

No. VI-1-4








Name of Dam Musuvovi

Location	District Chivi		Communal Land Chivi		
	Map Ref. 2030D1		Coordinates TN477081		
Geology	Gneiss, shearing widely, very soft, joint are well developed.				
Hydrology	River (T) Save		Hydrological Zone E-L2		
	Catchment Area 5.9 sq.km		M.A. Rainfall 570 mm		
	M.A. Runoff 3l mm		Sediment 70 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.360 MCM		1/10 Yr. Yield 0.022 MCM		
	Dead Capacity 0.010 MCM		D.W.S. 672 m		
	Total Capacity 0.370 MCM		N.W.S. 677 m		
Dam	Height 9 m		Length 400 m		
	Embankment Volume 33 000 cu.m		Spillway 47 m		
Agriculture	Natural Region V		Soil SL		
	Potential Irrigable Area		200 ha		
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 1.3 ha		Dist. 1.0 km by Pump, H=28.0 m		
	Topography	Area	Slightly sloping		
		Conveyance	Gently sloping		
Rural Water Supply	Population 912 person		18 cu.m/day		
	Livestock 570 unit		26 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 453 000		Z\$ 359 000	Z\$ 812 000	C
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 3 612 /year		Z\$ 42 000	-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

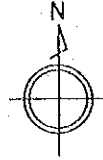
Present Condition on the Ward

Ward Name	20		Area 17 000 ha	
Demography	Population Density		30.4 persons/sq.km	
	Family Size		5.5 Persons/household	
Agriculture	Arable Area 9 350 ha		Grazing Area 7 650 ha	
	Maize 3.7 ha/household		6 bags/ha	
	Sorghum 0.5 ha/household		7 bags/ha	
	Livestock 2.0 LSUs/household		11.4 LSUs/sq.km	
Rural Water Supply	Borehole 0.04 units/sq.km		860 persons/unit	
	Well - units/sq.km		- persons/unit	

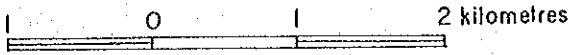
LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

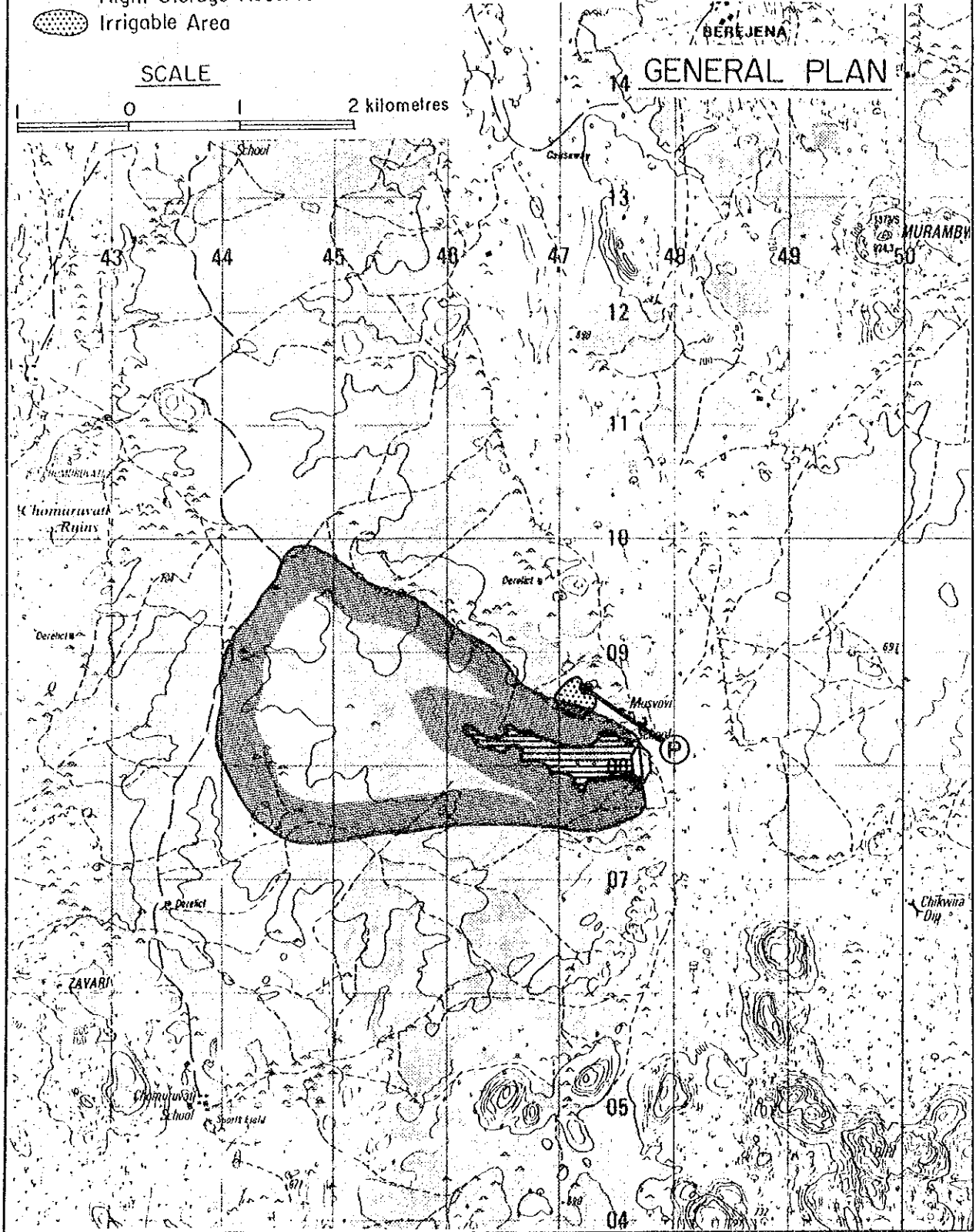
Dam No.	VI-1-4
Dam Name	MUSUVOVI
Catchment Area	5.9 sq.km
1/10 yr. Yield	22 Th.cu.m
Water Conveyance	
Method	Pumping
Distance	1.0 km
Gross Irrigable Area	2 ha



SCALE



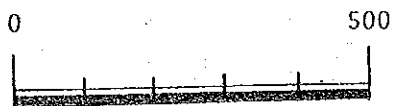
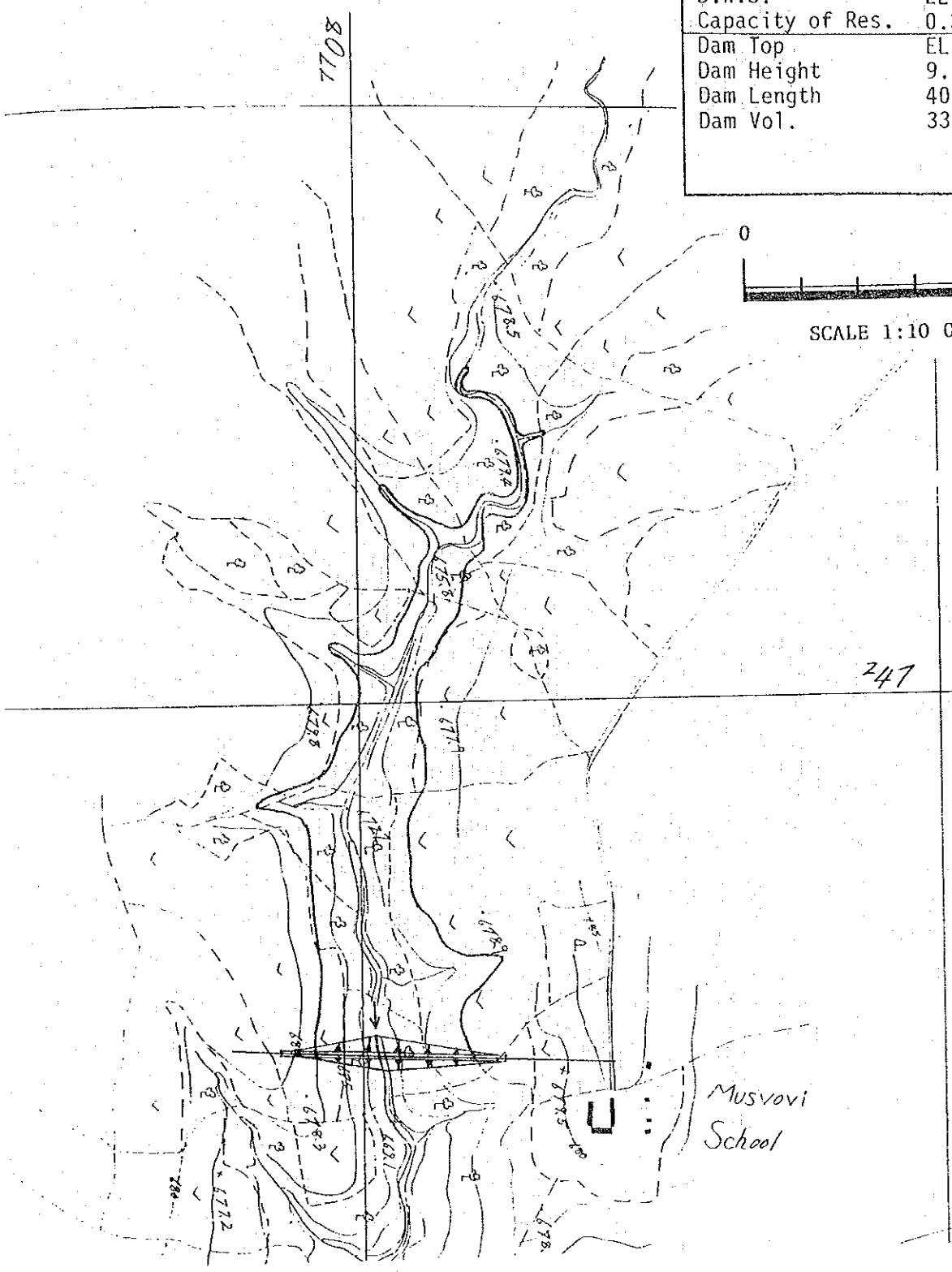
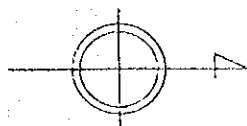
GENERAL PLAN



MUSUVOVI

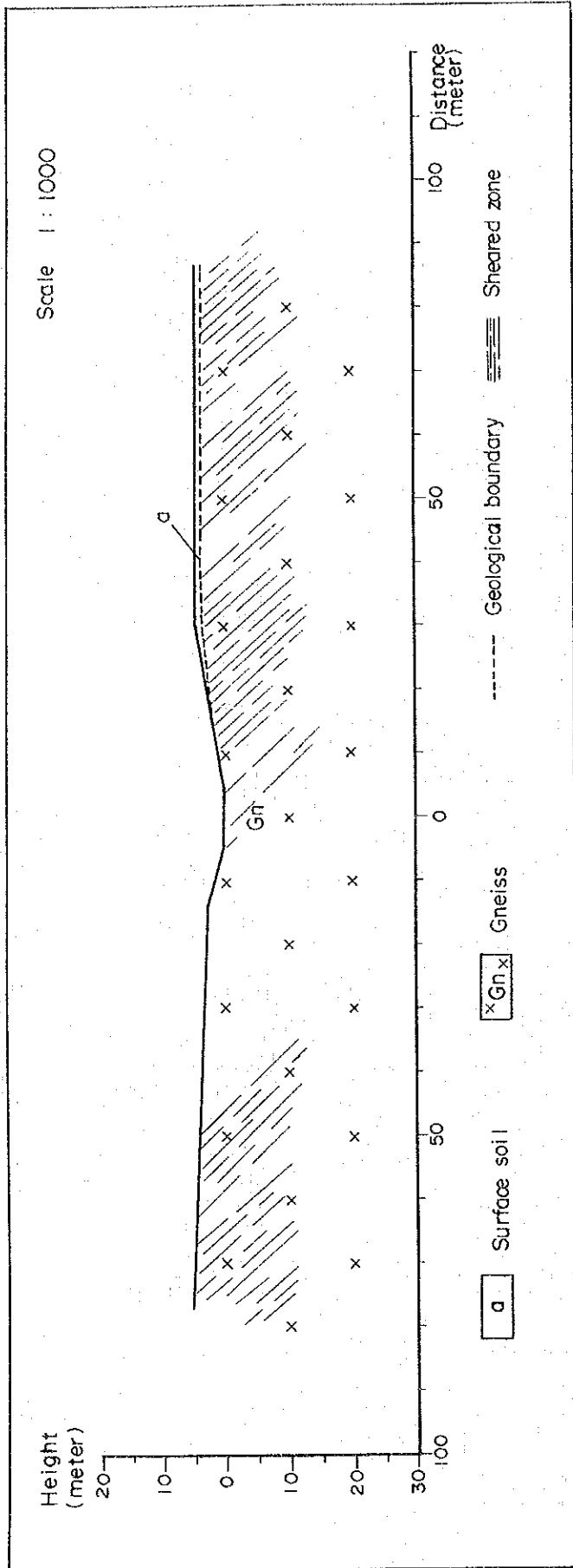
PLAN OF DAM

Dam No.	VI- 1 - 4
District	Chivi
Communal L.	Chivi
River	(T)Save
Map Ref.	2030 D1
Coordinate	TN 477081
Catchment A.	5.9 sq.km
Design Flood	85 cum/sec
N.W.S.	EL.677.0 m
D.W.S.	EL.672.0 m
Capacity of Res.	0.37 M.C.M.
Dam Top	EL.679.0 m
Dam Height	9.0 m
Dam Length	400 m
Dam Vol.	33,000 cum



