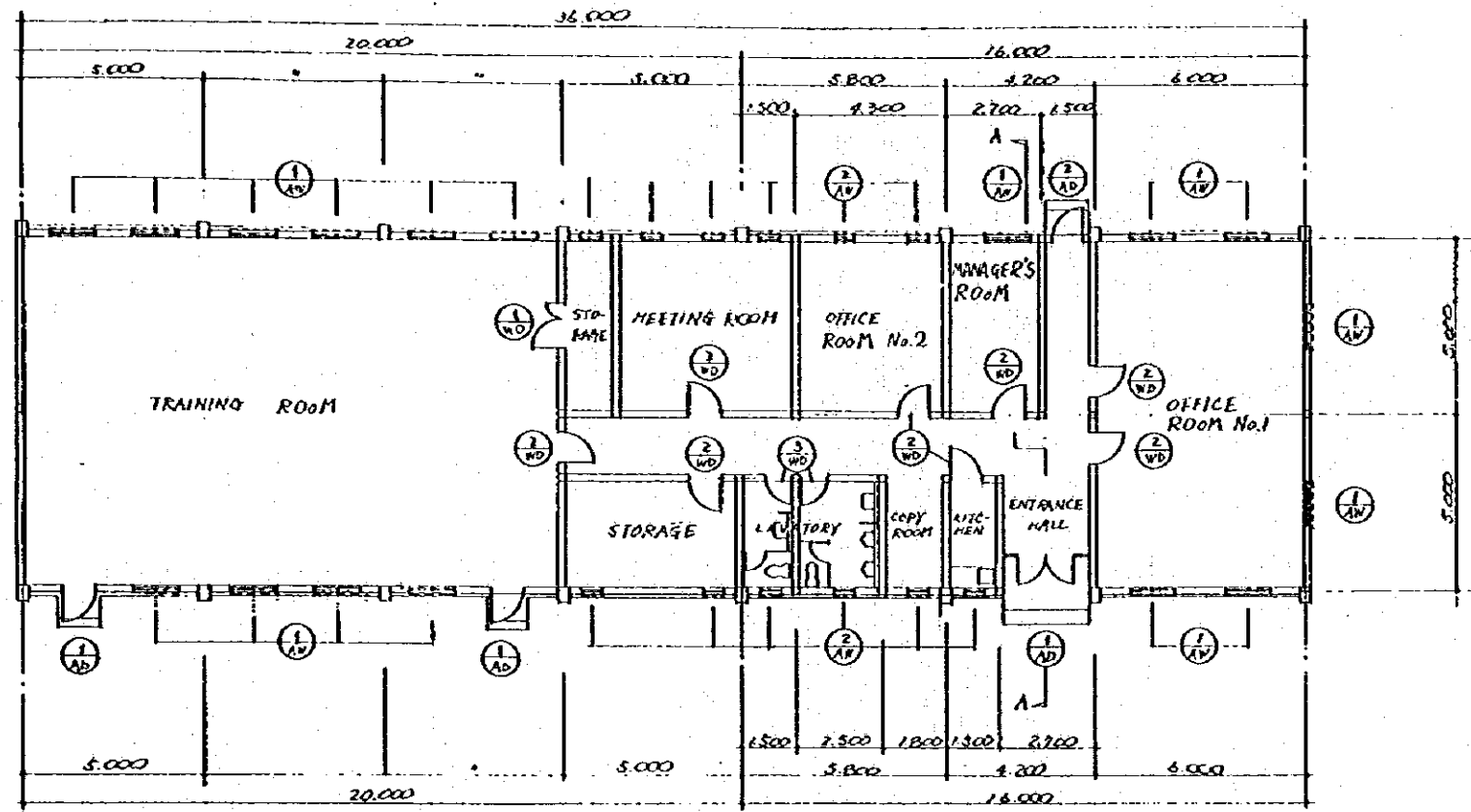
THE UNITED REPUBLIC OF TANZANIA	
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
ON - FARM FACILITIES	
Date	Drawing No. 200 - 25
JAPAN INTERNATIONAL COOPERATION AGENCY	



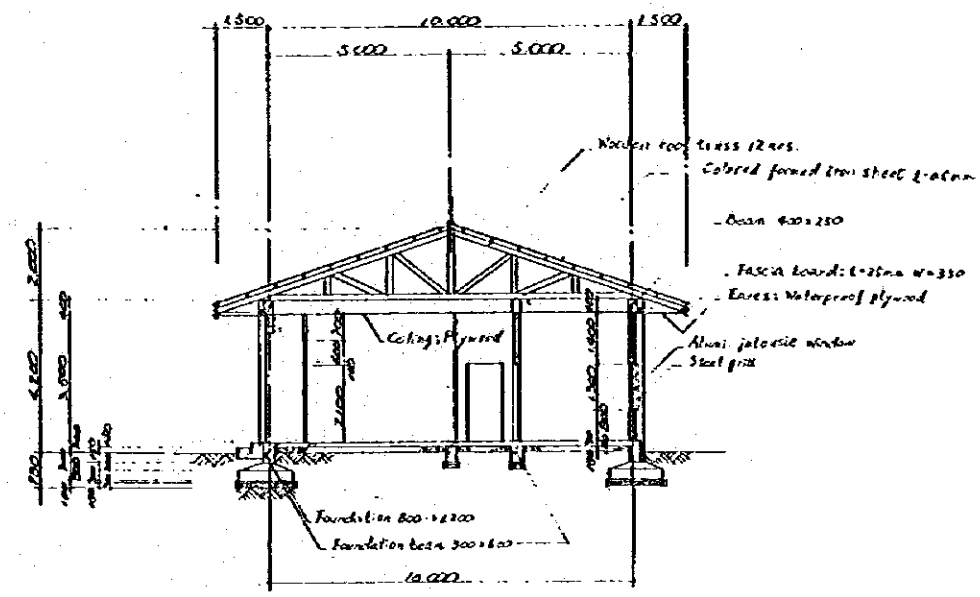
PLOT PLAN S=1/500



THE UNITED REPUBLIC OF TANZANIA	
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
PLOT PLAN	
Date	Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY	



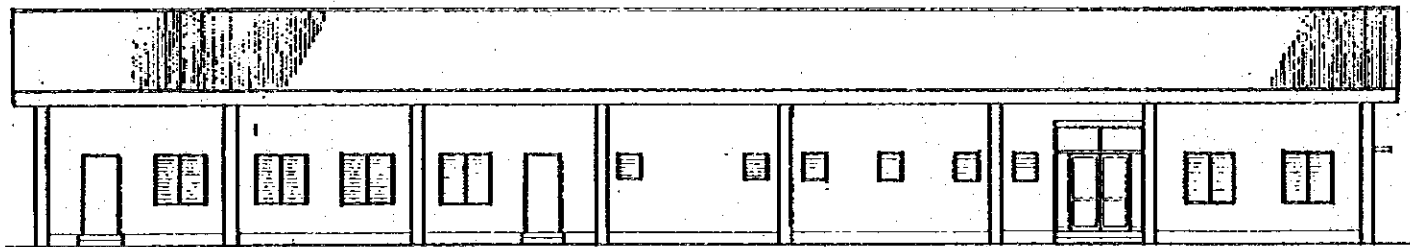
FLOOR PLAN 1/100 Floor area 360. m²



SECTION A-A 1/100

EXTERIOR FINISH SCHEDULE

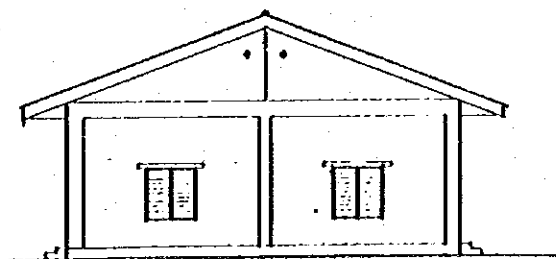
	FINISH
ROOF	Colored formed iron sheet 1.05mm
WALL	Acrylic emulsion paint
EAVES & FASCIA	Eaves: Acrylic emulsion paint on waterproof plywood. Fascia: Oil paint on plywood board
DOOR & WINDOW	Aluminium door and window. Steel grill for outside of window



FRONT ELEVATION 1/100

INTERIOR FINISH SCHEDULE

	FLOOR	SKIRTING WAINSCOT	WALL	CEILING	REMARKS
OFFICE, ENTRANCE HALL, MEETING ROOM & CORRIDOR	Terrazzo	Vinyl asbestos H-100	Vinyl emulsion paint on cement mortar	Oil paint on plywood	
TRAINING ROOM	DO	DO	DO	DO	
KITCHEN & COPY ROOM	DO	DO	DO	DO	
LAYATORY	DO	TERRAZZO H-1400	DO	DO	
STORAGE	Cement mortar	Cement mortar H-110	DO	DO	