SCALE 1:10 000

VI-1-4 Musuvovi

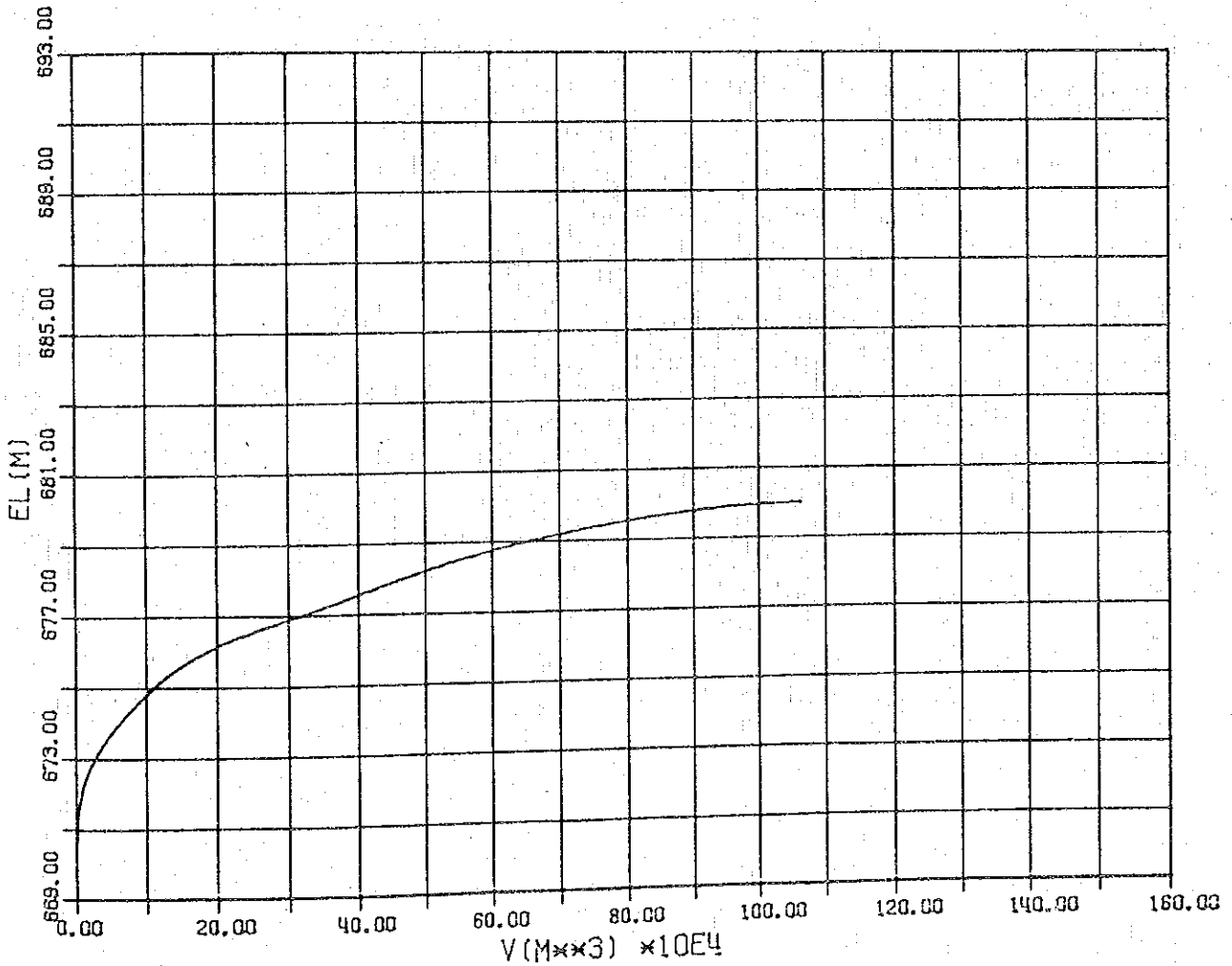


The bedrock consists of gneiss, and around the dam axis it is sheared widely and very soft. The sheared zone trends N50° to 60°E and dips 40° to 60°S, and the rock has been changed into boulders or foliations. It seems that leakage through the bedrock is large and bearing strength in the foundation strata is small. Sedimentation in this area is very deep, because the sheared soft bedrock supplies soils. The bedrock is less suitable for the dam foundation from the geological point of view.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
VI-1-4	203001	TN	477	081

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
669.7	0.0	0	0	0	0.00	
670.0	0.3	306	153	46	0.05	
672.5	2.5	11419	5863	14656	14.70	
675.0	2.5	64295	37857	94643	109.34	
677.5	2.5	160722	112509	281271	390.62	
680.0	2.5	377480	269101	672753	1063.37	



No. VI-1-5

Name of Dam Magwari

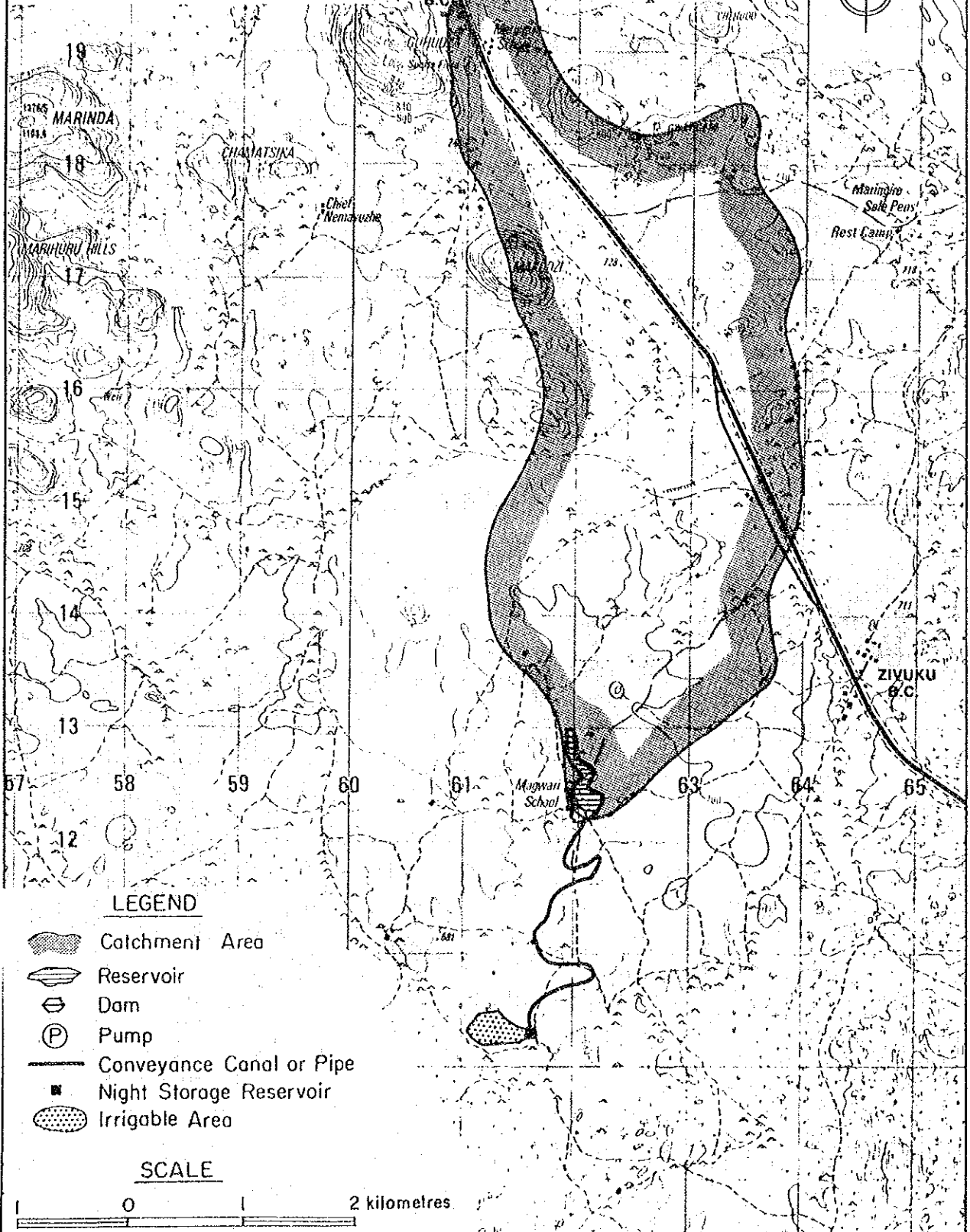
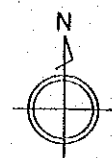
Location	District Chivi		Communal Land Chivi		
	Map Ref. 2030D1		Coordinates TN619121		
Geology	Gneiss, weathered, partly highly weathered and very soft and joints well developed.				
Hydrology	River Birishave		Hydrological Zone E-L2		
	Catchment Area	15.0 sq.km	M.A. Rainfall	600 mm	
	M.A. Runoff	38 mm	Sediment	70 tonnes km ² /yr.	
Reservoir	Effective Capacity	0.500 MCM	1/10 Yr. Yield	0.063 MCM	
	Dead Capacity	0.020 MCM	D.W.S.	678 m	
	Total Capacity	0.520 MCM	N.W.S.	683 m	
Dam	Height	10 m	Length	1 000 m	
	Embankment Volume	57 000 cu.m	Spillway	87 m	
Agriculture	Natural Region V		Soil SL		
	Potential Irrigable Area			30 ha	
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 3.7 ha		Dist. 3.5 km by Gravity		
	Topography	Area	Undulated		
		Conveyance	Undulated, one river crossing		
Rural Water Supply	Population 2 225 person		45 cu.m/day		
	Livestock 2 260 unit		102 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 661 000	Z\$ 702 000	Z\$ 1 363 000	C	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
	Z\$ 9 036 /year	Z\$ 105 000	-		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward








Ward Name	21		Area	13 700 ha
Demography	Population Density		44.5	persons/sq.km
	Family Size		4.5	Persons/household
Agriculture	Arable Area		8 220 ha	Grazing Area 5 480 ha
	Maize	2.2	ha/household	6 bags/ha
	Sorghum	0.6	ha/household	7 bags/ha
	Livestock	2.3	LSUs/household	22.6 LSUs/sq.km
Rural Water Supply	Borehole		0.06	units/sq.km
	Well		-	units/sq.km

Dam No. VI-1-5
 Dam Name MAGWARI
 Catchment Area 15.0 sq.km
 1/10 yr. Yield 63 Th.cu.m
 Water Conveyance
 Method Gravity
 Distance 3.5 km
 Gross Irrigable Area 5 ha

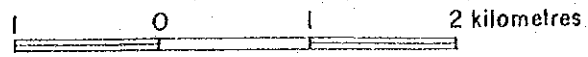
GENERAL PLAN



LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

SCALE

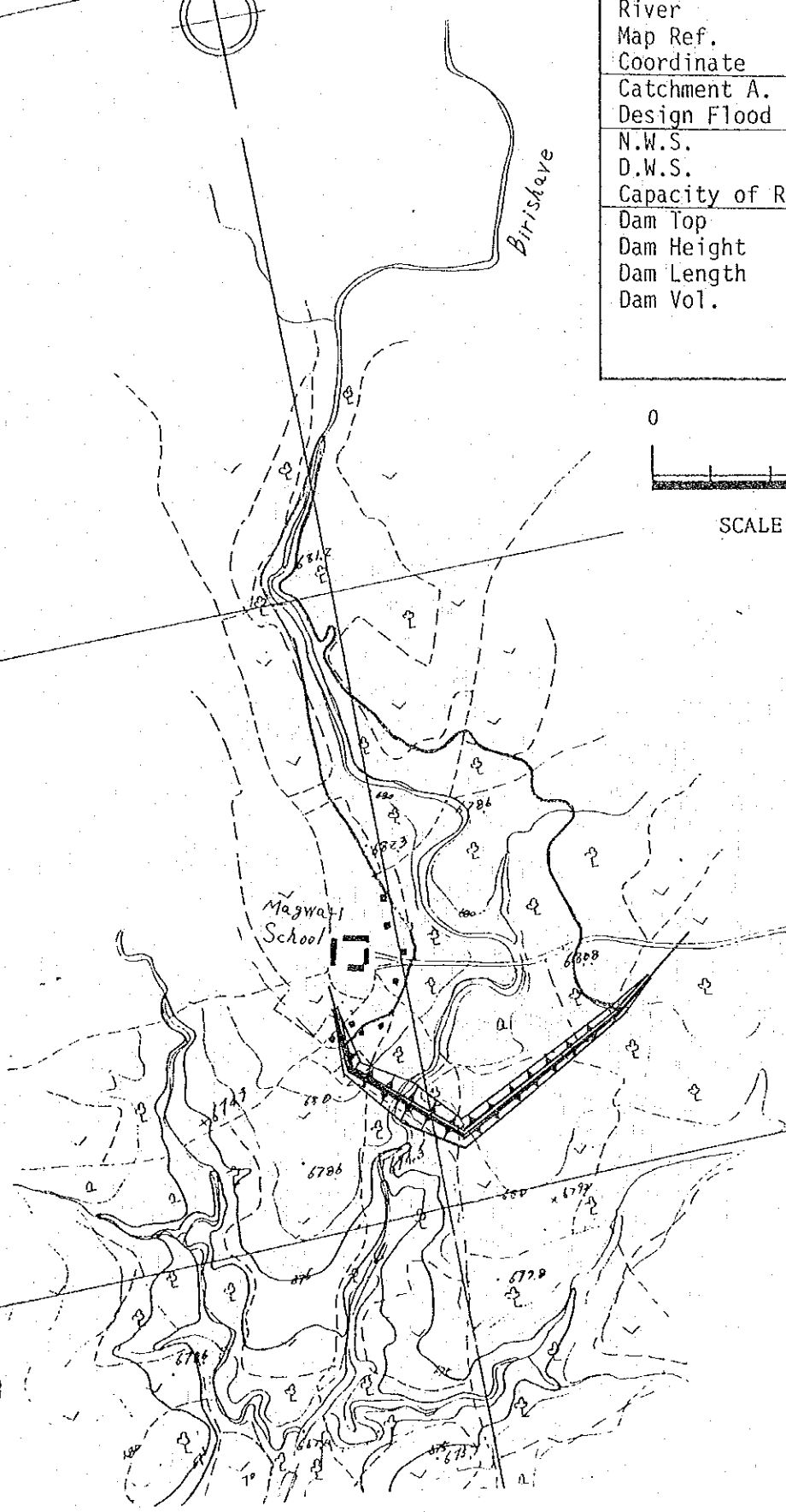


PLAN OF DAM MAGWARI

Dam No.	VI- 1 - 5
District	Chivi
Communal L.	Chivi
River	Birishave
Map Ref.	2030 D1
Coordinate	TN 619121
Catchment A.	15.0 sq.km
Design Flood	156 cum/sec
N.W.S.	EL.683.0 m
D.W.S.	EL.678.0 m
Capacity of Res.	0.52 M.C.M.
Dam Top	EL.685.0 m
Dam Height	10.0 m
Dam Length	1,000 m
Dam Vol.	57,000 cum

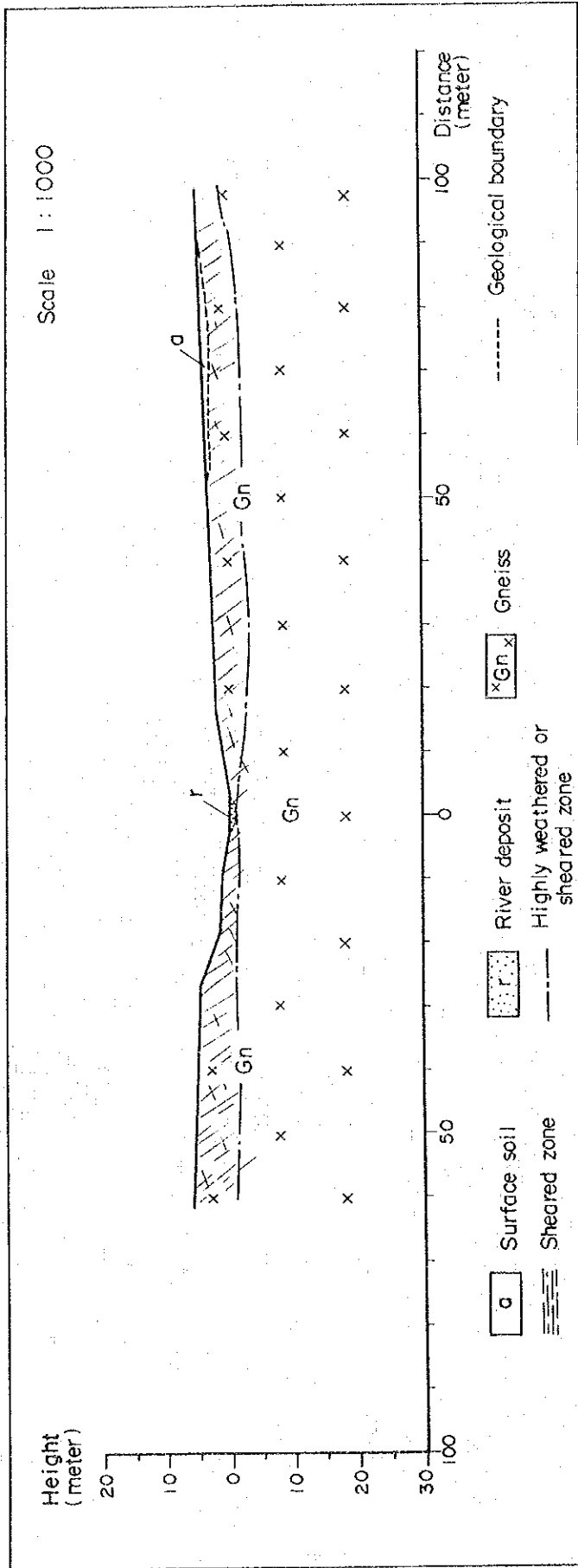


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VI-1-5 Magwari

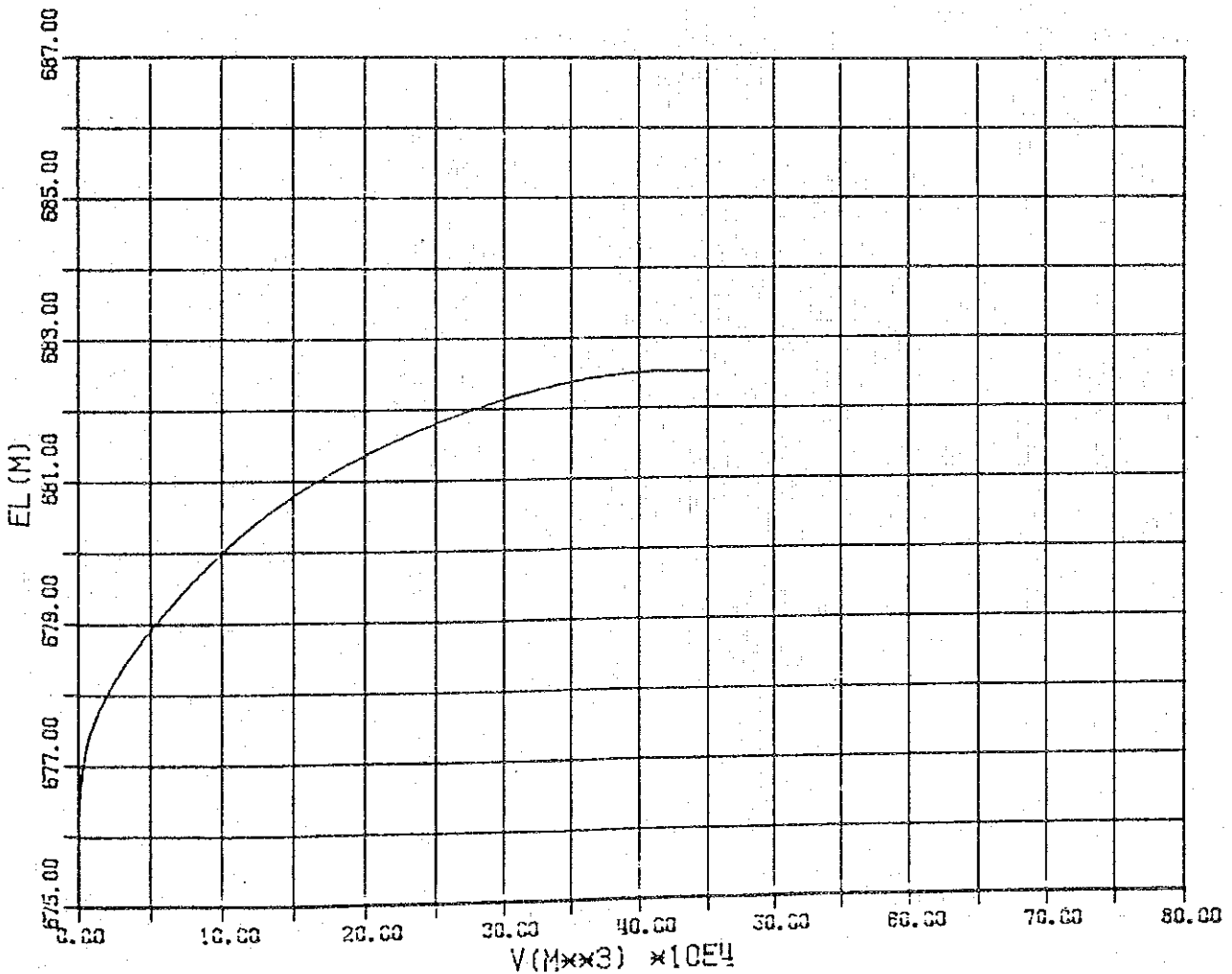


The bedrock consists of gneiss, and it has been weathered to varying degrees from massive and very hard to foliated and very soft. The bedrock around the damsite is very hard at the right bank, however it is soft and has been changed into boulders at the left bank. The estimated thickness of the highly weathered layer is maximum 5 meters. It seems that leakage through the bedrock is considerably large and bearing strength in the foundation strata is small.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
VI-1-5	203001	TN	619	121

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
675.0	0.0	0	0	0	0.00	
677.5	2.5	7316	3658	9145	9.14	
680.0	2.5	65871	36594	91484	100.63	
682.5	2.5	214193	140032	350080	450.71	



No. VI-1-6

Name of Dam Zifunzi No. 2

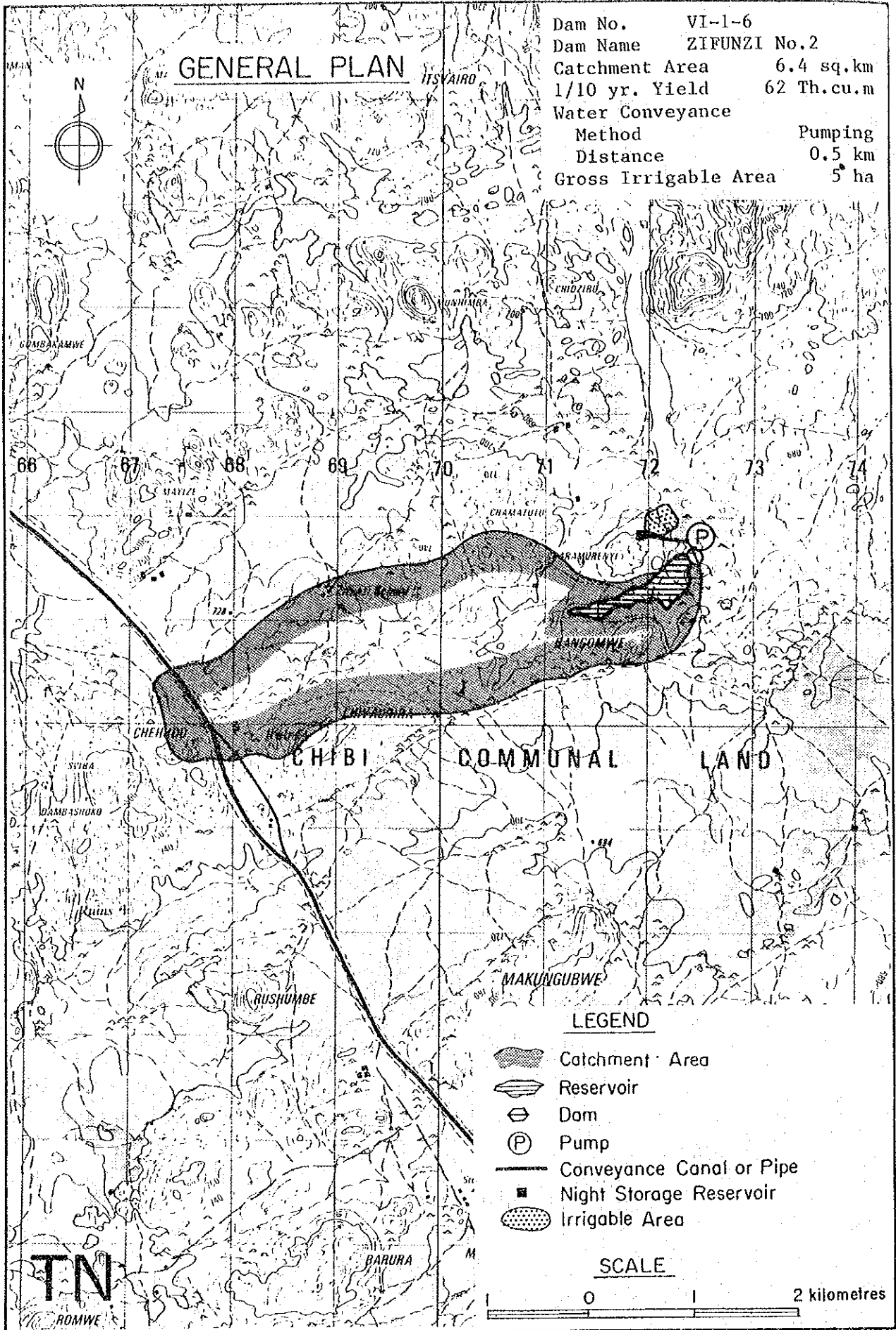
Location	District Chivi		Communal Land Chivi		
	Map Ref. 2030D2		Coordinates TN724116		
Geology	Gneiss, highly weathering, changed into boulders and soils.				
Hydrology	River (T) Tokwe		Hydrological Zone E-T1		
	Catchment Area 6.4 sq.km		M.A. Rainfall 650 mm		
	M.A. Runoff 51 mm		Sediment 70 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.320 MCM		1/10 Yr. Yield 0.062 MCM		
	Dead Capacity 0.010 MCM		D.W.S. 671 m		
	Total Capacity 0.330 MCM		N.W.S. 677 m		
Dam	Height 9 m		Length 50 m		
	Embankment Volume 14 000 cu.m		Spillway 50 m		
Agriculture	Natural Region IV		Soil SL		
	Potential Irrigable Area		30 ha		
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 3.6 ha		Dist. 0.5 km by Pump, H=29.0 m		
	Topography	Area		Flat	
		Conveyance		Slightly sloping	
Rural Water Supply	Population 1 386 person		28 cu.m/day		
	Livestock 1 260 unit		57 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 203 000	Z\$ 367 000	Z\$ 570 000	C	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
	Z\$ 8 293 /year	Z\$ 96 000	-		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

Present Condition on the Ward

Ward Name	23		Area	14 000 ha	
Demography	Population Density		46.2 persons/sq.km		
	Family Size		4.1 Persons/household		
Agriculture	Arable Area 4 900 ha		Grazing Area 9 100 ha		
	Maize 1.6 ha/household		10 bags/ha		
	Sorghum 0.3 ha/household		9 bags/ha		
	Livestock 2.2 LSUs/household		25.2 LSUs/sq.km		
Rural Water Supply	Borehole 0.09 units/sq.km		539 persons/unit		
	Well - units/sq.km		- persons/unit		

GENERAL PLAN

Dam No. VI-1-6
 Dam Name ZIFUNZI No.2
 Catchment Area 6.4 sq.km
 1/10 yr. Yield 62 Th.cu.m
 Water Conveyance
 Method Pumping
 Distance 0.5 km
 Gross Irrigable Area 5 ha