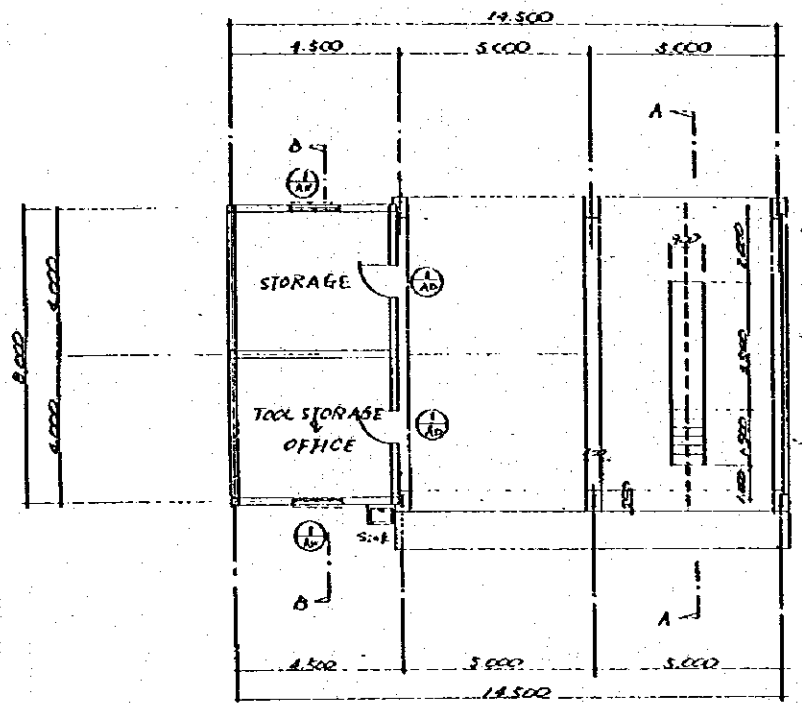


SIDE ELEVATION 1/100

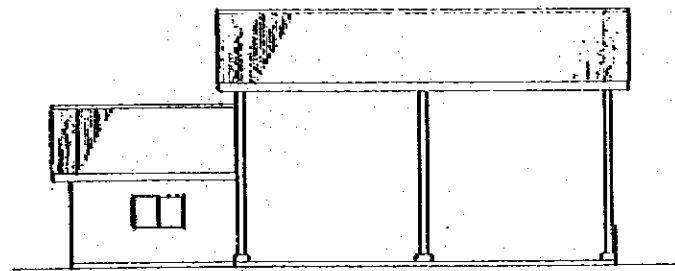
DOOR AND WINDOW LIST

Mark	W x H	Materials	Glass	Hardware
(1/1)	1.600 x 2.000	Aluminium door	Sheet glass 3mm	Cylinder door lock, Door check
(1/2)	900 x 2.100	-Do-	-Do-	-Do-
(1/3)	1.300 x 1.300	Aluminium jalousie window	Sheet glass 3mm	-Do-
(1/4)	800 x 900	-Do-	-Do-	-Do-
(1/5)	1.200 x 2.100	Wood door	-Do-	Cylinder door lock, Door stopper
(1/6)	900 x 2.100	-Do-	-Do-	-Do-
(1/7)	700 x 2.100	-Do-	-Do-	Door stopper

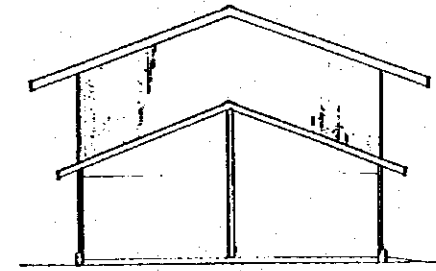
THE UNITED REPUBLIC OF TANZANIA
 HOUGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
O & M OFFICE
 Date _____ Drawing No. 300-02
 JAPAN INTERNATIONAL COOPERATION AGENCY



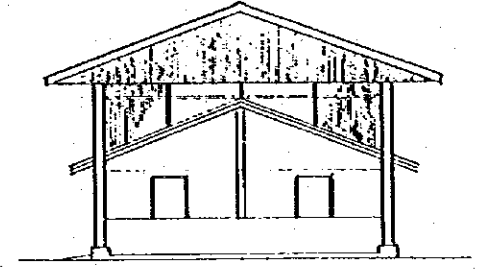
FLOOR PLAN $s = 1/100$ Floor area 116 m^2



FRONT ELEVATION



SIDE ELEVATION



SIDE ELEVATION

EXTERIOR FINISH SCHEDULE

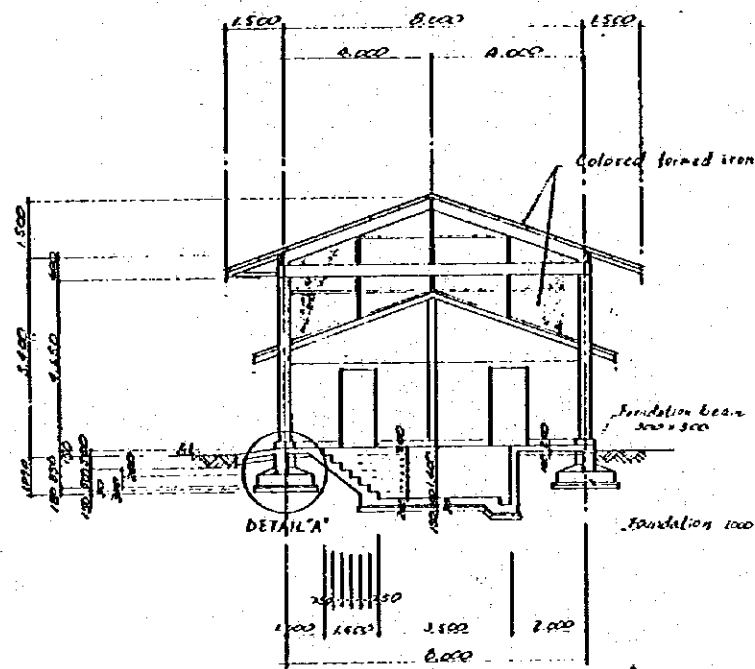
	FINISH
ROOF	Colored formed iron sheet 1-0.5 mm
WALL	Work shops: Colored formed iron sheet 1-0.5 mm. Storage: Acrylic emulsion paint on cement mortar
FASCIA	Oil paint on wooden board 1-25 mm W-250 mm
WAINSCOT	Acrylic emulsion paint on cement mortar
FLOOR	Concrete trowel finish
DOOR & WINDOW	Aluminium door & window. Steel grill for outside of window
STEEL SURFACE	Oil paint

INTERIOR FINISH SCHEDULE

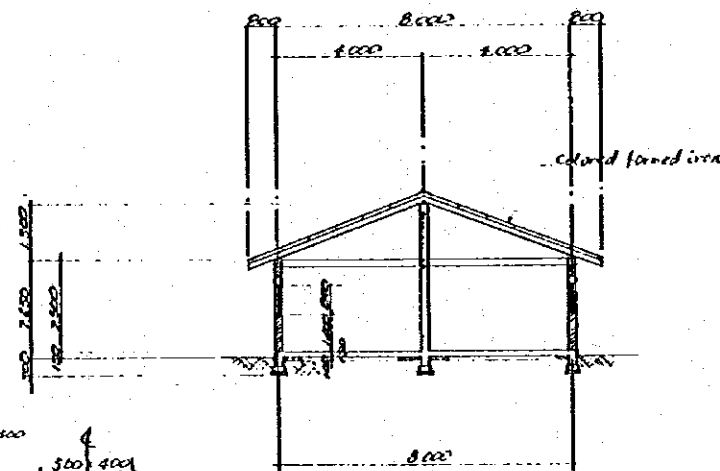
- STORAGE ; FLOOR : Concrete trowel finish
- SKIRTING : Cement mortar H=200
- WALL : Vinyl paint on cement mortar

DOOR AND WINDOW LIST

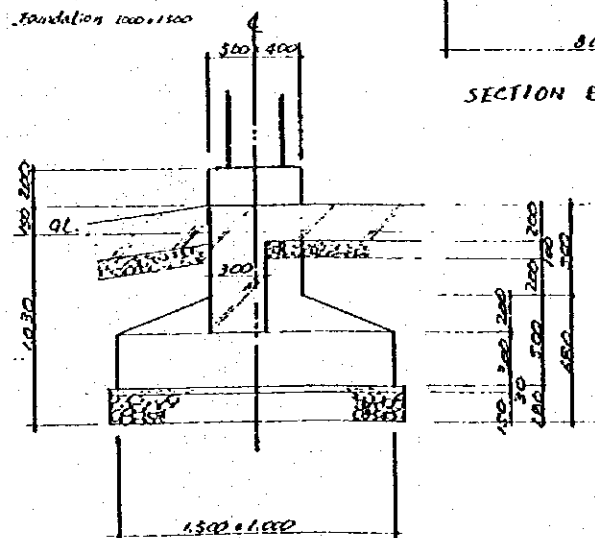
	W	H	Material	Glass	Hardware
⊕	900	2100	Aluminium door	---	Cylinder door lock, Door stopper
⊕	1300	800	Aluminium jalousie window	Sheet glass 5mm	---



SECTION A-A $s = 1/100$

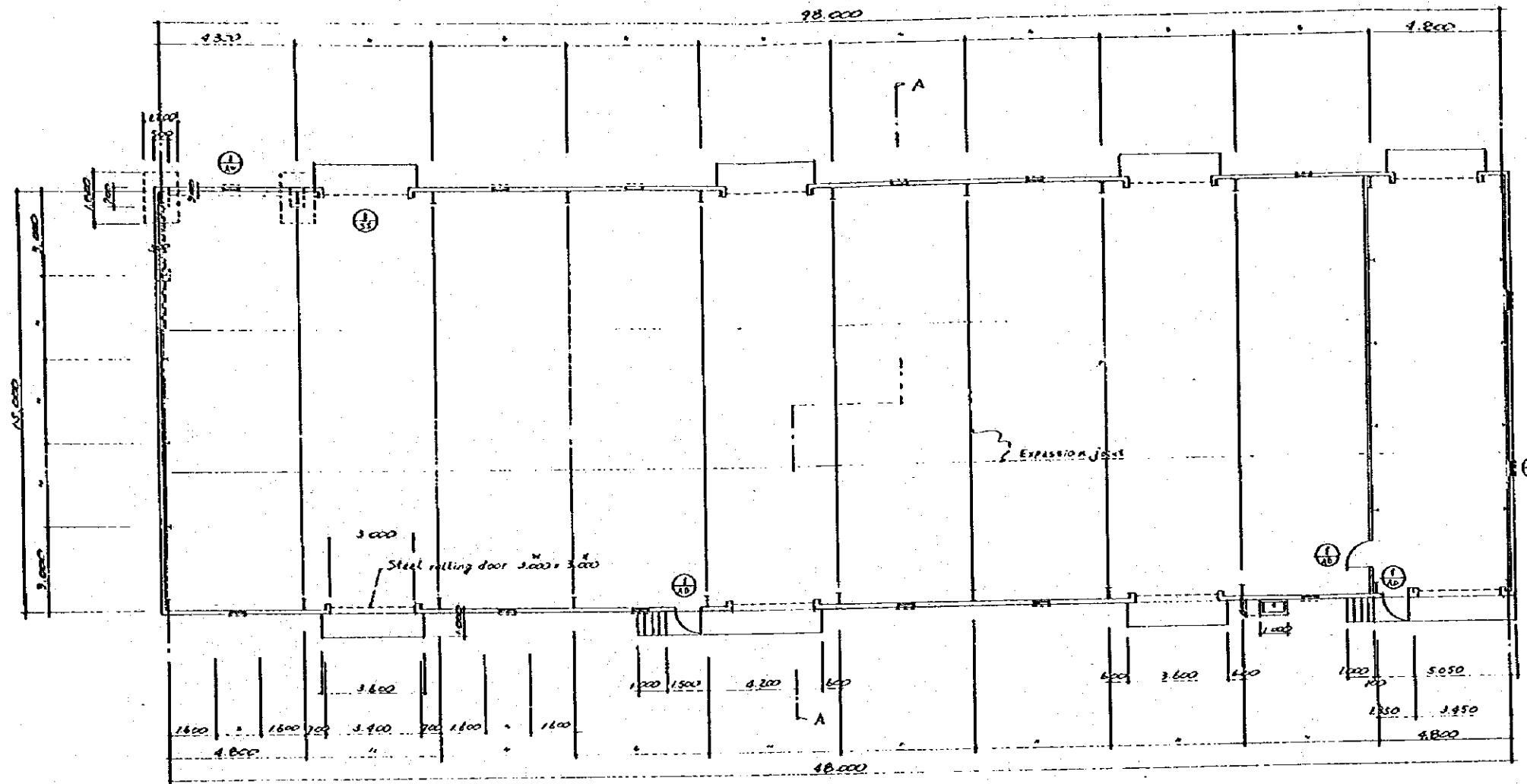


SECTION B-B $s = 1/100$



DETAIL "A" $s = 1/20$

THE UNITED REPUBLIC OF TANZANIA	
HOUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
O&M WORKSHOP	
Date	Drawing No. 300-03
JAPAN INTERNATIONAL COOPERATION AGENCY	