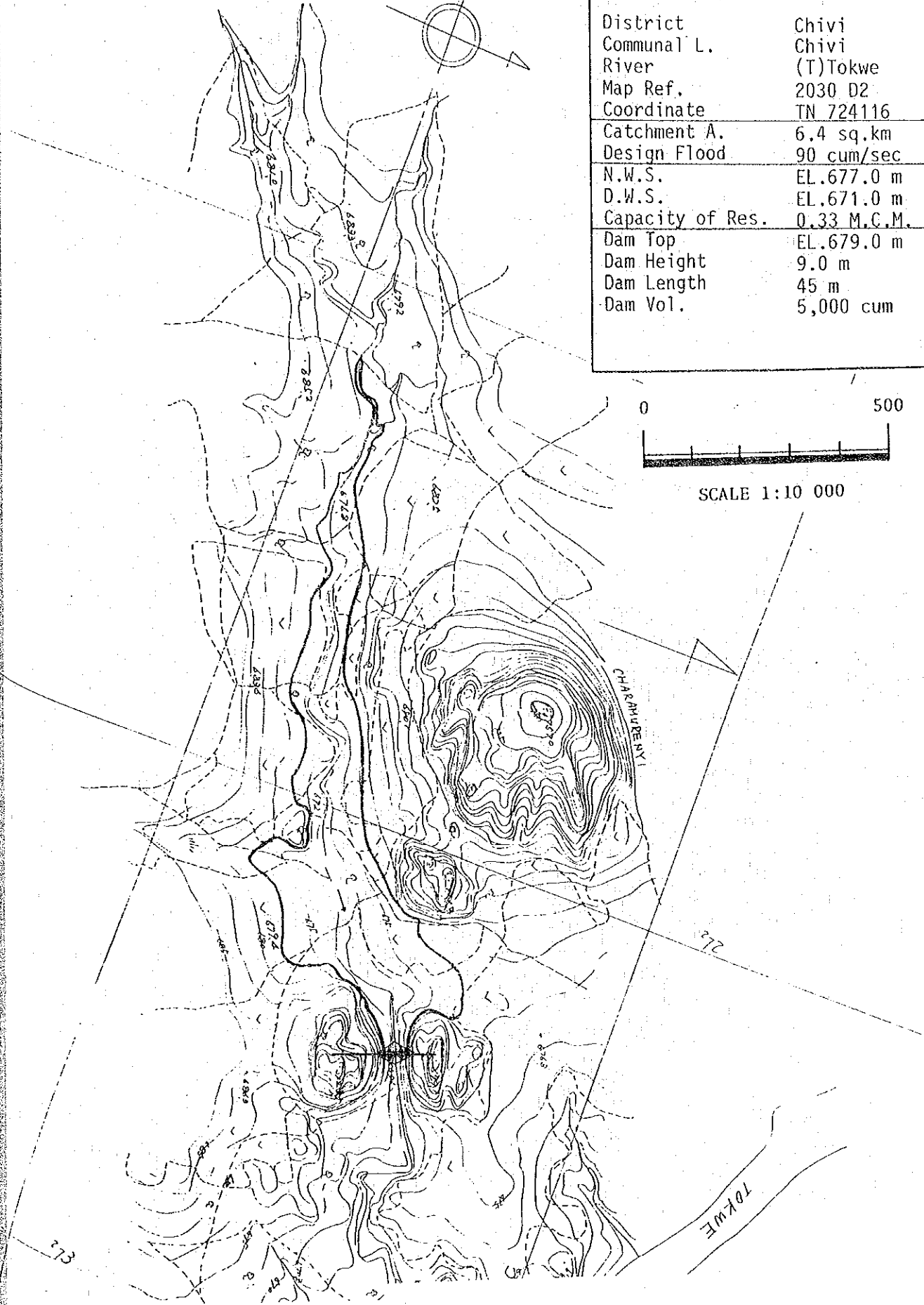


TNI
ROMWE

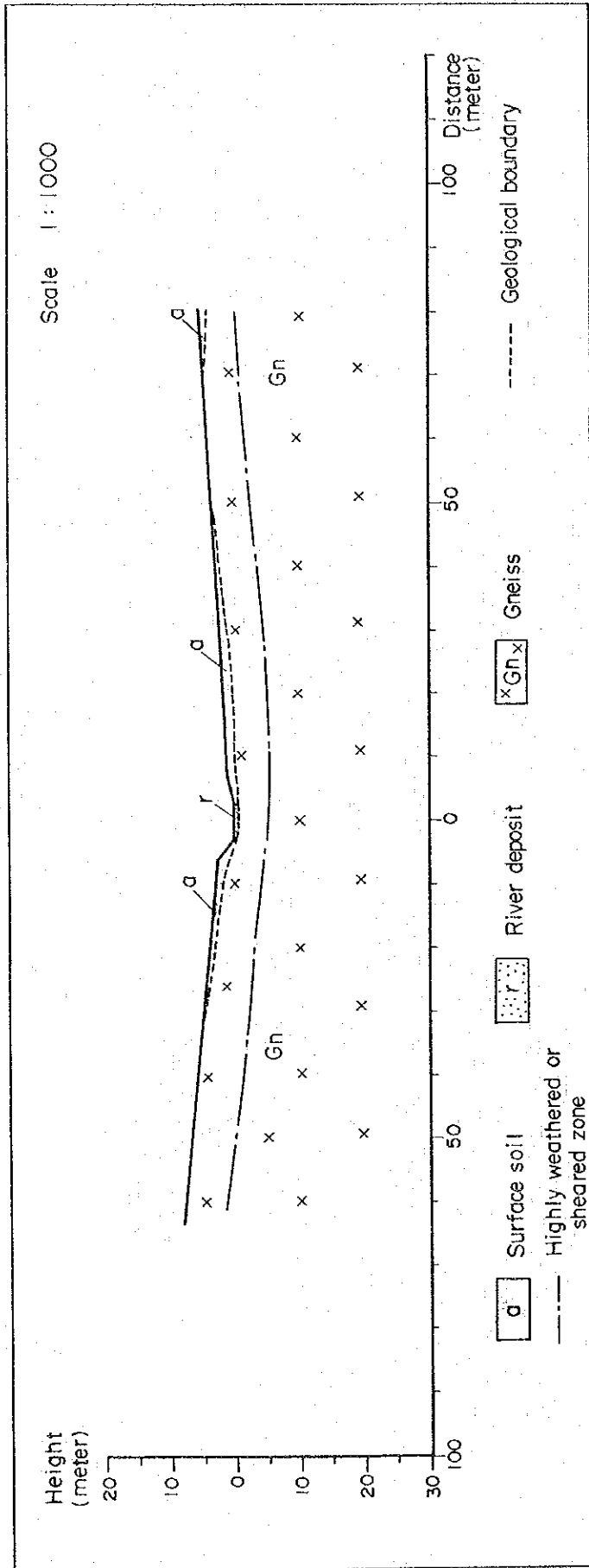
PLAN OF DAM

ZIFUNZI No. 2

Dam No.	VI-1-6
District	Chivi
Communal L.	Chivi
River	(T)Tokwe
Map Ref.	2030 D2
Coordinate	TN 724116
Catchment A.	6.4 sq.km
Design Flood	90 cum/sec
N.W.S.	EL.677.0 m
D.W.S.	EL.671.0 m
Capacity of Res.	0.33 M.C.M.
Dam Top	EL.679.0 m
Dam Height	9.0 m
Dam Length	45 m
Dam Vol.	5,000 cum



VI-1-6 Zifunzi No.2



The river forms relatively a narrow and deep riverbed, and accumulates boulders.

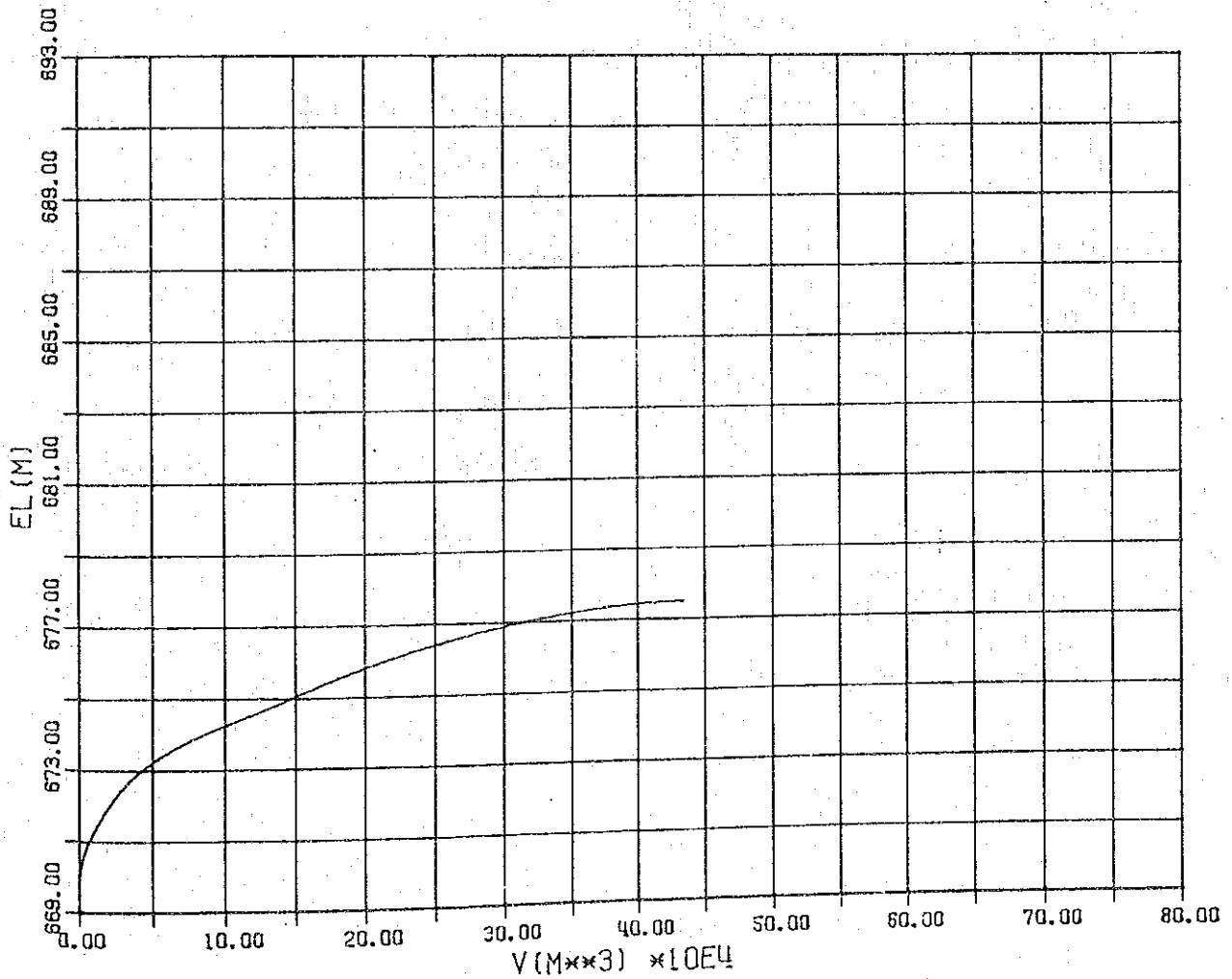
The bedrock consists of gneiss. All rock at the surge has been changed into boulders. The estimated thickness of the weathered layer is about 5 meters. Leakage through the bedrock seems to be large.

The bedrock is less suitable for dam foundation from the geological point of view.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
VI-1-6	203002	TN	724	116

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
669.6	0.0	0	0	0	0.00	
670.0	0.4	1261	631	252	0.25	
672.5	2.5	22736	11999	29996	30.25	
675.0	2.5	70761	46749	116871	147.12	
677.5	2.5	158319	114540	286350	433.47	



No. VI-1-7

Name of Dam Takavarasha

Location	District Chivi		Communal Land Chivi		
	Map Ref. 2030A4		Coordinates TN171525		
Geology	Granite, highly weathering, soft to very soft, joints are well developed.				
Hydrology	River (T) Nyarutedzi		Hydrological Zone E-L3		
	Catchment Area 30.4 sq.km		M.A. Rainfall 590 mm		
	M.A. Runoff 36 mm		Sediment 70 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.470 MCM		1/10 Yr. Yield 0.109 MCM		
	Dead Capacity 0.030 MCM		D.W.S. 814 m		
	Total Capacity 0.500 MCM		N.W.S. 818 m		
Dam	Height 9 m		Length 720 m		
	Embankment Volume 44 000 cu.m		Spillway 136 m		
Agriculture	Natural Region V		Soil SL		
	Potential Irrigable Area		200 ha		
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 6.4 ha		Dist. 0.7 km by Pump, H=6.0 m		
	Topography	Area	Slightly sloping		
		Conveyance	Gently sloping		
Rural Water Supply	Population 3 205 person		64 cu.m/day		
	Livestock 1 120 unit		50 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	
	Z\$ 566 000		Z\$ 493 000	Z\$ 1 059 000	
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$14 888 /year		Z\$ 173 000	-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

Ward Name	11		Area	8 300 ha	
Demography	Population Density		64.1 persons/sq.km		
	Family Size		3.5 Persons/household		
Agriculture	Arable Area		5 395 ha		Grazing Area 2 905 ha
	Maize		0.4 ha/household		4 bags/ha
	Sorghum		1.2 ha/household		9 bags/ha
	Livestock		0.6 LSUs/household		11.2 LSUs/sq.km
Rural Water Supply	Borehole		0.06 units/sq.km		1 064 persons/unit
	Well		0.01 units/sq.km		5 320 persons/unit

GENERAL PLAN



LUNDI RANCH

GUWA
105/9
927

Cheteni Dip

Cheteni School

Dama Dip

Mabika School

JAMBAL

MHANGWE








CHEMBANJE

CHOMUZANGARI

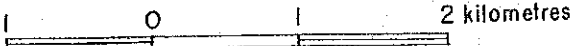
TAKAVARASHA
B.C.

Causeway

LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

SCALE

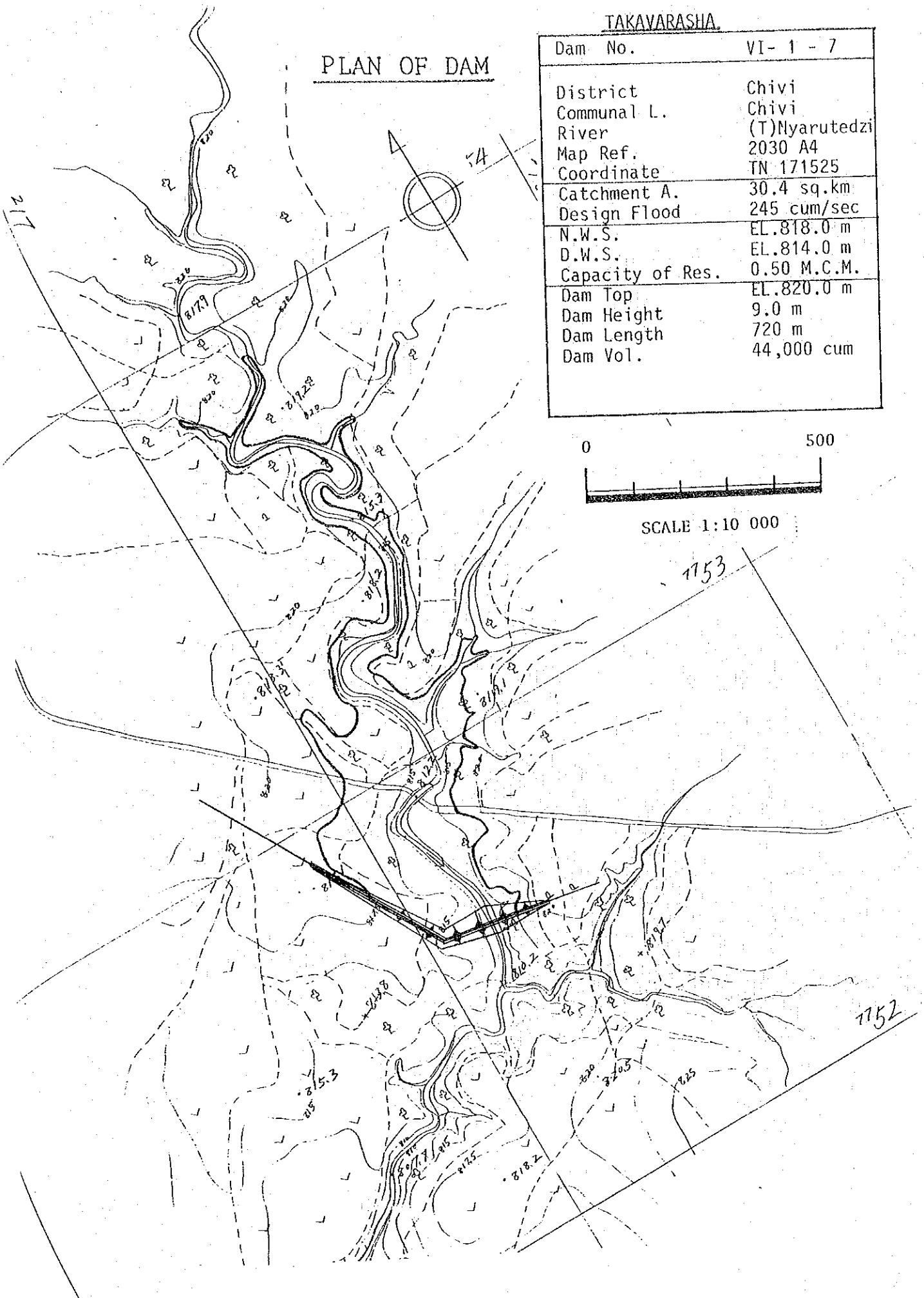


Dam No.	VI-1-7
Dam Name	TAKAVARASHA
Catchment Area	30.4 sq.km
1/10 yr. Yield	109 Th.cu.m
Water Conveyance	
Method	Pumping
Distance	0.7 km
Gross Irrigable Area	8 ha

TAKAVARASHA

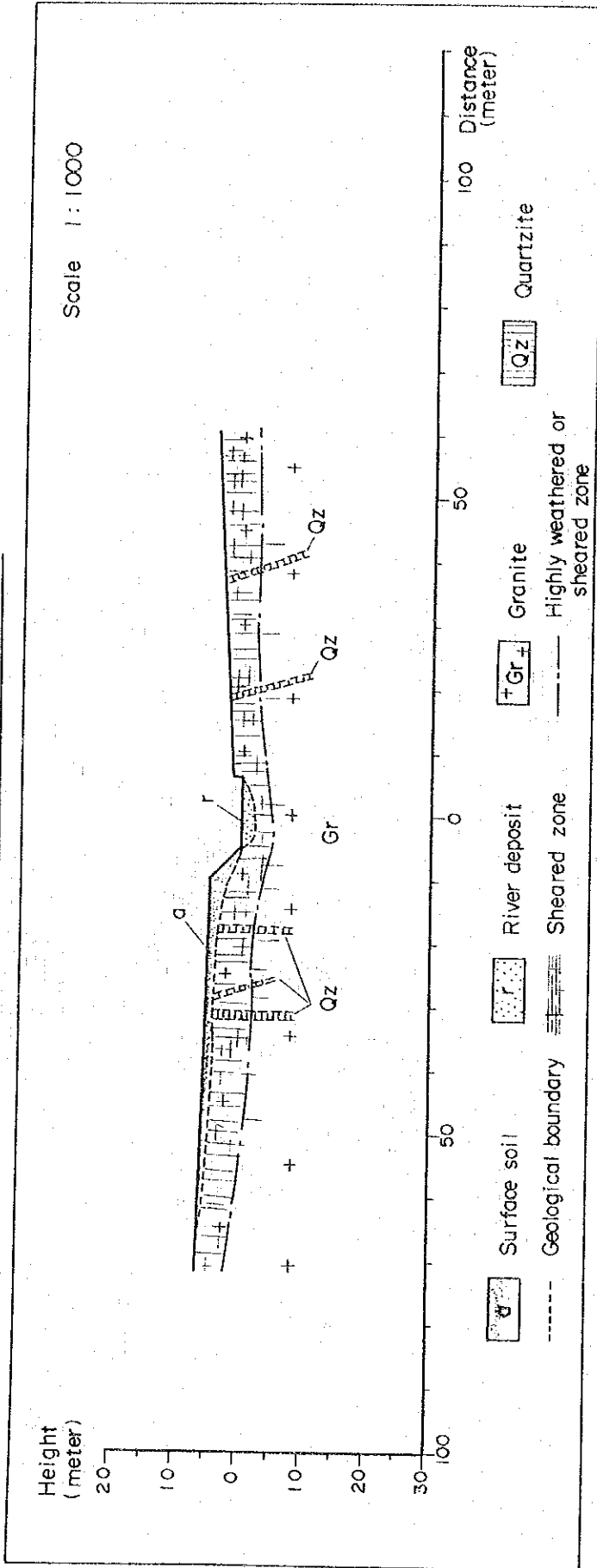
PLAN OF DAM

Dam No.	VI- 1 - 7
District	Chivi
Communal L.	Chivi
River	(T)Nyarutedzi
Map Ref.	2030 A4
Coordinate	TN 171525
Catchment A.	30.4 sq.km
Design Flood	245 cum/sec
N.W.S.	EL.818.0 m
D.W.S.	EL.814.0 m
Capacity of Res.	0.50 M.C.M.
Dam Top	EL.820.0 m
Dam Height	9.0 m
Dam Length	720 m
Dam Vol.	44,000 cum



SCALE 1:10 000

VI-1-7 Takavarasha

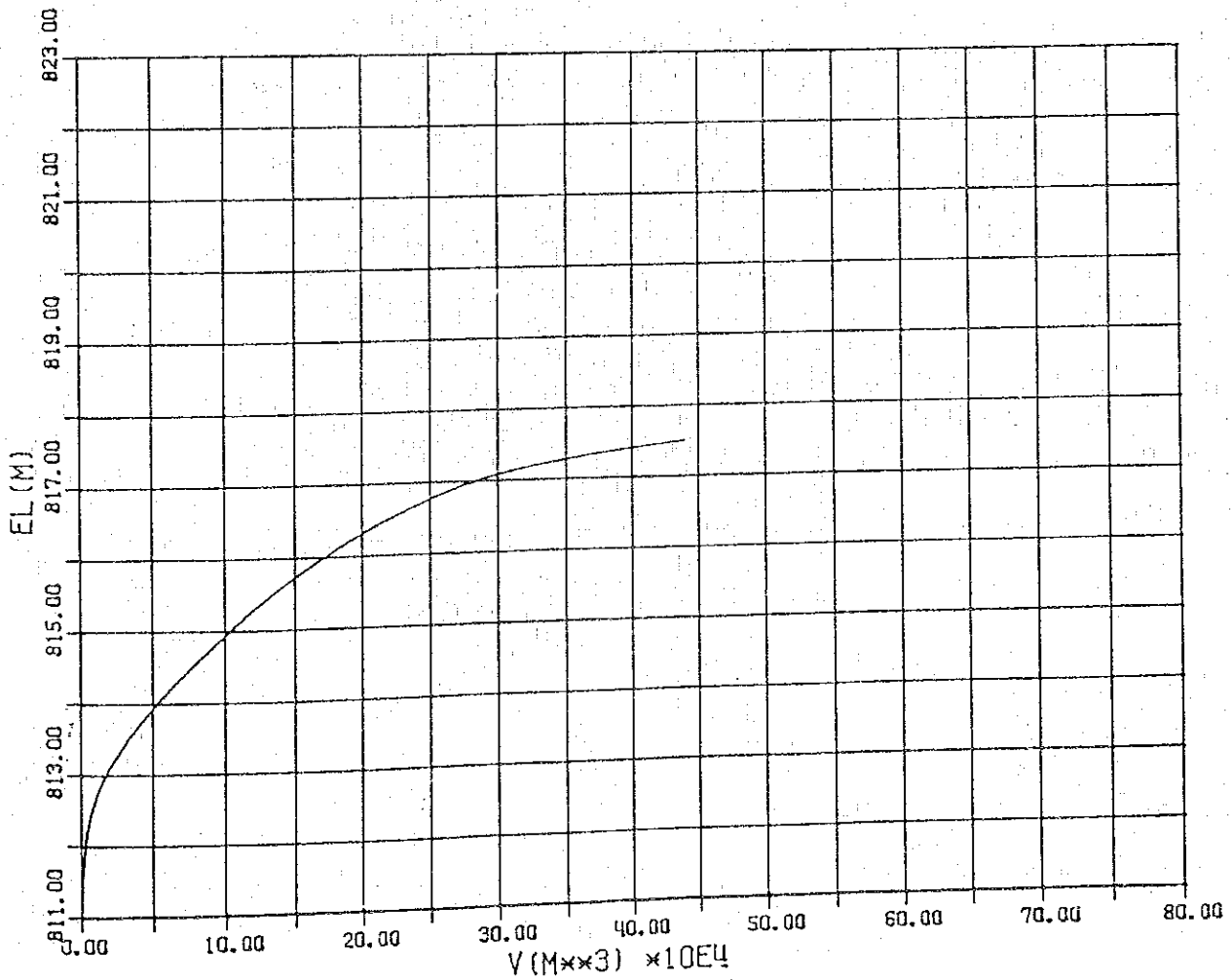


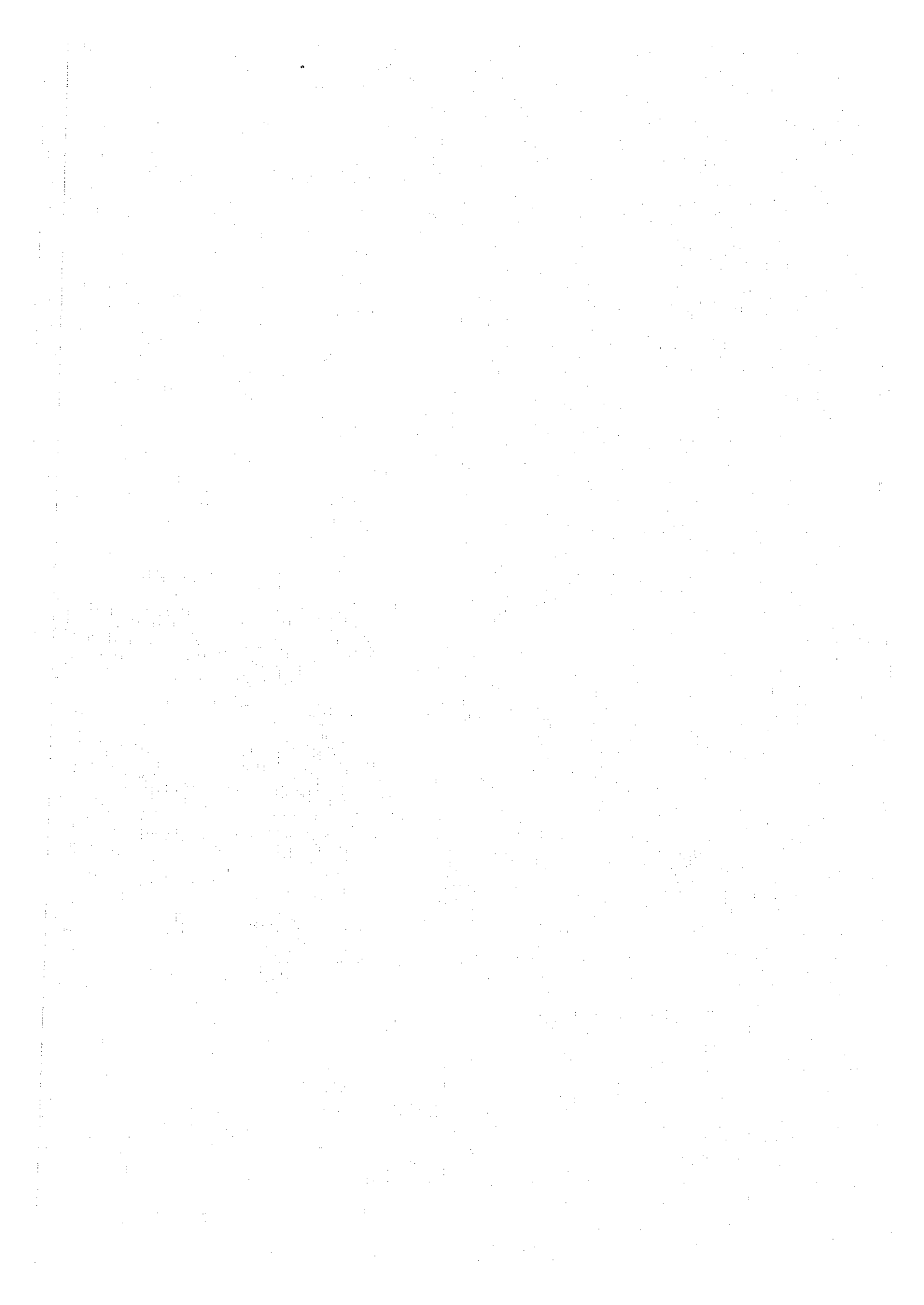
The area is very flat land, and the river forms a shallow valley and relatively wide flood plane. The bedrock consists of porphyritic granite and it is soft to very soft around the damsite by highly weathering, and it is well jointed and the foliation is trending N50°W direction. The highly weathering layer is estimated to be 10 to 5 meters thick, and leakage through the bedrock seems to be large. The estimated thickness of unconsolidated deposits is 0.5 to 2.0 meters. Deep soil in the riverbed indicates that sedimentation after dam construction will be great.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HØR
VI-1-7	2030A4	TN	171	525

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
811.0	0.0	0	0	0	0.00	
812.5	1.5	9632	4816	7224	7.22	
815.0	2.5	66814	38223	95558	102.78	
817.5	2.5	201282	134048	335120	437.90	