FLOOR PLAN 5/1100

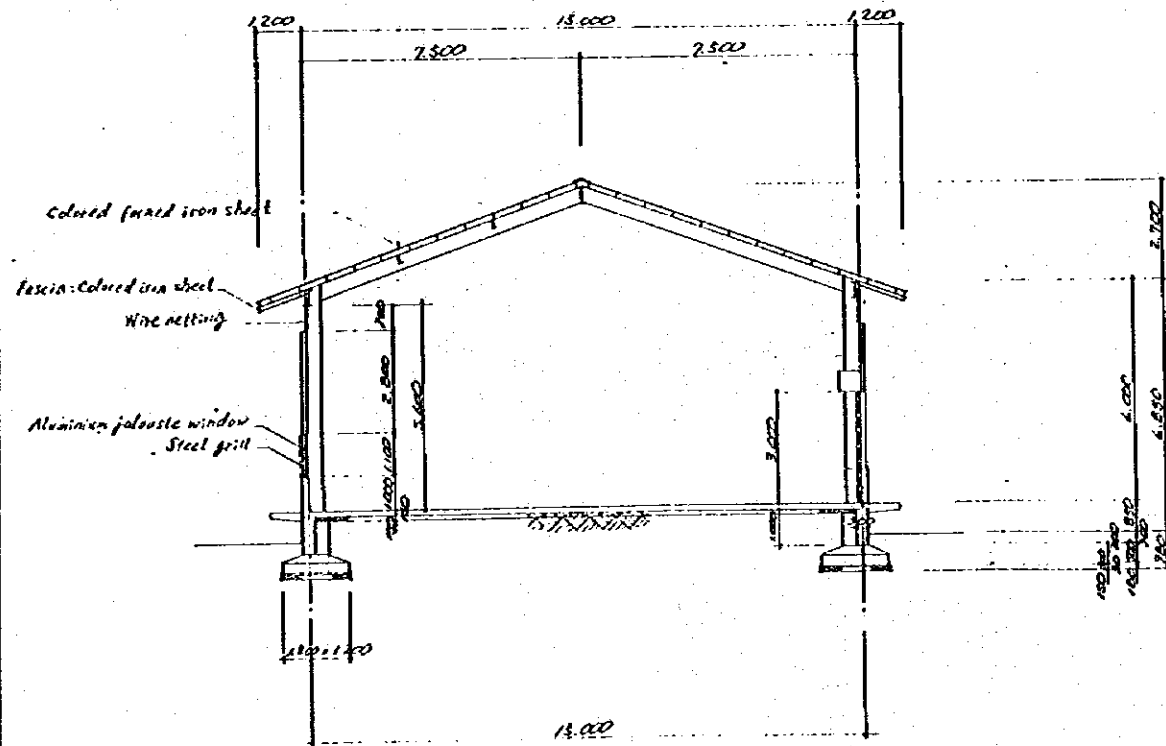
Floor area 720 m²

EXTERIOR FINISH SCHEDULE

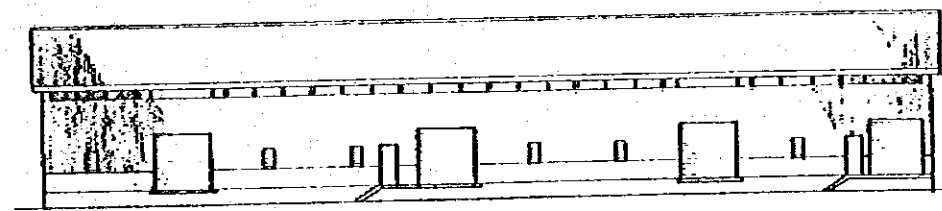
	FINISH
ROOF	Colored formed iron sheet t-0.5mm
WALL	Do
FASCIA	Colored iron sheet t-0.5mm
WAINSCOT	Acrylic emulsion paint over cement mortar
STEP	Cement mortar
DOOR & WINDOW	Aluminium door & window
	Steel rolling door 3,000 x 3,000
STEEL SURFACE	Oil paint

INTERIOR FINISH SCHEDULE

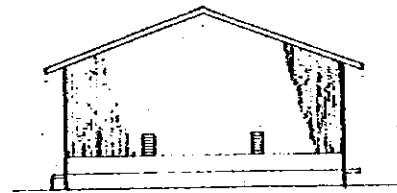
FLOOR : Concrete gravel finish
 WAINSCOT : Cement mortar
 STEEL SURFACE : Oil paint



SECTION A-A 5/1100



FRONT ELEVATION 5/1200



SIDE ELEVATION 5/1200

DOOR AND WINDOW LIST

	W x H	Material	Glass	Hardware	Remarks
⊕	900 x 2,100	Aluminium door	---	Cylinder door lock, door stopper	
⊕	600 x 1,100	Aluminium jalousie window	Sheet glass 5mm		Steel grill
⊕	3,000 x 3,000	Steel rolling door	---		