No. VI-1-8

Name of Dam Nyamakwe

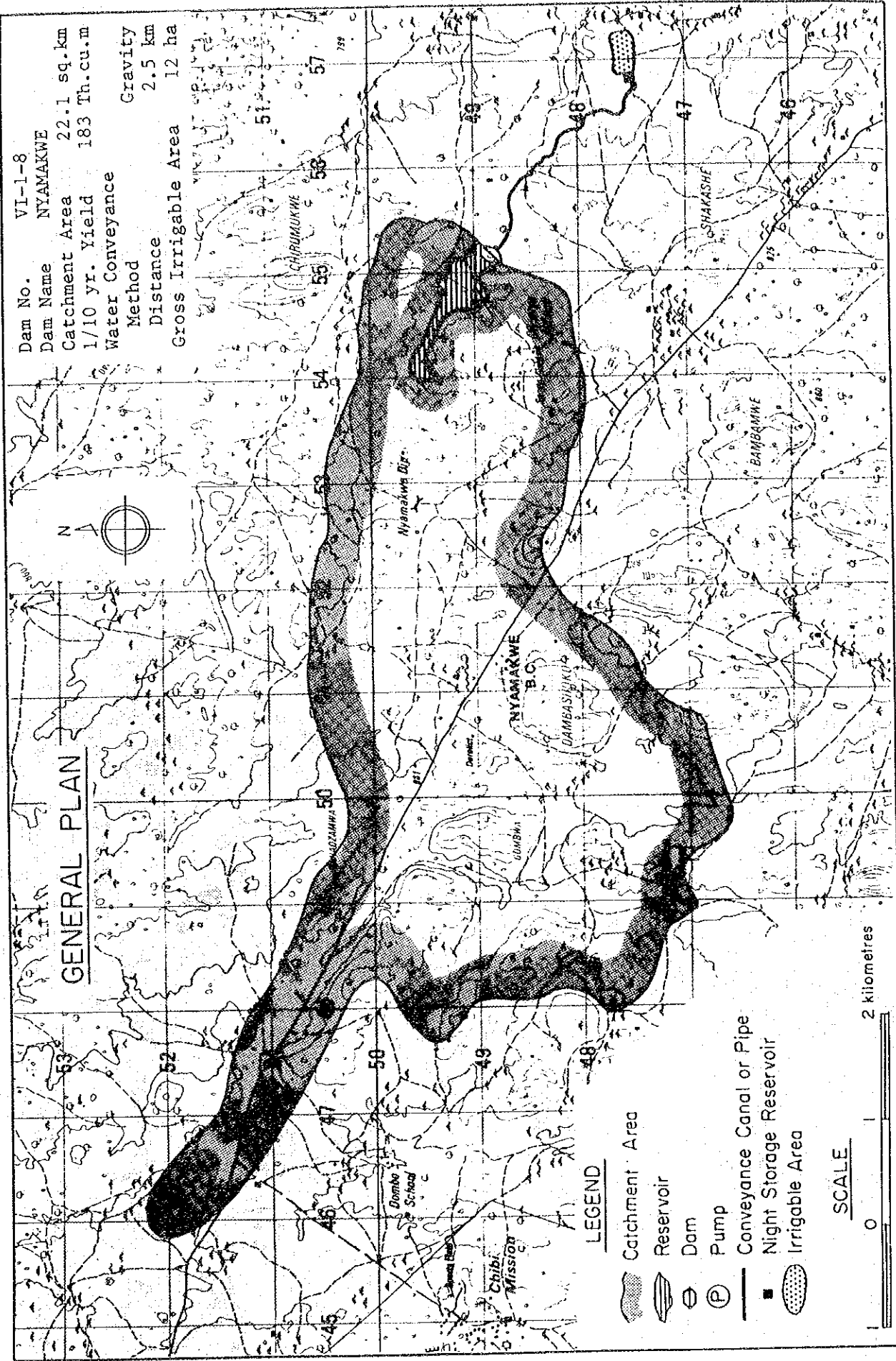
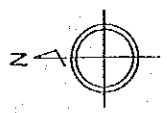
Location	District Chivi		Communal Land Chivi		
	Map Ref. 2030B4		Coordinates TN552488		
Geology	Granite, generally massive and hard, however opened joints well developed in the river bed.				
Hydrology	River Nyamakwe		Hydrological Zone E-T2		
	Catchment Area	22.1 sq.km	M.A. Rainfall	590 mm	
	M.A. Runoff	36 mm	Sediment	70 tonnes km ² /yr.	
Reservoir	Effective Capacity	0.600 MCM	1/10 Yr. Yield	0.183 MCM	
	Dead Capacity	0.030 MCM	D.W.S.	823 m	
	Total Capacity	0.630 MCM	N.W.S.	830 m	
Dam	Height	13 m	Length	700 m	
	Embankment Volume	68,000 cu.m	Spillway	62 m	
Agriculture	Natural Region V		Soil SL		
	Potential Irrigable Area		40 ha		
	Proposed Cropping Pattern		B		
Irrigation	Net Irrigable Area 9.4 ha		Dist. 2.5 km by Gravity		
	Topography	Area	Very flat		
		Conveyance	Gently sloping		
Rural Water Supply	Population 2 660 person		53 cu.m/day		
	Livestock 925 unit		42 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 732 000	Z\$ 493 000	Z\$ 1 225 000	B	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
Z\$ 21 620/year	Z\$ 250 000	1.6 per cent			
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks	Water right ... 4 km (No. 11056/11711) 5 km (No. 4743)				

Present Condition on the Ward

Ward Name	15	Area	11 500 ha
Demography	Population Density		53.2 persons/sq.km
	Family Size		4.7 Persons/household
Agriculture	Arable Area		6 900 ha
	Grazing Area		4 600 ha
	Maize	2.1 ha/household	8 bags/ha
	Sorghum	0.5 ha/household	6 bags/ha
Rural Water Supply	Livestock	1.6 LSUs/household	8.5 LSUs/sq.km
	Borehole	0.03 units/sq.km	1 529 persons/unit
	Well	- units/sq.km	- persons/unit

Dam No. VI-1-8
 Dam Name NYAMAKWE
 Catchment Area 22.1 sq.km
 1/10 yr. Yield 183 Th.cu.m
 Water Conveyance
 Method Gravity
 Distance 2.5 km
 Gross Irrigable Area 12 ha

GENERAL PLAN



LEGEND

- Catchment Area
- Reservoir
- Dam
- Pump
- Conveyance Canal or Pipe
- Night Storage Reservoir
- Irrigable Area

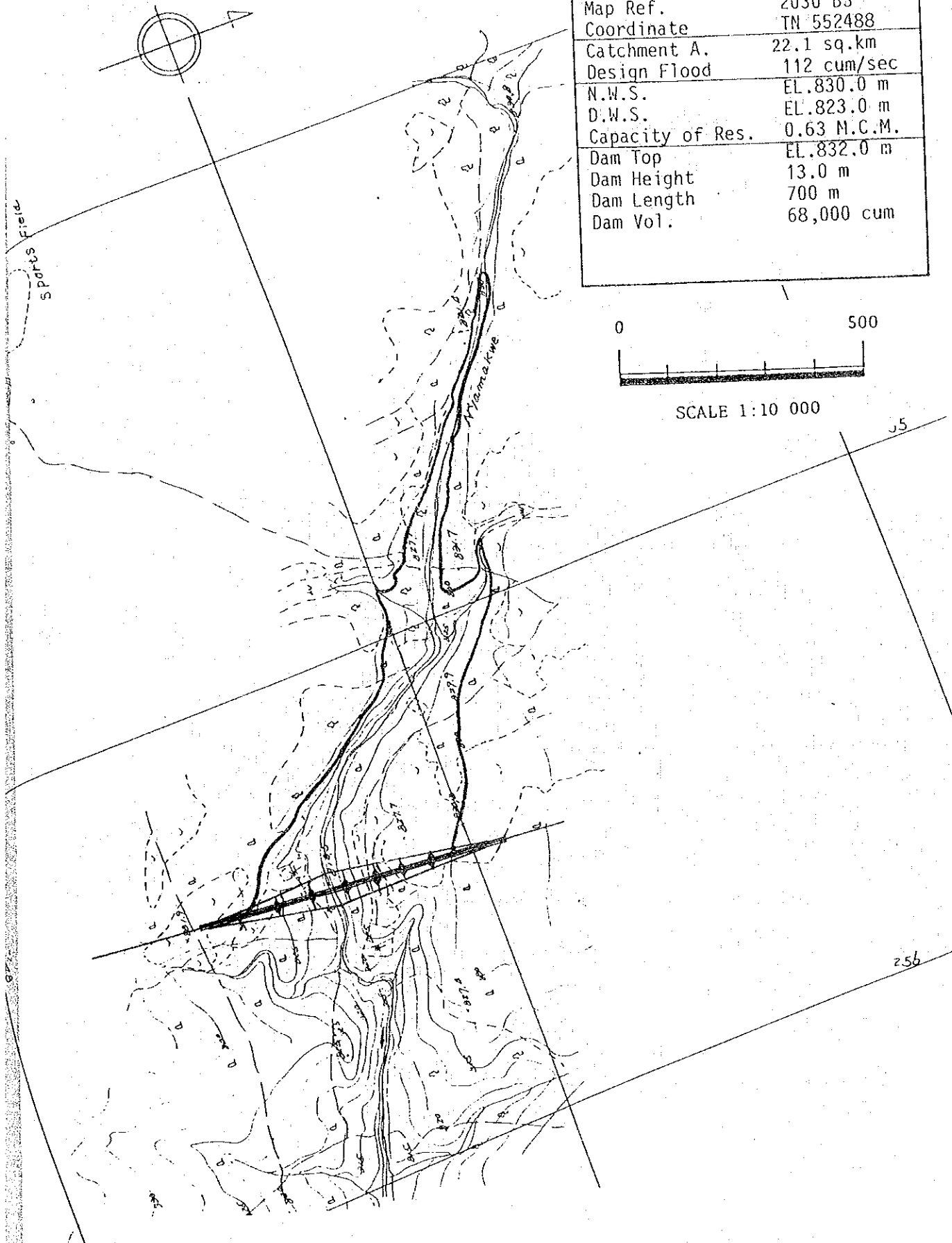
SCALE



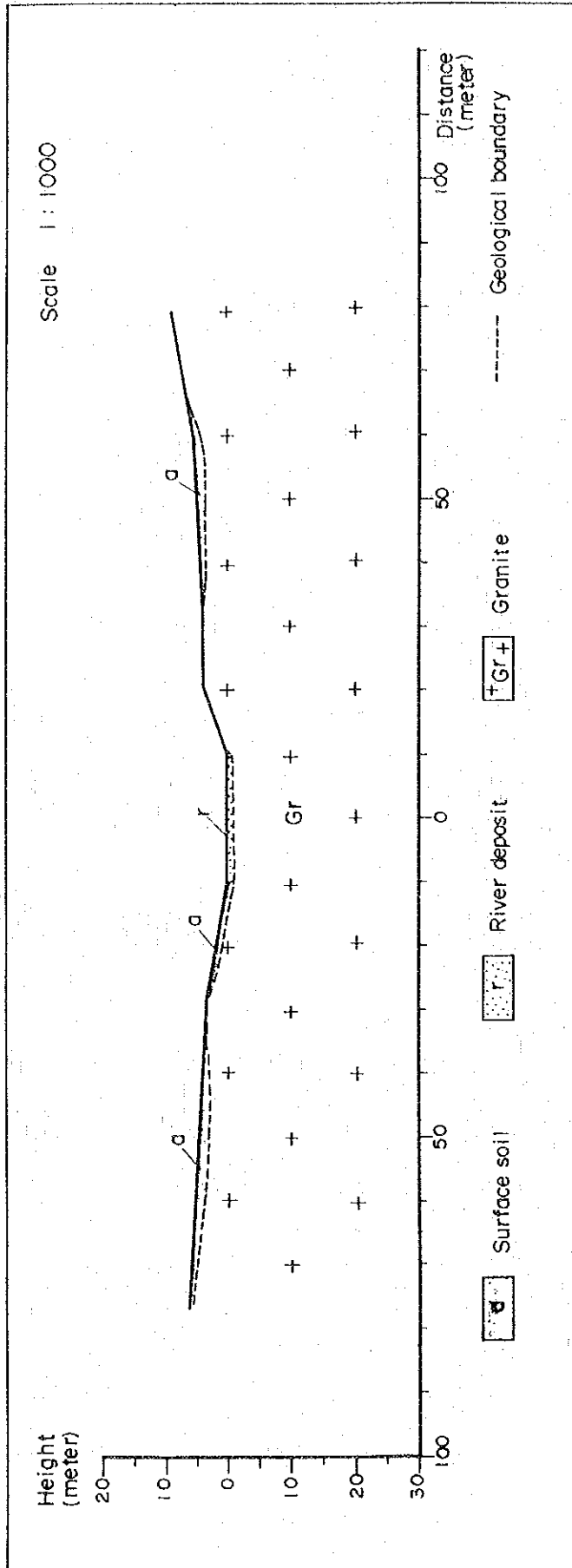
NYAMAKWE

PLAN OF DAM

Dam No.	VI- 1 - 8
District	Chivi
Communal L.	Chivi
River	Nyamakwe
Map Ref.	2030 B3
Coordinate	TN 552488
Catchment A.	22.1 sq.km
Design Flood	112 cum/sec
N.W.S.	EL.830.0 m
D.W.S.	EL.823.0 m
Capacity of Res.	0.63 M.C.M.
Dam Top	EL.832.0 m
Dam Height	13.0 m
Dam Length	700 m
Dam Vol.	68,000 cum



VI-1-8 Nymakwa



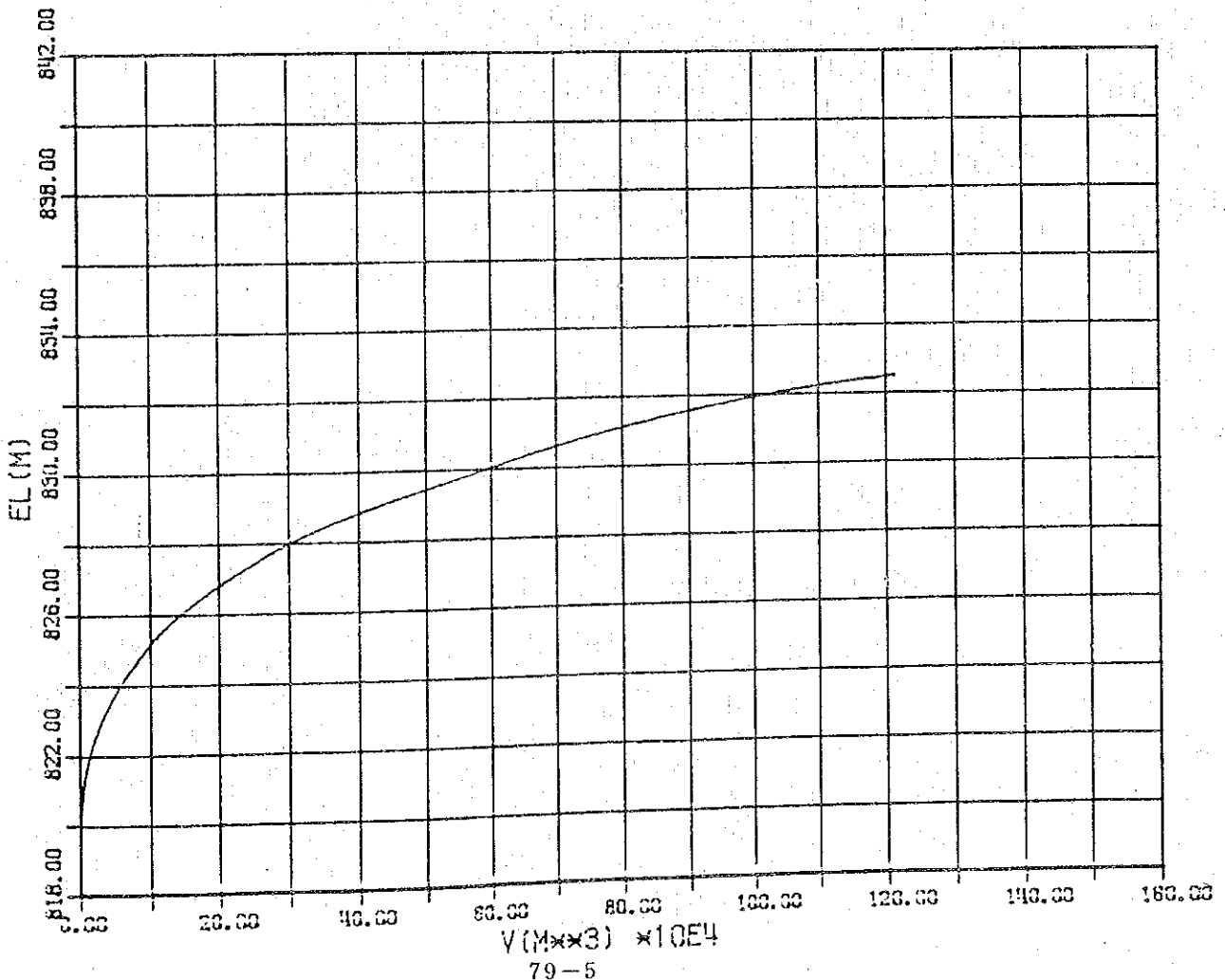
The bedrock consists of porphyritic granite, and it is massive and hard around the damsite. It is well jointed in the river bed. It is necessary to pay attention leakage through these joints in the case of dam construction.