THE UNITED REPUBLIC OF TANZANIA

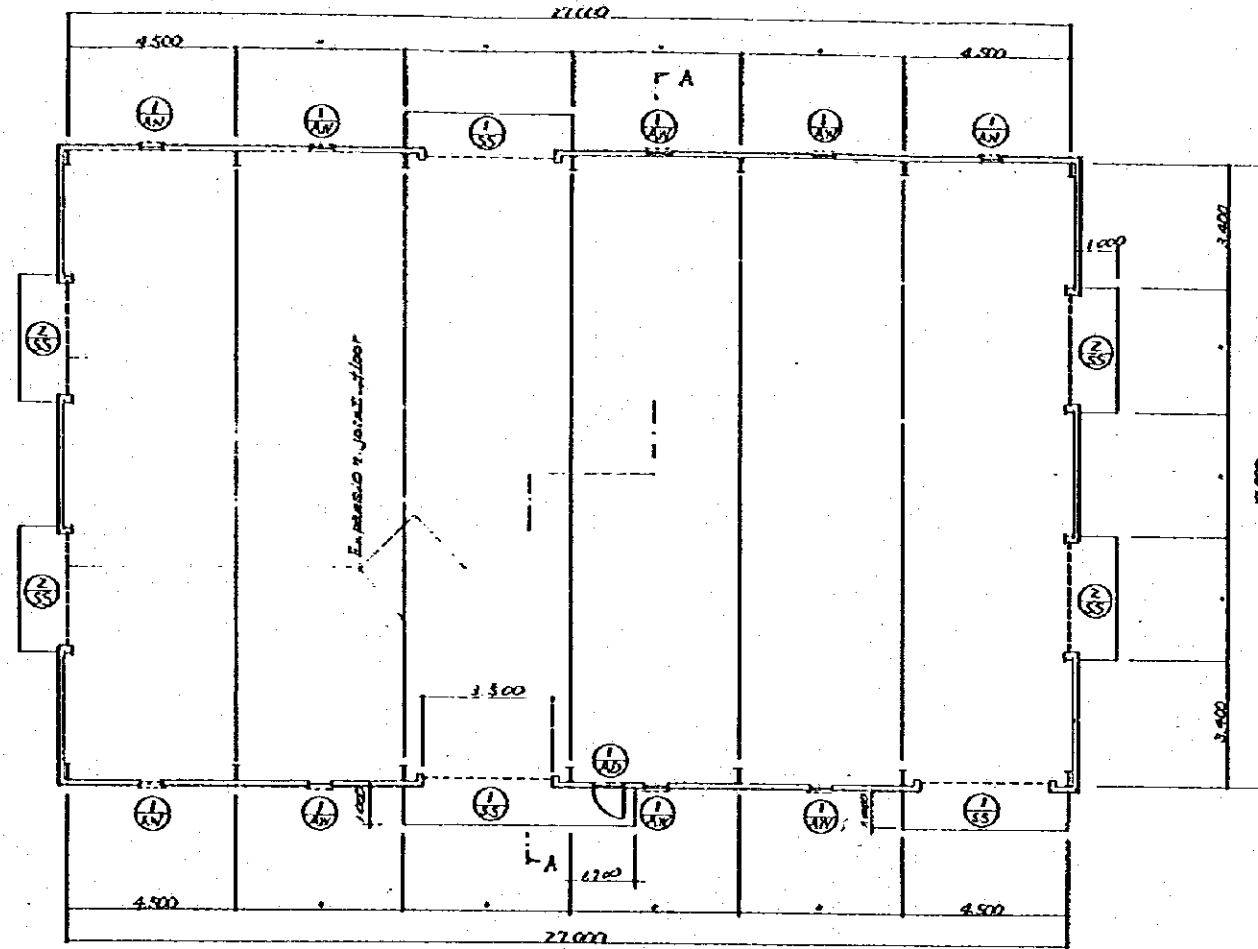
NDUNGU AGRICULTURAL
DEVELOPMENT PROJECT

TITLE OF DRAWING

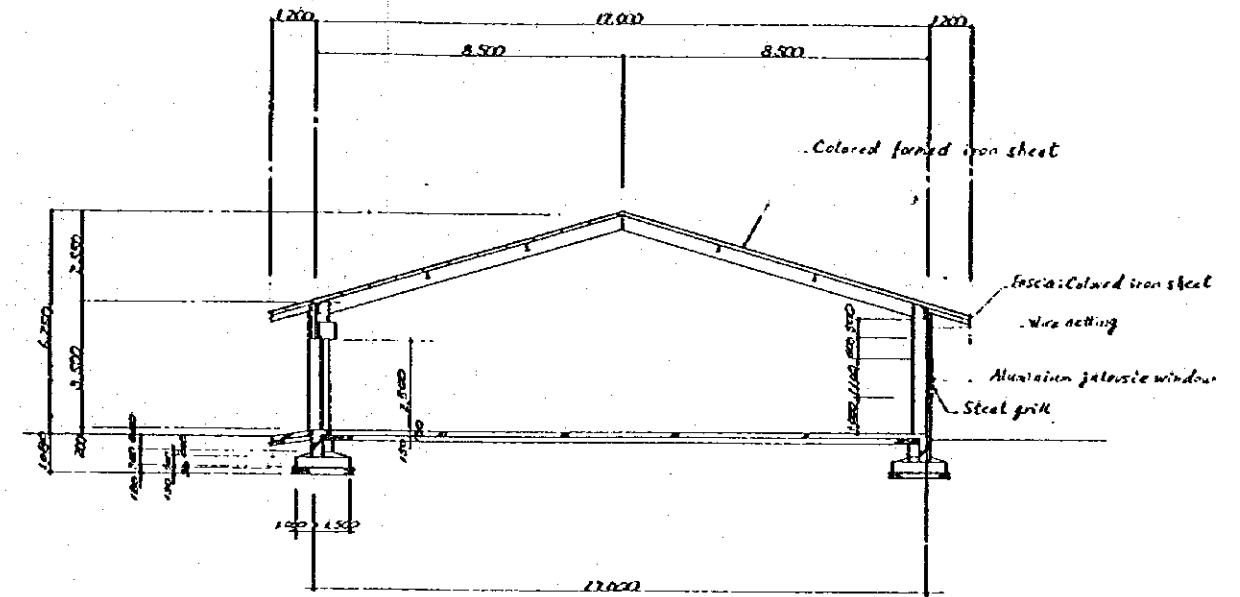
MULTI-PURPOSE WAREHOUSE

Date _____ Drawing No. 300-04

JAPAN INTERNATIONAL COOPERATION AGENCY



FLOOR PLAN s. 1/100 Floor area 459.22



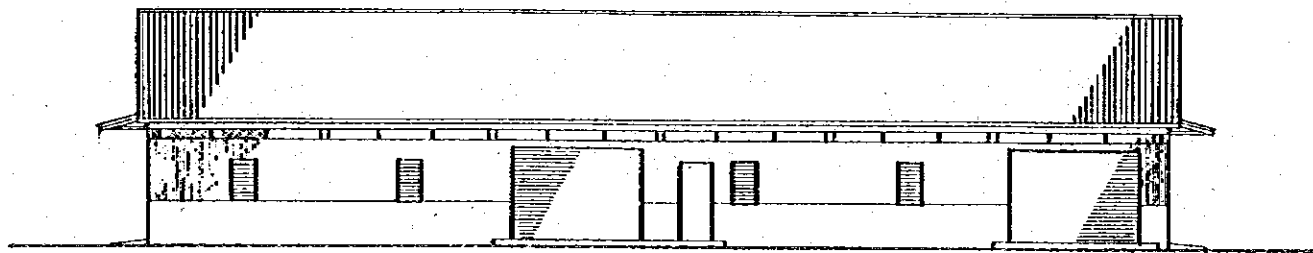
SECTION A-A s. 1/100

EXTERIOR FINISH SCHEDULE

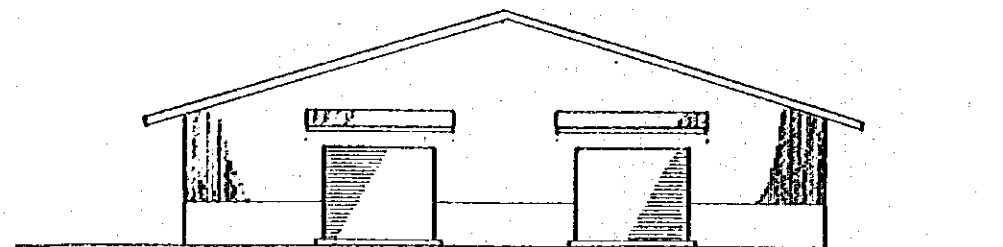
	FINISH
ROOF	Colored formed iron sheet t=0.8mm
WALL	Do
FASCIA	Colored iron sheet t=0.8mm
DOOR & WINDOW	Aluminium door and window Steel rolling door 2.500 x 3.500
STEEL SURFACE	Oil paint

INTERIOR FINISH SCHEDULE

- FLOOR : Concrete trowel finish
- WAINSCOT : Cement plaster
- STEEL SURFACE : Oil paint



FRONT ELEVATION s. 1/100



SIDE ELEVATION s. 1/100

Marks	N x H	Materials	Glass	Hardware	Remarks
I-SS	3.500 x 2.500	Steel, light weight			
I-SS	3.000 x 2.500	Steel, light weight			
I-AB	900 x 2.100	Aluminium door	Sheet glass 3mm	Cylinder door lock, Door check	
I-AT	600 x 1.100	Aluminium jalousie window	Sheet glass 5mm		Steel grill

THE UNITED REPUBLIC OF TANZANIA

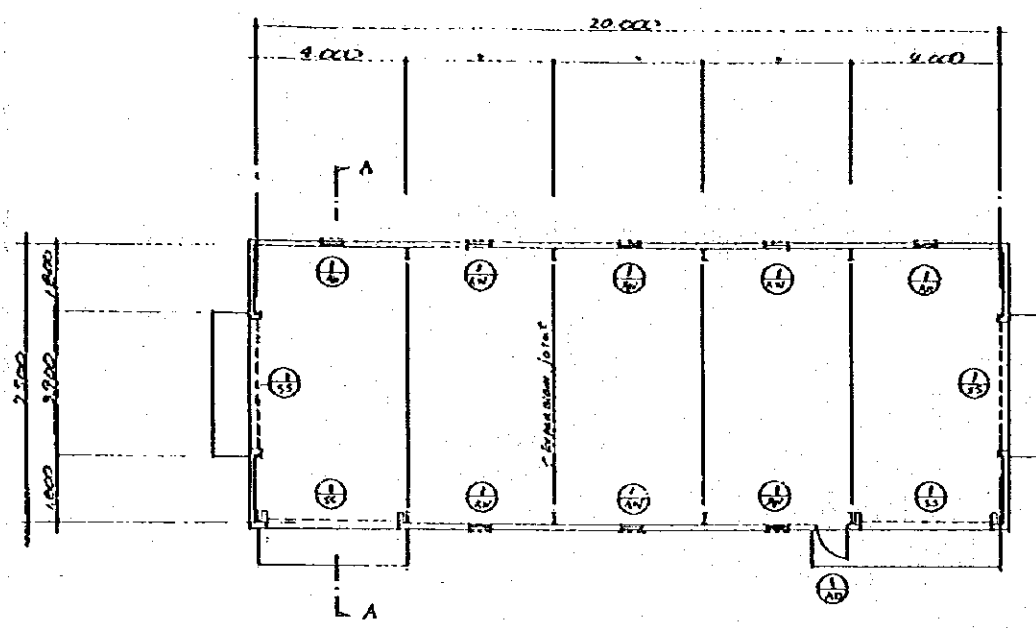
NDUNGU AGRICULTURAL
DEVELOPMENT PROJECT

TITLE OF DRAWING

DRYING HOUSE

Date _____ Drawing No. 300-05

JAPAN INTERNATIONAL COOPERATION AGENCY



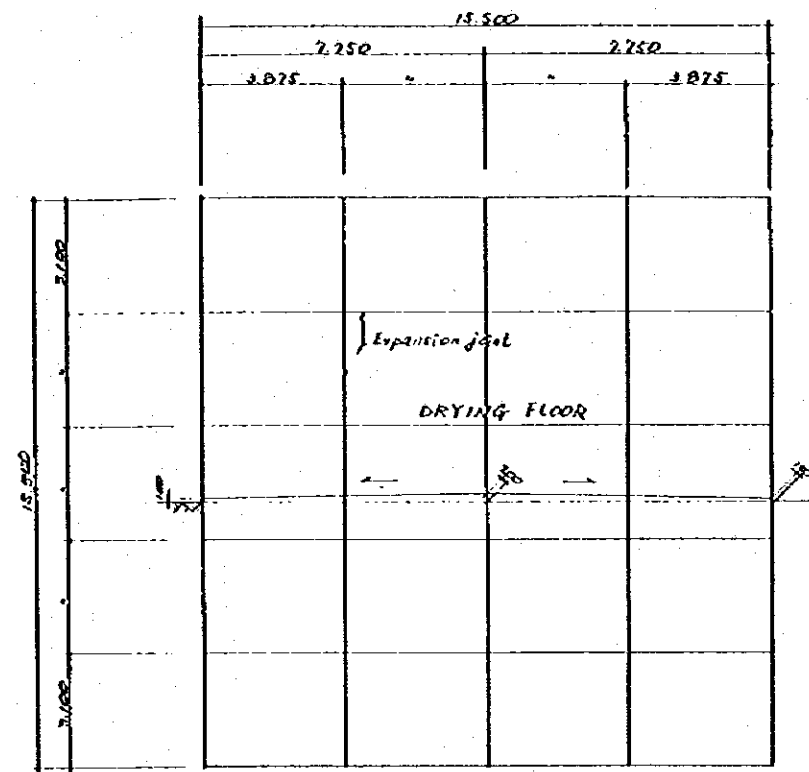
FLOOR PLAN 5:1/100 Floor area 150m²

EXTERIOR FINISH SCHEDULE

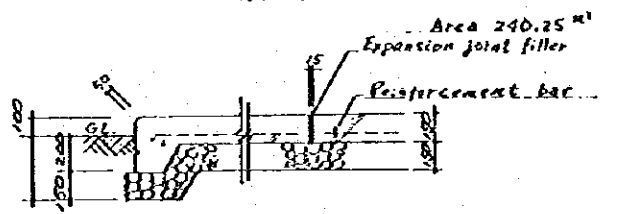
ROOF	Colored formed iron sheet 6.25mm
WALL	Do
FASCIA	Colored iron sheet
WAINSCOT	Acrylic emulsion paint on cement mortar
DOOR & WINDOW	Aluminium door & window
	Steel rolling door 3,000 x 3,000
STEEL SURFACE	Oil paint

INTERIOR FINISH SCHEDULE

FLOOR	: Concrete trowel finish
WAINSCOT	: Cement mortar
STEEL SURFACE	: Oil paint



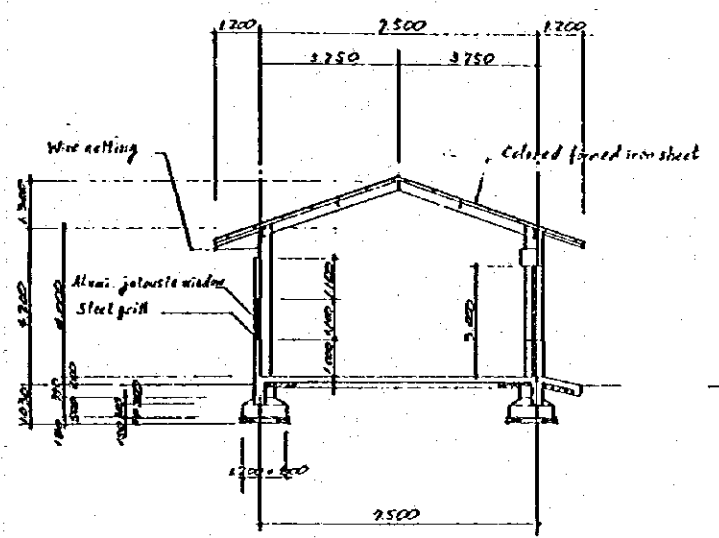
DRYING FLOOR 5:1/100



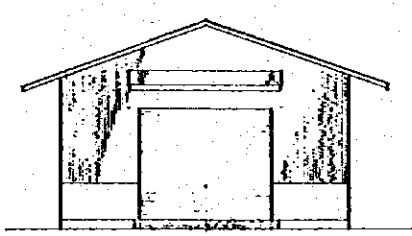
DETAIL OF DRYING FLOOR 5:1/20

DOOR AND WINDOW LIST

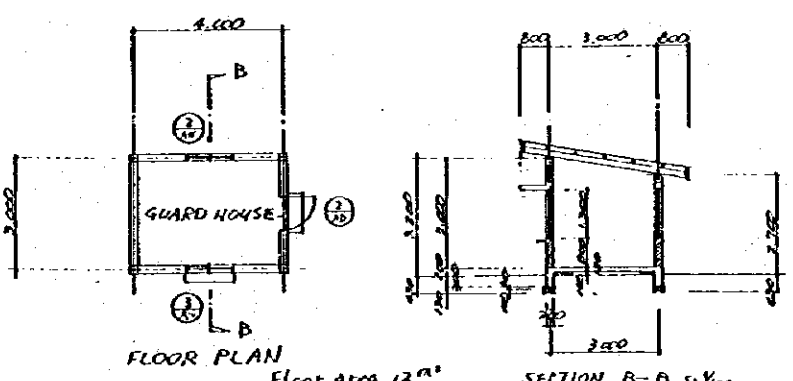
	W x H	MATERIAL	GLASS	HARDWARE
⊕	700 x 2,100	Aluminium door		Cylinder door lock, door stopper
⊕	600 x 1,100	Aluminium jalousie window	Sheet glass 5mm	Steel grill
⊕	3,000 x 3,000	Steel rolling door		



SECTION A-A 5:1/100

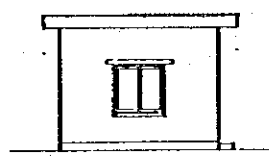


SIDE ELEVATION 5:1/100

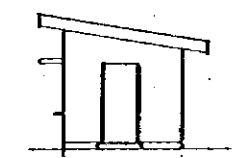


FLOOR PLAN Guard House - Floor area 12m²

SECTION B-B 5:1/100



FRONT ELEVATION



SIDE ELEVATION

ELEVATION 5:1/100

EXTERIOR FINISH SCHEDULE

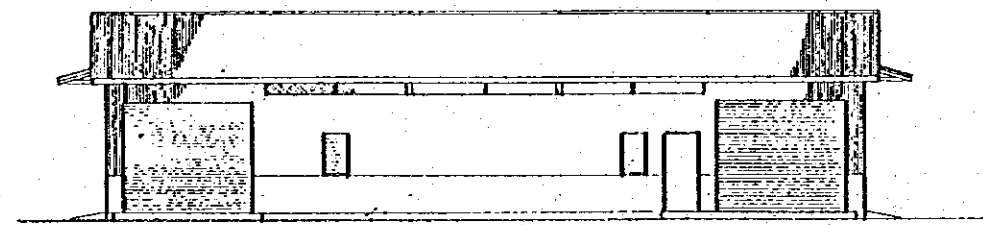
ROOF	: Colored formed iron sheet 6.25mm
WALL	: Acrylic emulsion paint on cement mortar
DOOR & WINDOW	: Aluminium door and window

INTERIOR FINISH SCHEDULE

FLOOR	: Concrete trowel finish
SKIRTING	: Cement mortar
WALL	: Vinyl emulsion paint on cement mortar

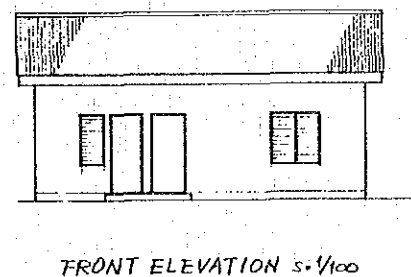
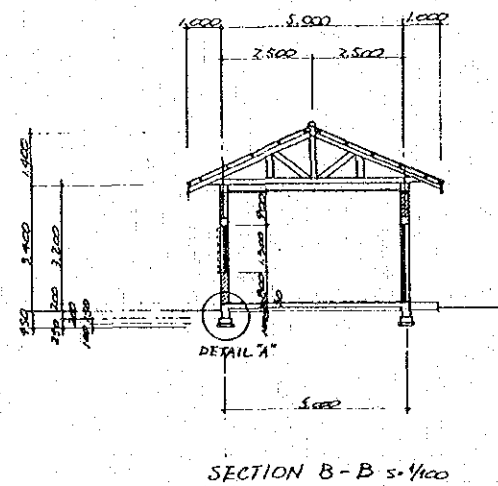
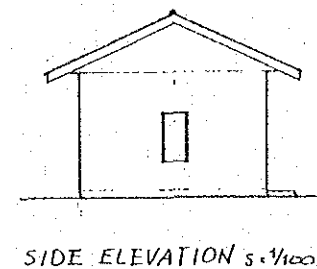
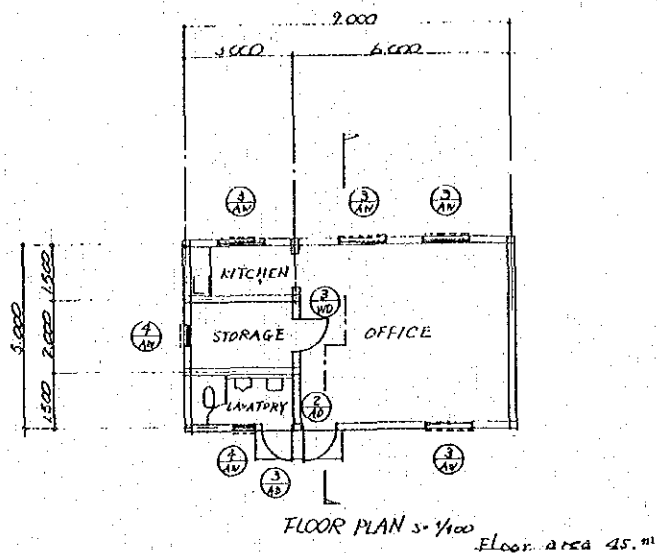
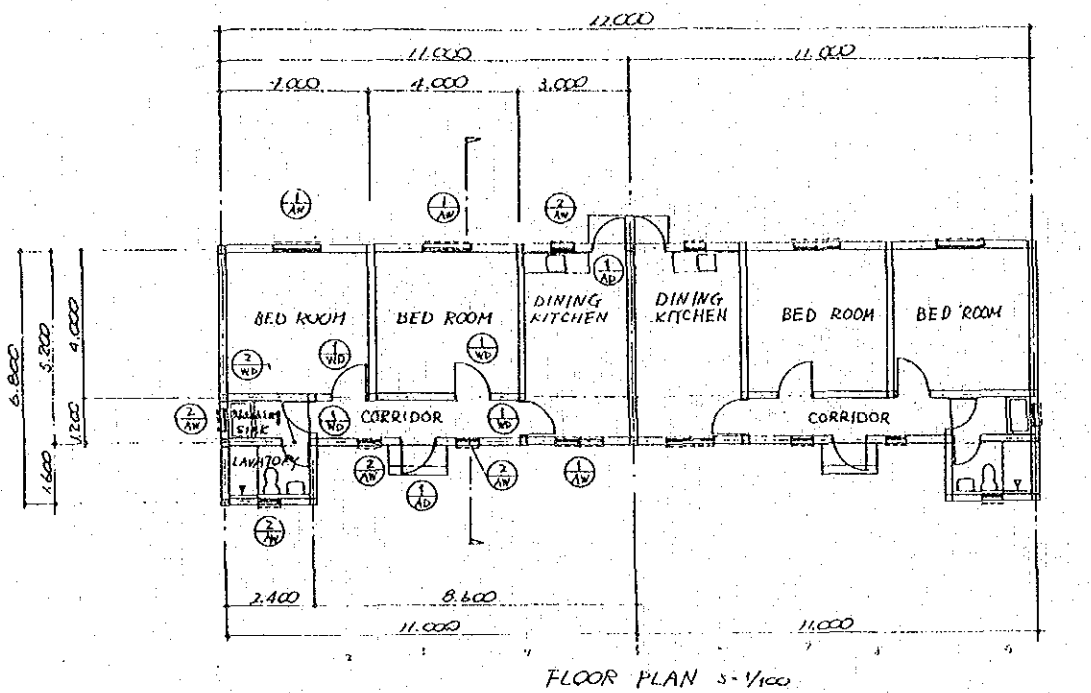
DOOR AND WINDOW LIST