The estimated thickness of unconsolidated deposits is less than 50 centimeters.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
VI-1-8	2030B3	TN	552	488

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
818.5	0.0	0	0	0	0.00	
820.0	1.5	600	300	450	0.45	
822.5	2.5	16200	8400	21000	21.45	
825.0	2.5	40900	28550	71375	92.82	
827.5	2.5	89400	65150	162875	255.70	
830.0	2.5	180200	134800	337000	592.70	
832.5	2.5	315300	247750	619375	1212.07	



No. VI-2-1

Name of Dam Mukovoriri

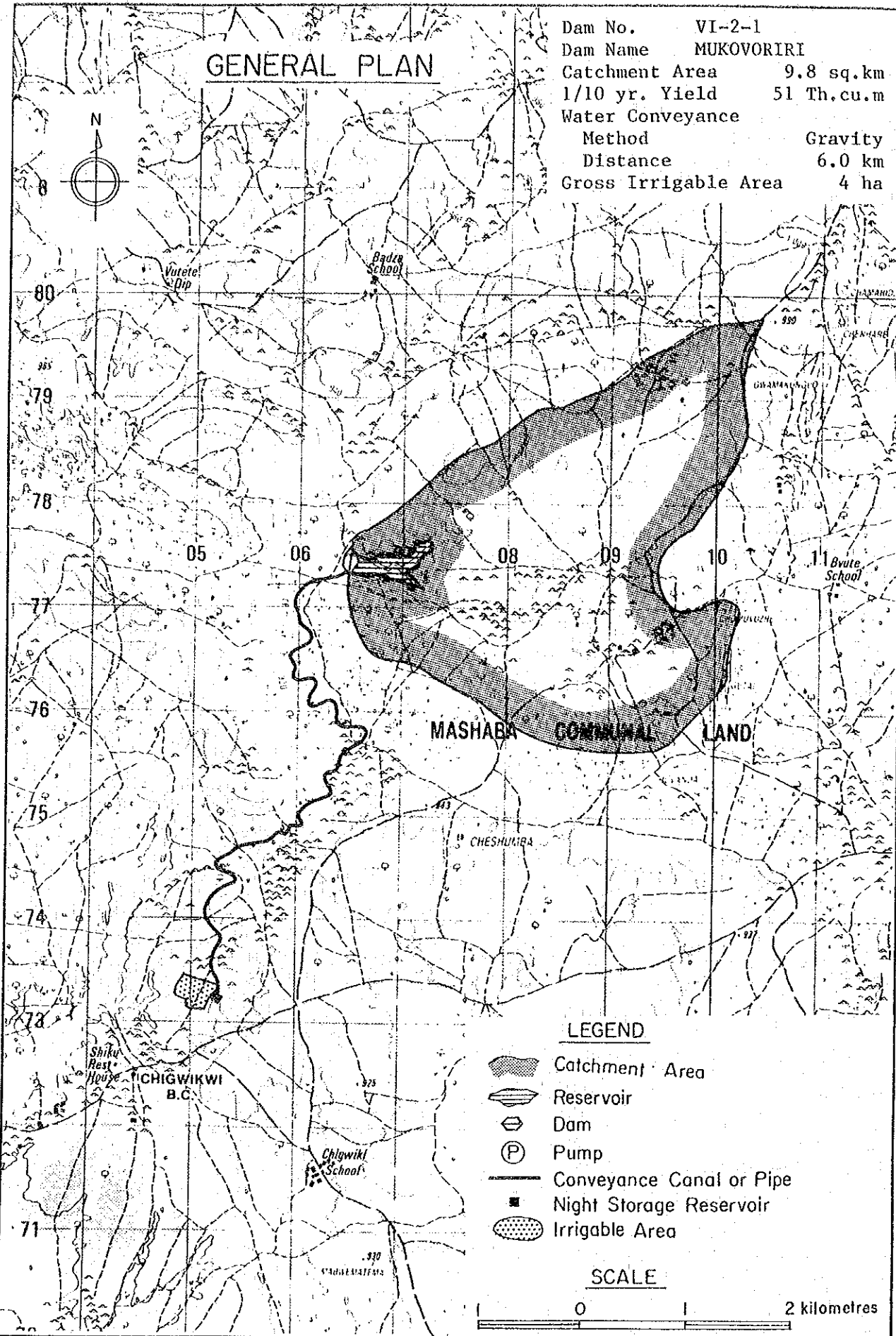
Location	District Chivi		Communal Land Mashaba		
	Map Ref. 2030A1		Coordinates TN065775		
Geology	Granite and the dyke of dolerite, dolerite and surrounding rock changed into boulders.				
Hydrology	River Mukovoriri		Hydrological Zone E-L4		
	Catchment Area 9.8 sq.km		M.A. Rainfall 620 mm		
	M.A. Runoff 43 mm		Sediment 700 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.590 MCM		1/10 Yr. Yield 0.051 MCM		
	Dead Capacity 0.100 MCM		D.W.S. 926 m		
	Total Capacity 0.690 MCM		N.W.S. 930 m		
Dam	Height 10 m		Length 360 m		
	Embankment Volume 45 000 cu.m		Spillway 67 m		
Agriculture	Natural Region IV		Soil SL-SCL		
	Potential Irrigable Area		50 ha		
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 3.0 ha		Dist. 6.0 km by Gravity		
	Topography	Area	Sloping		
		Conveyance	Complicated, two rivers crossing		
Rural Water Supply	Population 2 250 person		45 cu.m/day		
	Livestock 1 205 unit		54 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 514 000		Z\$ 1 041 000	Z\$ 1 555 000	
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	C
	Z\$ 7 628 /year		Z\$ 89 000	-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

Ward Name	3		Area 8 400 ha	
Demography	Population Density		75.0 persons/sq.km	
	Family Size		6.6 Persons/household	
Agriculture	Arable Area 4 260 ha		Grazing Area 4 140 ha	
	Maize 1.6 ha/household		12 bags/ha	
	Sorghum 0.2 ha/household		7 bags/ha	
	Livestock 2.1 LSUs/household		24.1 LSUs/sq.km	
Rural Water Supply	Borehole 0.02 units/sq.km		3 150 persons/unit	
	Well 0.14 units/sq.km		525 persons/unit	

GENERAL PLAN

Dam No. VI-2-1
 Dam Name MUKOVORIRI
 Catchment Area 9.8 sq.km
 1/10 yr. Yield 51 Th.cu.m
 Water Conveyance Method Gravity
 Distance 6.0 km
 Gross Irrigable Area 4 ha



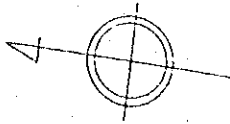
LEGEND

- Catchment Area
- Reservoir
- Dam
- Pump
- Conveyance Canal or Pipe
- Night Storage Reservoir
- Irrigable Area

SCALE

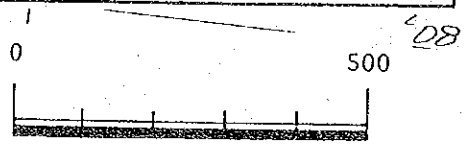


PLAN OF DAM

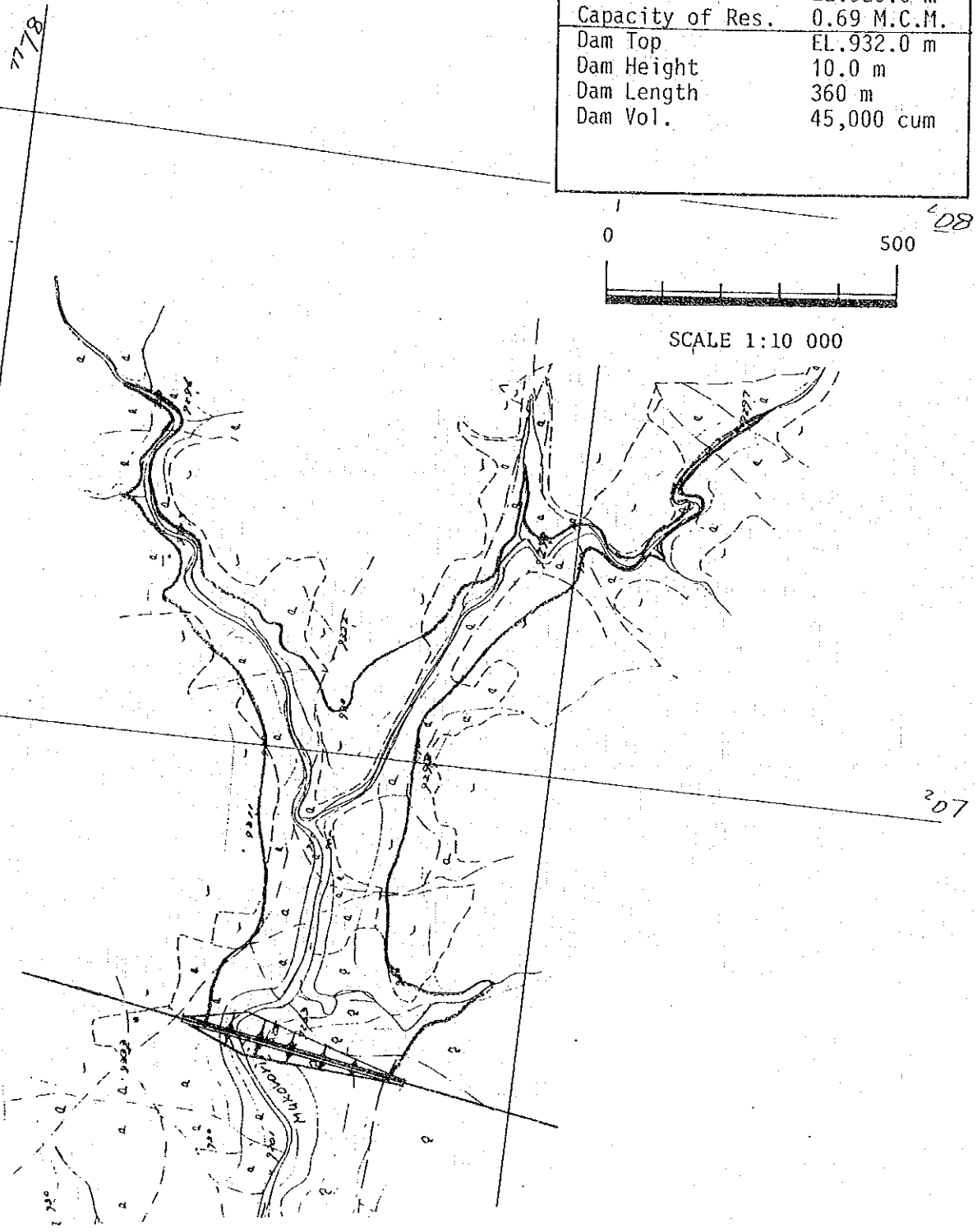


MUKOVORIRI

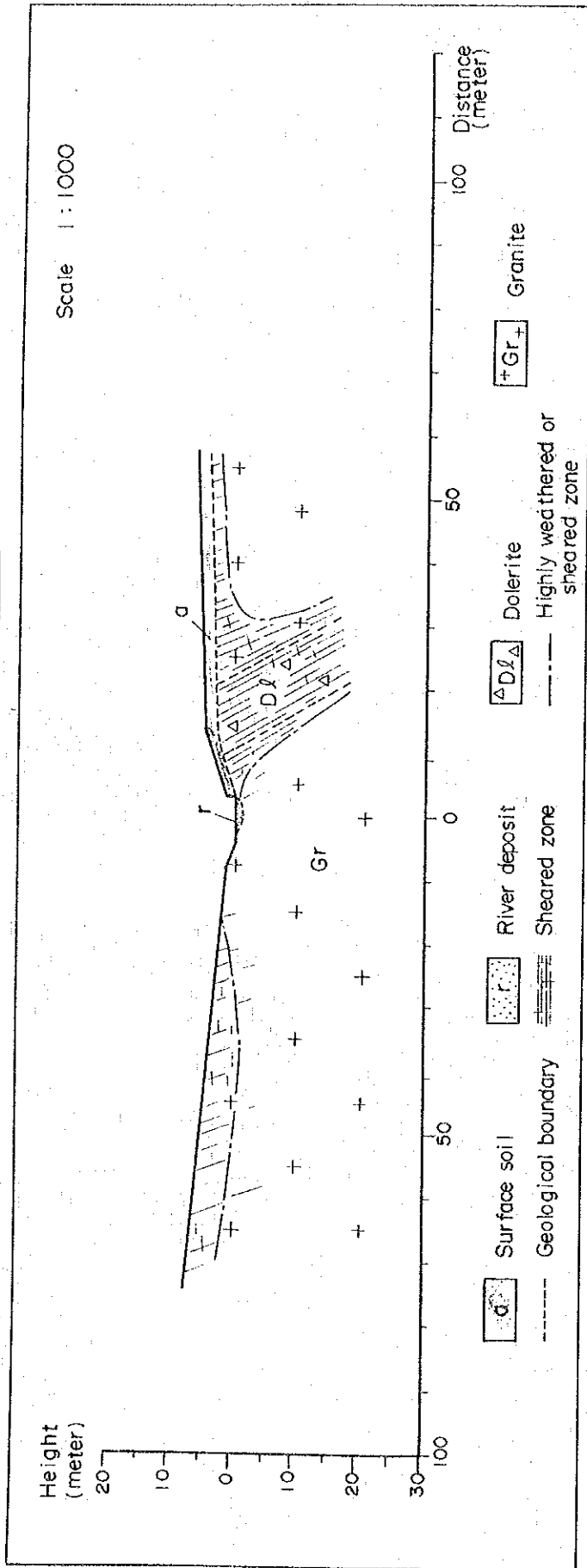
Dam No.	VI- 2 - 1
District	Chivi
Communal L.	Mashaba
River	Mukovoriri
Map Ref.	2030 A1
Coordinate	TN 065775
Catchment A.	9.8 sq.km
Design Flood	120 cum/sec
N.W.S.	EL.930.0 m
D.W.S.	EL.926.0 m
Capacity of Res.	0.69 M.C.M.
Dam Top	EL.932.0 m
Dam Height	10.0 m
Dam Length	360 m
Dam Vol.	45,000 cum