	W x H	MATERIAL	GLASS	HARDWARE	Remarks
⊕	800 x 2,100	Aluminium door		Cylinder door lock, door stopper	
⊕	1,300 x 1,300	Aluminium jalousie window	Sheet glass 5mm		Steel grill
⊕	1,300 x 1,300	Aluminium window	Sheet glass 5mm	Crescent	



FRONT ELEVATION 5:1/100

THE UNITED REPUBLIC OF TANZANIA
 NOUNGU AGRICULTURAL DEVELOPMENT PROJECT
 TITLE OF DRAWING
RICE MILL HOUSE AND GUARD HOUSE
 Date _____ Drawing No. 300-06
 JAPAN INTERNATIONAL COOPERATION AGENCY

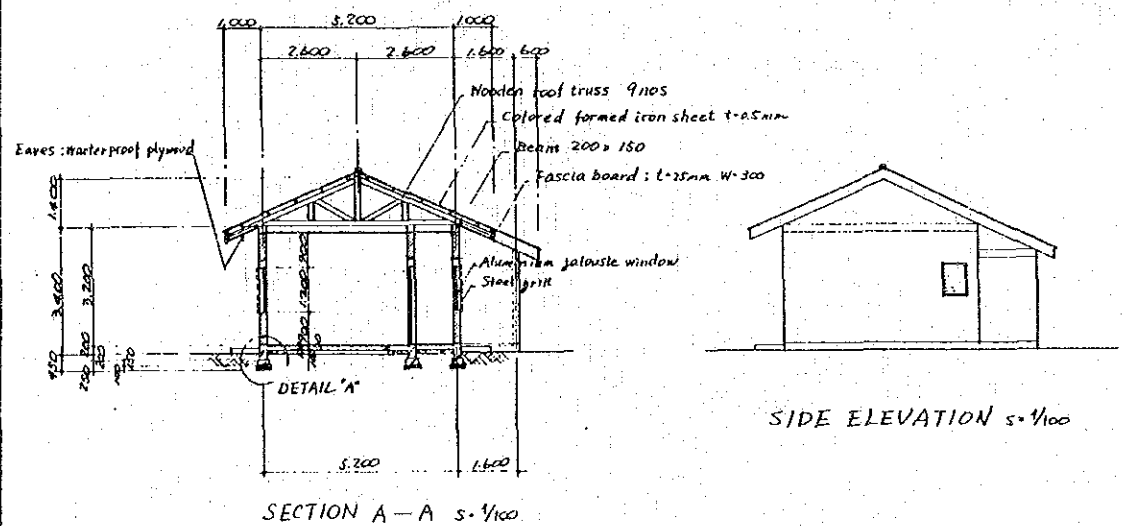
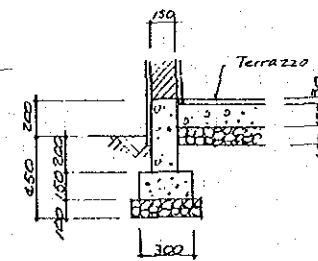


DOOR AND WINDOW LIST

	W x H	Materials	Remarks
① AD	900 x 2.100	Aluminium door	
① AW	1.200 x 1.300	Aluminium jalousie window	Steel grill
② AD	600 x 1.300	— Do —	— Do —
① WD	900 x 2.100	Wooden door	
② WD	700 x 2.100	— Do —	

	W x H	Materials	Remarks
② AD	900 x 2.100	Aluminium door	
③ AD	800 x 2.100	— Do —	
③ AW	1.300 x 1.300	Aluminium jalousie window	Steel grill
④ AD	600 x 700	— Do —	— Do —
③ WD	900 x 2.100	Wooden door	

Notes:
Hardware: Cylinder door lock, Door check
Glass: Sheet glass 5mm

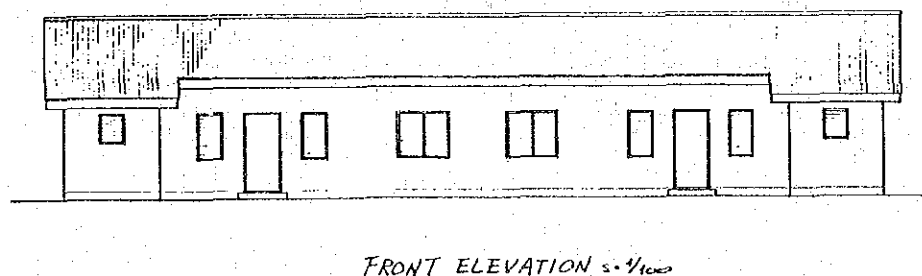


INTERIOR FINISH SCHEDULE

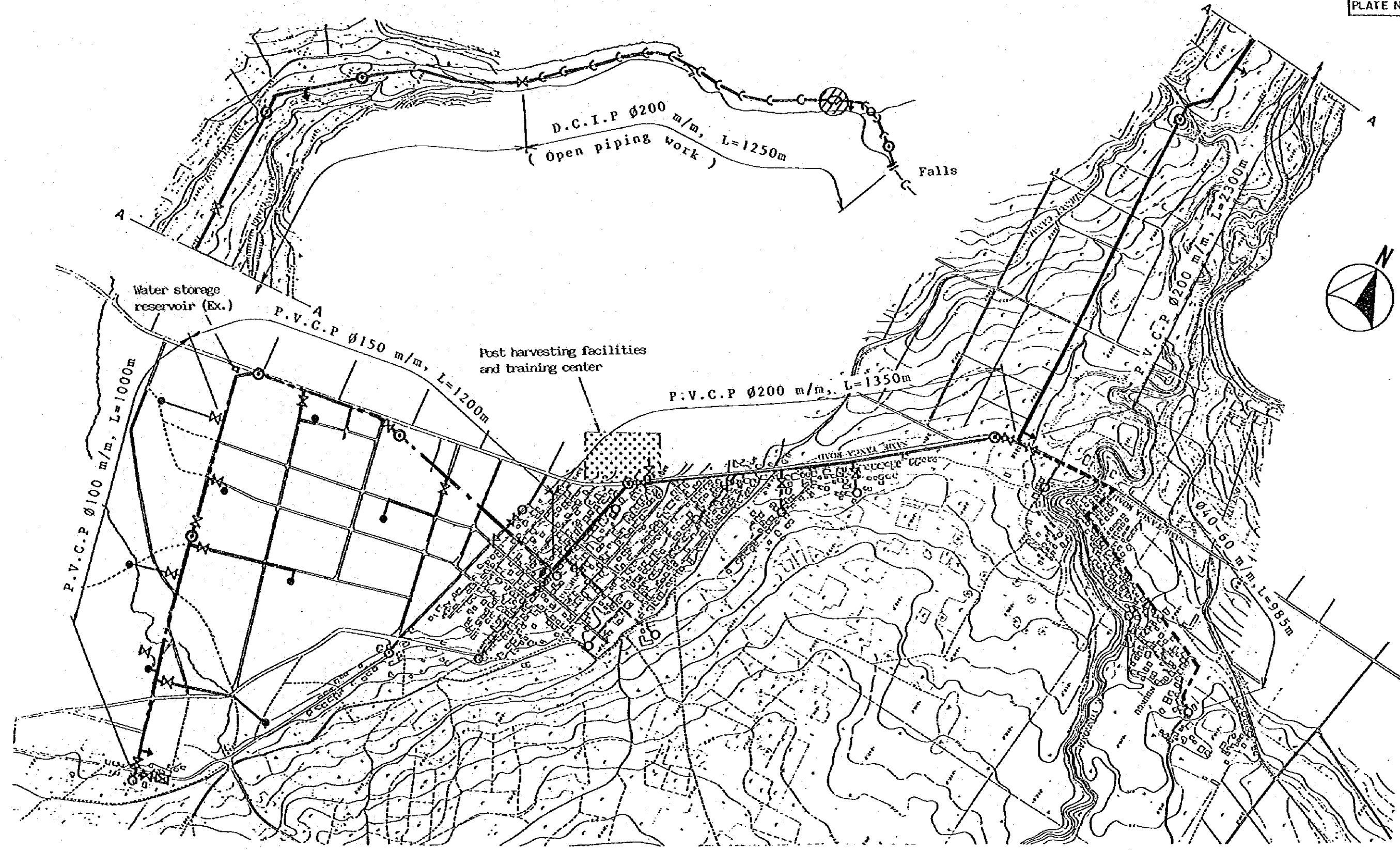
	FLOOR	SKIRTING WAINSCOT	WALL	CEILING	REMARKS
BED ROOM	Terrazzo	Vinyl asbestos H=100	Vinyl emulsion paint on cement mortar	Oil paint on plywood	
DINING KITCHEN	— Do —	— Do —	— Do —	— Do —	
LAVATORY	— Do —	Terrazzo H=140	— Do —	— Do —	
OFFICE	Terrazzo	Vinyl asbestos H=100	Vinyl emulsion paint on cement mortar	Oil paint on plywood	
KITCHEN	— Do —	— Do —	— Do —	— Do —	
STORAGE	Cement mortar	Cement mortar H=100	— Do —	— Do —	
LAVATORY	— Do —	Vinyl emulsion paint on cement mortar H=140	— Do —	— Do —	

EXTERIOR FINISH SCHEDULE

	FINISH
ROOF	Colored formed iron sheet t=0.5mm
WALL	Acrylic emulsion paint
EAVES	Dormitory only: Acrylic emulsion paint on water-proof plywood
FASCIA	Oil paint on warden board
DOOR & WINDOW	Aluminium door and window. Steel grill for outside of window

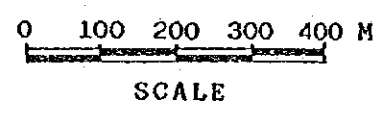


THE UNITED REPUBLIC OF TANZANIA
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT
TITLE OF DRAWING
O&M DORMITORY AND POSTHARVEST OFFICE
Date: _____ Drawing No. 300 - 07
JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

D.C.I. pipe	Ø200mm		Service pipe	Ø 50mm	
P.V.C. pipe	Ø200mm		"	Ex.	
"	Ø150mm		Communal standpipe	Ø 20mm	
"	Ø100mm		"	Ex.	
"	Ex.		Sluice valve		
Aqueduct	Ø200mm		Air valve		
Grit chamber			Drainage facilities		
Intake weir	Ex.		Cattle trough	Ex.	



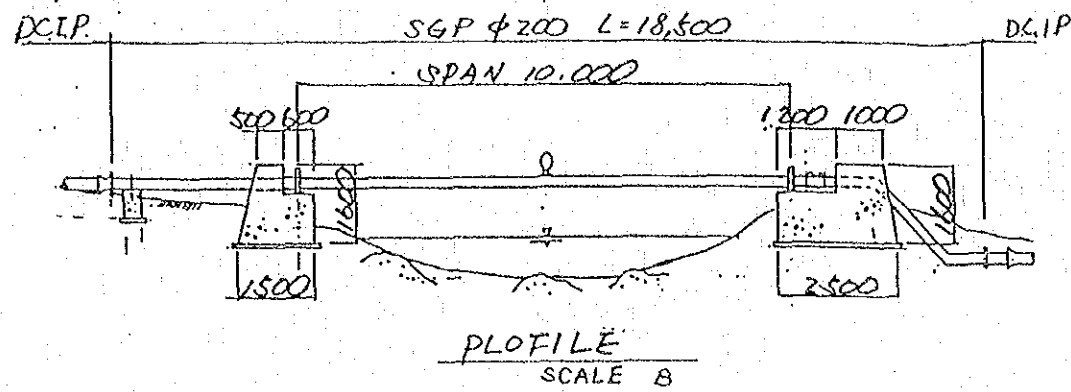
THE UNITED REPUBLIC OF TANZANIA

NOUNGU AGRICULTURAL DEVELOPMENT PROJECT

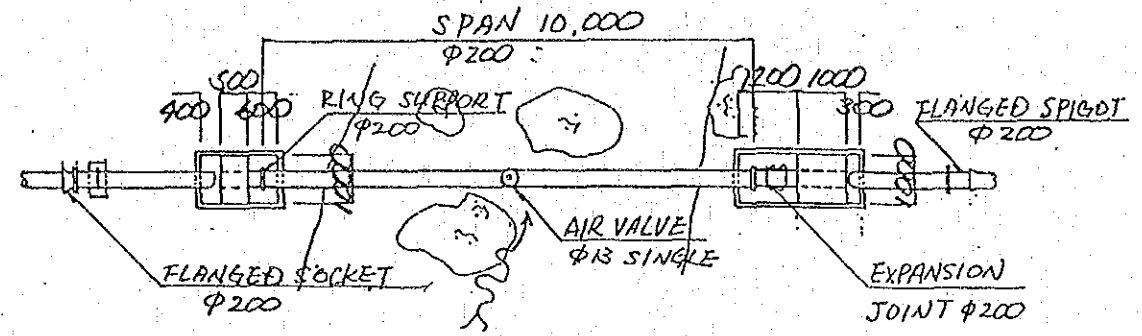
TITLE OF DRAWING
LAYOUT OF WATER SUPPLY SYSTEM

Date _____ Drawing No. 400-01

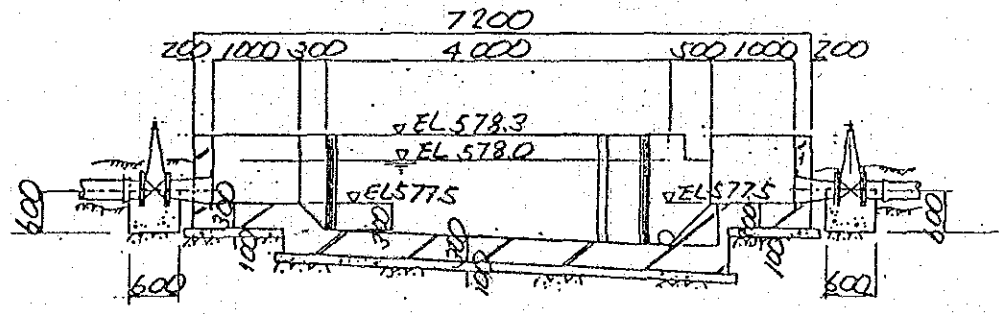
JAPAN INTERNATIONAL COOPERATION AGENCY



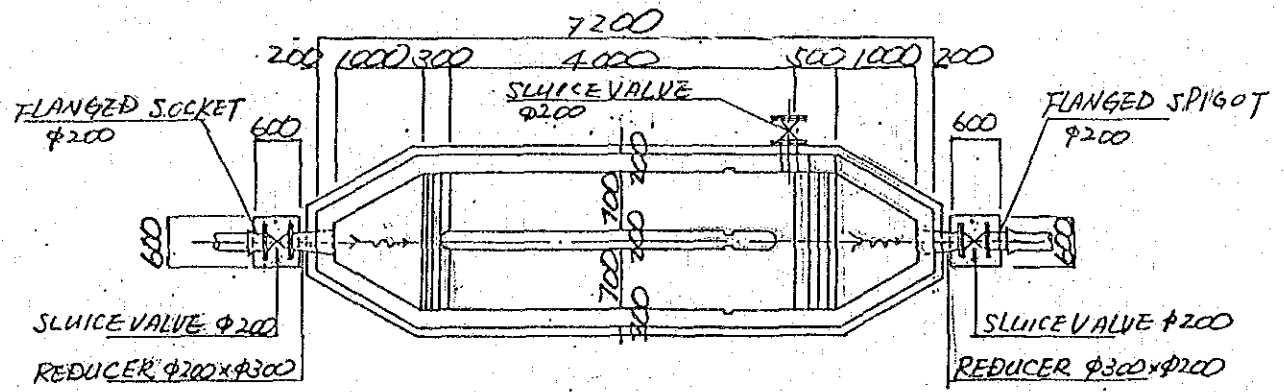
PROFILE
SCALE B



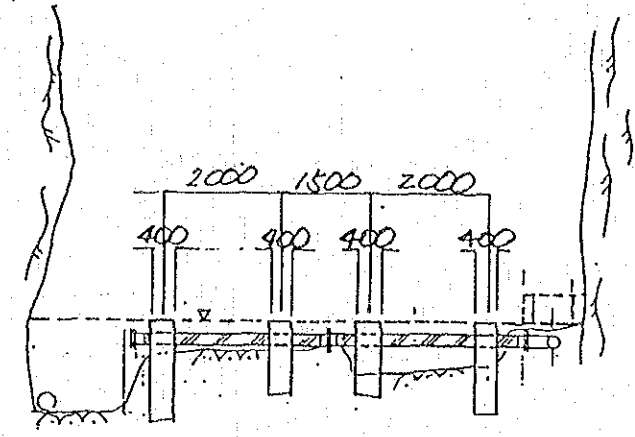
PLAN
SCALE B
AQUEDUCT



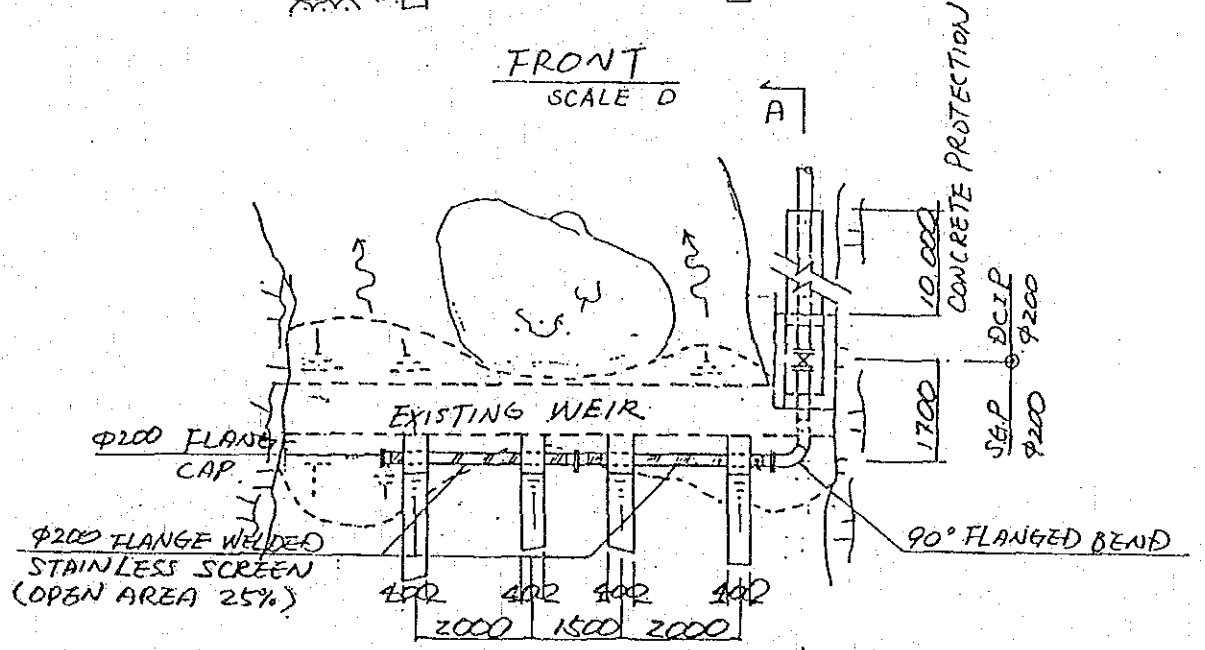
PROFILE
SCALE C



PLAN
SCALE C
GRIT - CHAMBER

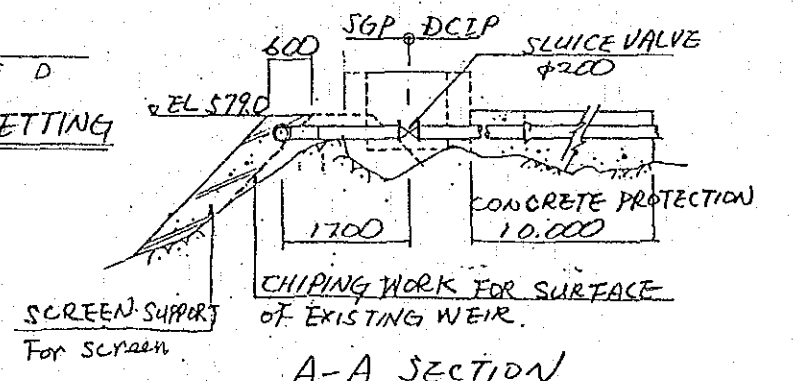


FRONT
SCALE D

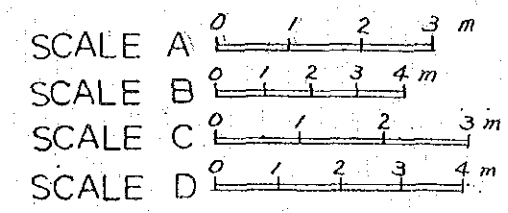


PLAN
SCALE D

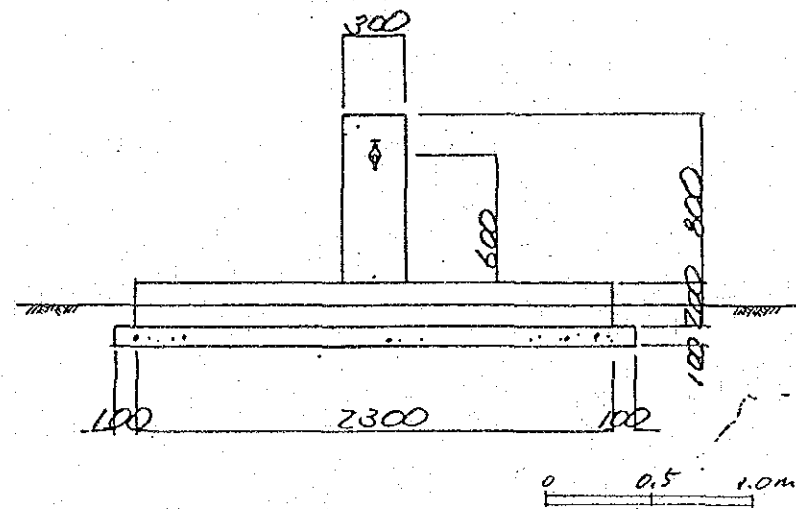
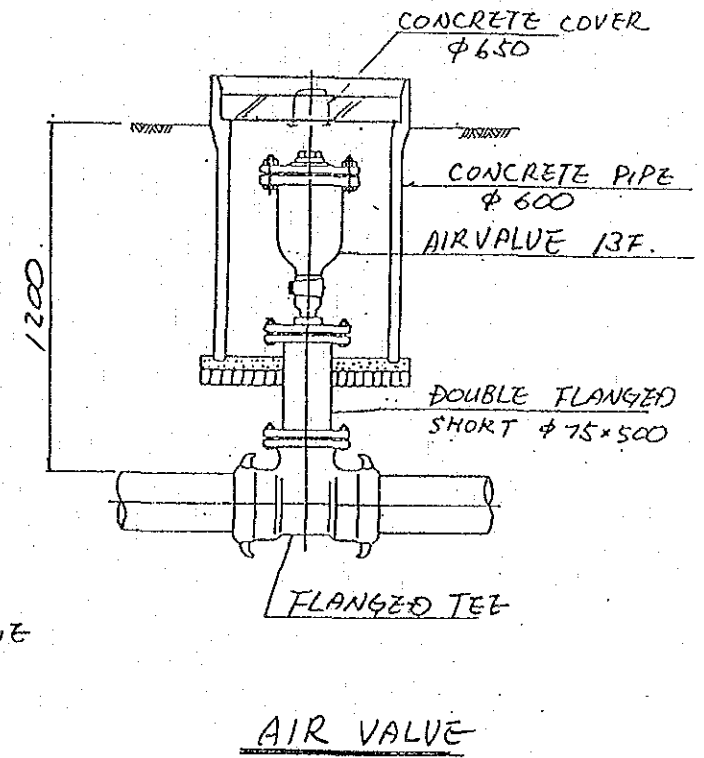
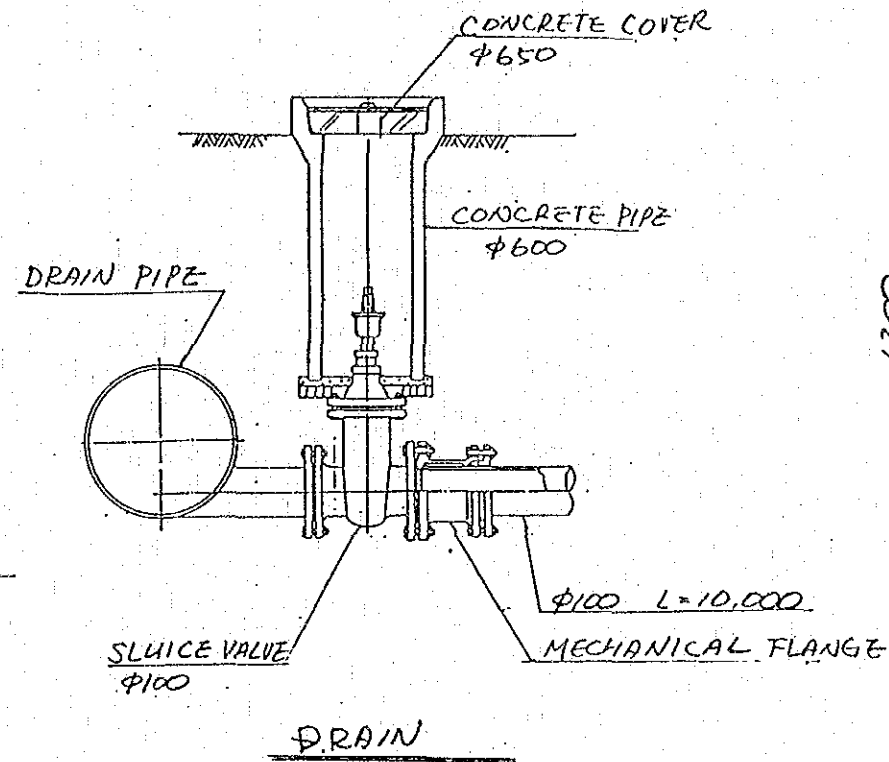
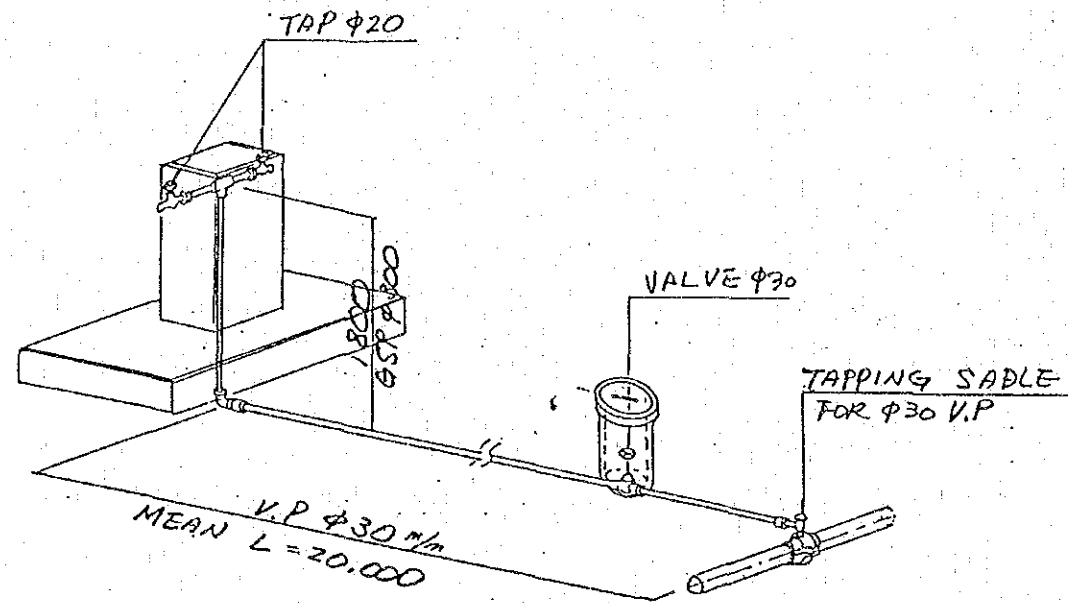
INTAKE PIPE SETTING



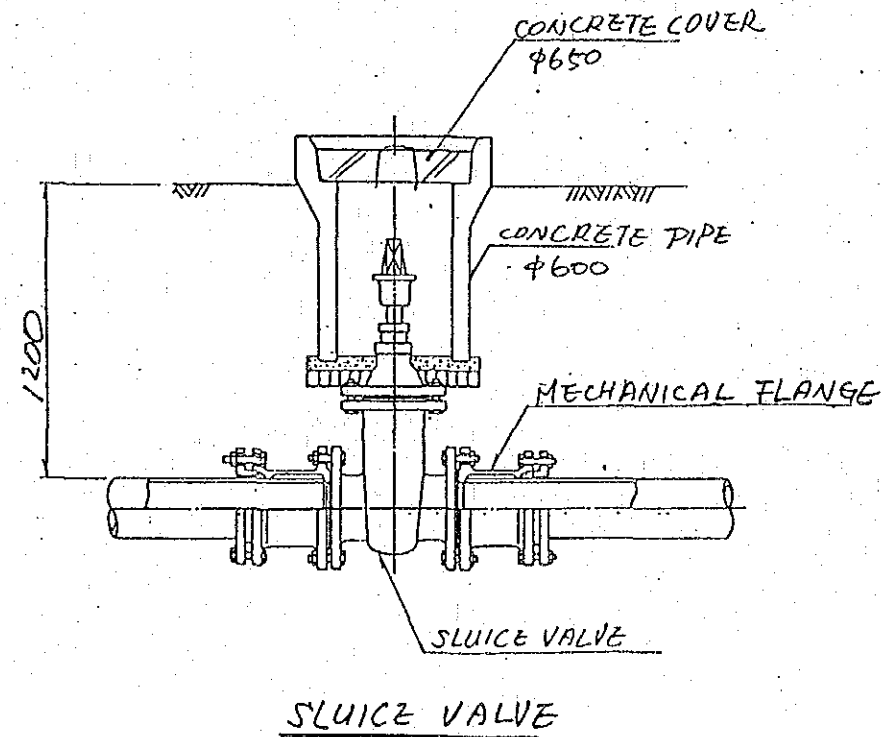
A-A SECTION
SCALE A



THE UNITED REPUBLIC OF TANZANIA	
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT	
TITLE OF DRAWING	
WATER SUPPLY FACILITIES(1/2)	
Date	Drawing no. 400-02
JAPAN INTERNATIONAL COOPERATION AGENCY	



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THE UNITED REPUBLIC OF TANZANIA		
NDUNGU AGRICULTURAL DEVELOPMENT PROJECT		
TITLE OF DRAWING		
WATER SUPPLY FACILITIES (2/2)		
Date	Drawing No.	400 - 03
JAPAN INTERNATIONAL COOPERATION AGENCY		

JICA