SCALE 1:10 000



VI-2-1 Mukovoriri



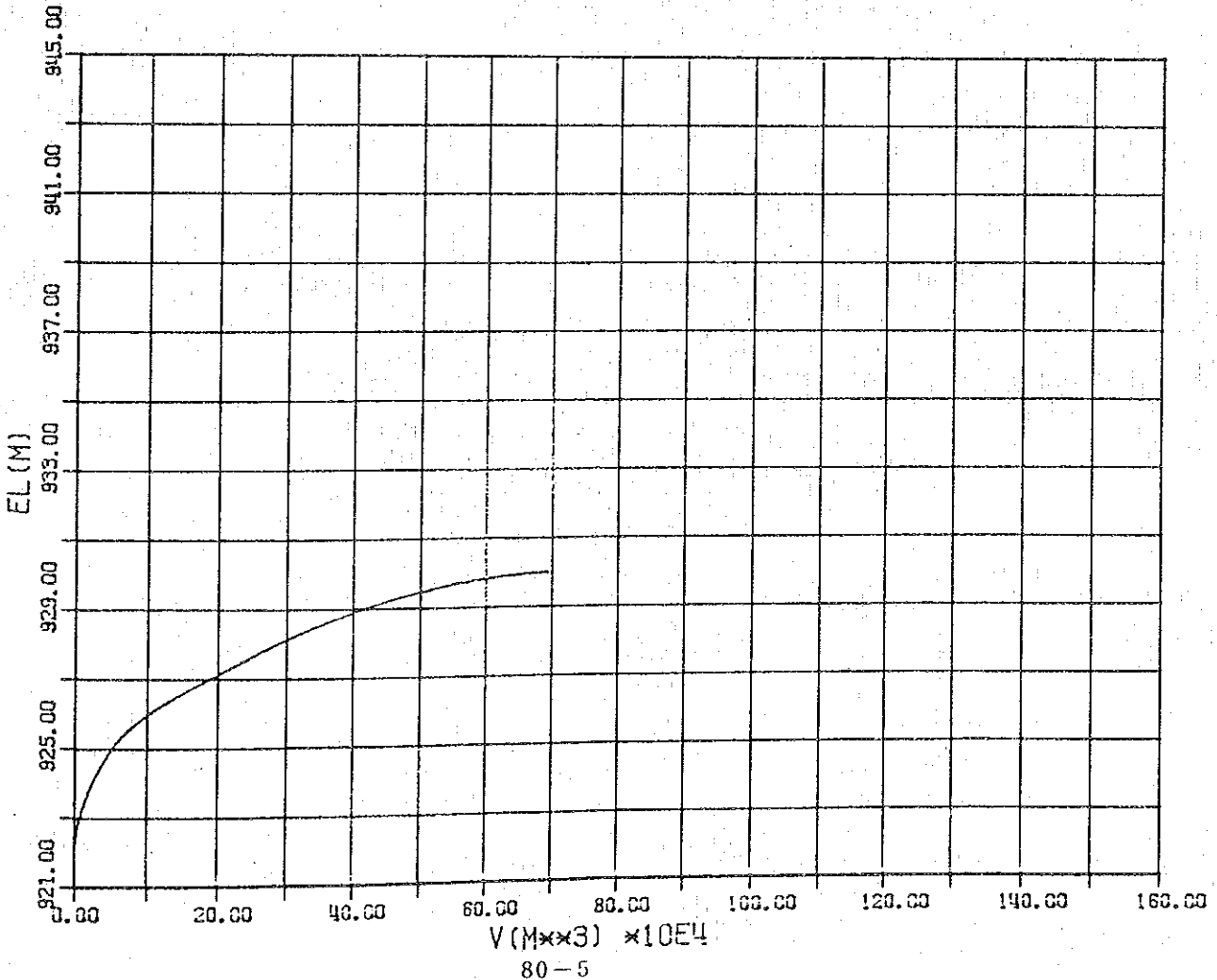
The bedrock consists of granite and it is massive and hard, however partly it has been changed into boulders. A dyke of diorite 10 meters wide is distributed at the right bank of the damsite. Surrounding rocks of the dyke are foliated and very soft.

It is necessary to cut off the foundation strata to considerably deep at both abutments. Leakage through the bedrock seems to be large. The bedrock is less suitable for dam foundation from the geological point of view. The estimated thickness of unconsolidated deposits is less than 2 meters.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
VI-2-1	2030A1	TN	065	775

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
921.5	0.0	0	0	0	0.00	
922.5	1.0	6000	3000	3000	3.00	
925.0	2.5	33000	19500	48750	51.75	
927.5	2.5	114000	73500	183750	235.50	
930.0	2.5	252000	183000	457500	693.00	



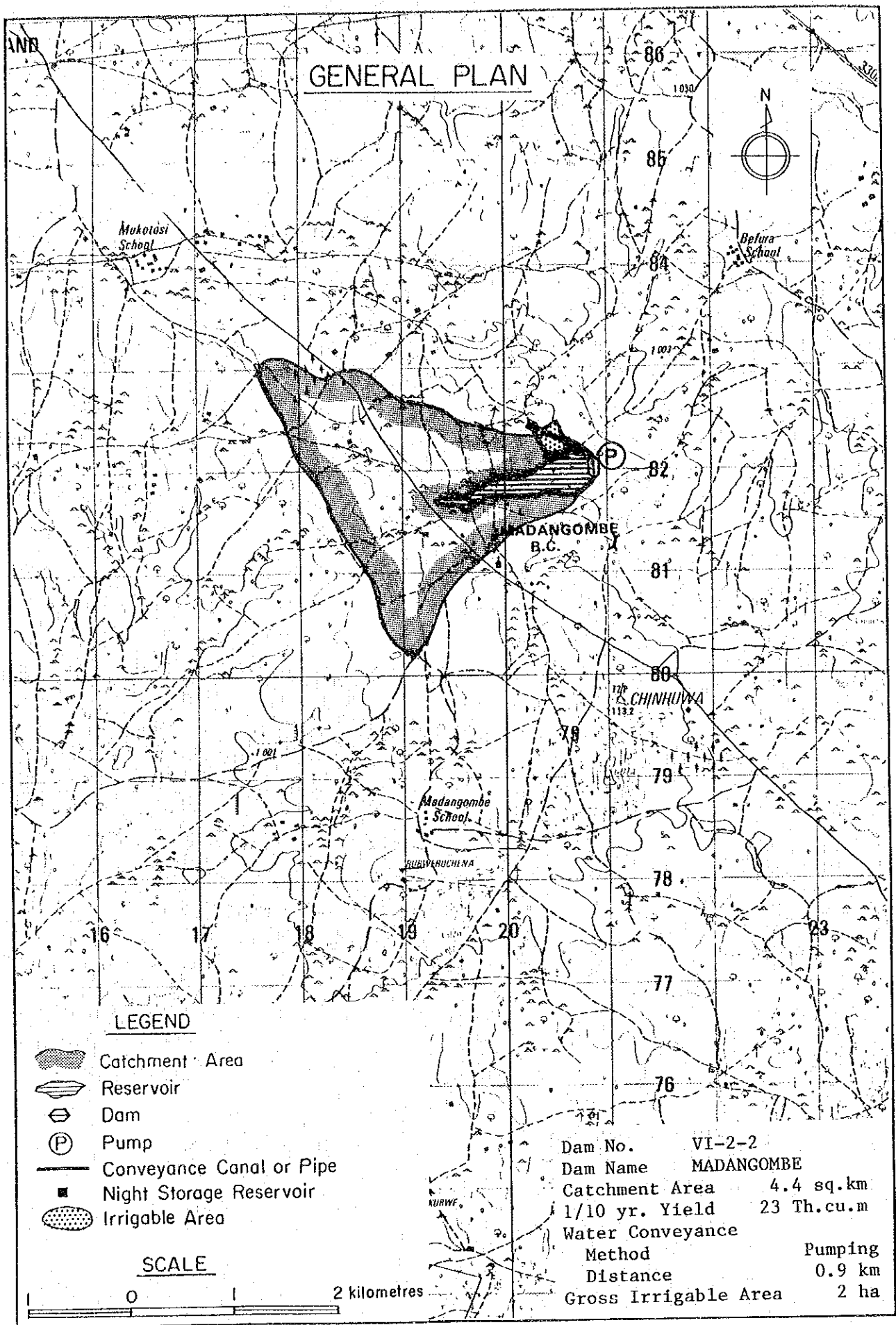
No. VI-2-2

Name of Dam Madangombe

Location	District Chivi		Communal Land Mashaba		
	Map Ref. 2030A2		Coordinates TN209819		
Geology	Granite, sheared and highly weathering, very soft and joints well developed.				
Hydrology	River (T) Misavezana		Hydrological Zone E-T2		
	Catchment Area 4.4 sq.km		M.A. Rainfall 620 mm		
	M.A. Runoff 43 mm		Sediment 440 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.350 MCM		1/10 Yr. Yield 0.023 MCM		
	Dead Capacity 0.030 MCM		D.W.S. 990 m		
	Total Capacity 0.380 MCM		N.W.S. 994.5 m		
Dam	Height 10.5 m		Length 500 m		
	Embankment Volume 54 000 cu.m		Spillway 39 m		
Agriculture	Natural Region IV		Soil SL		
	Potential Irrigable Area		50 ha		
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 1.4 ha		Dist. 0.9 km by Pump, H=20.0 m		
	Topography	Area	Steep slope		
		Conveyance	Gently sloping		
Rural Water Supply	Population 4 130 person		83 cu.m/day		
	Livestock 860 unit		39 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 1 073 000		Z\$ 350 000	Z\$ 1 423 000	
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	C
	Z\$ 3 722 /year		Z\$ 43 000		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

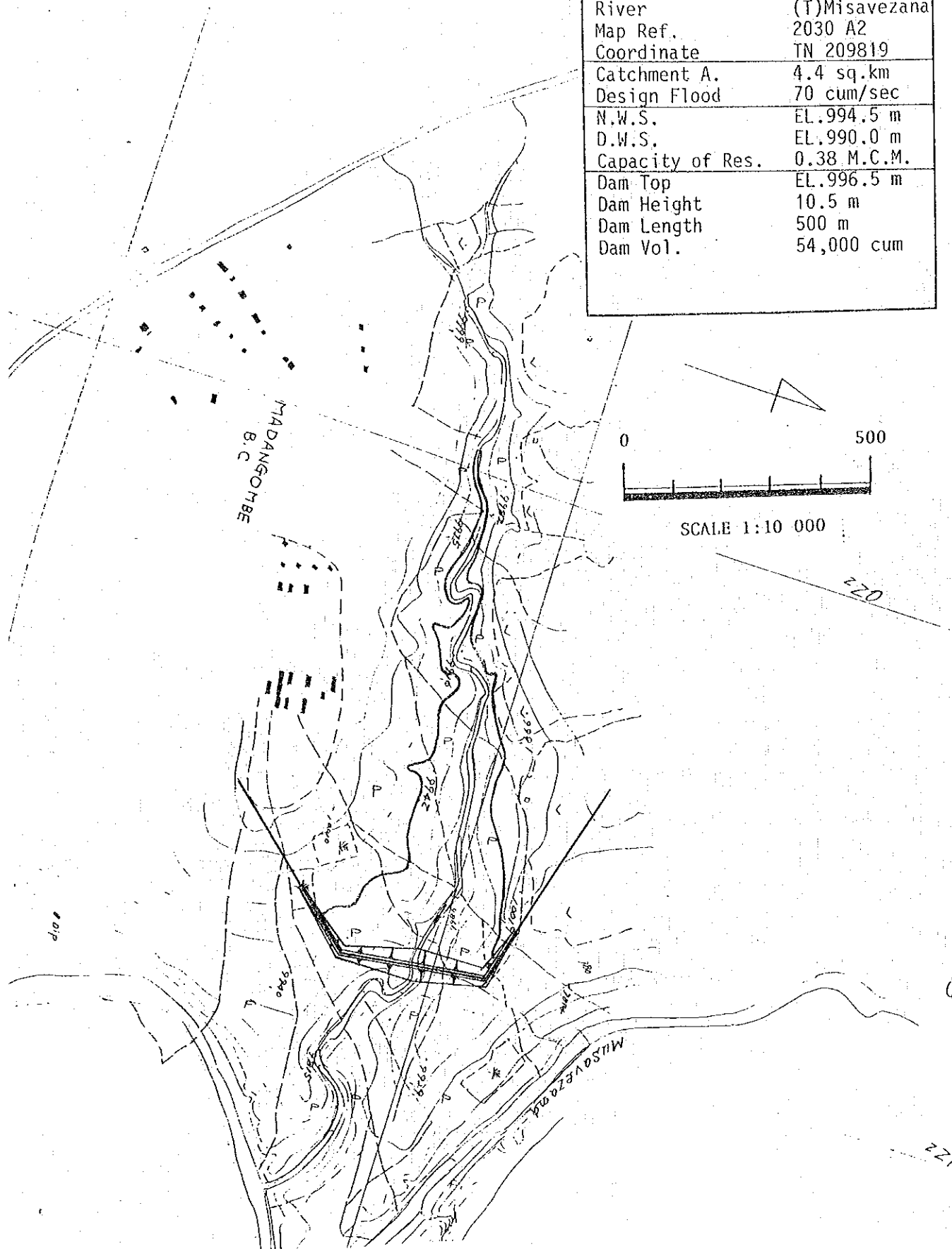
Ward Name	2		Area	8 600 ha	
Demography	Population Density		82.6		persons/sq.km
	Family Size		9.9		Persons/household
Agriculture	Arable Area 5 160 ha		Grazing Area		3 440 ha
	Maize 2.9 ha/household		12		bags/ha
	Sorghum 0.4 ha/household		7		bags/ha
	Livestock 2.1 LSUs/household		17.2		LSUs/sq.km
Rural Water Supply	Borehole 0.06 units/sq.km		1 420		persons/unit
	Well 0.10 units/sq.km		789		persons/unit



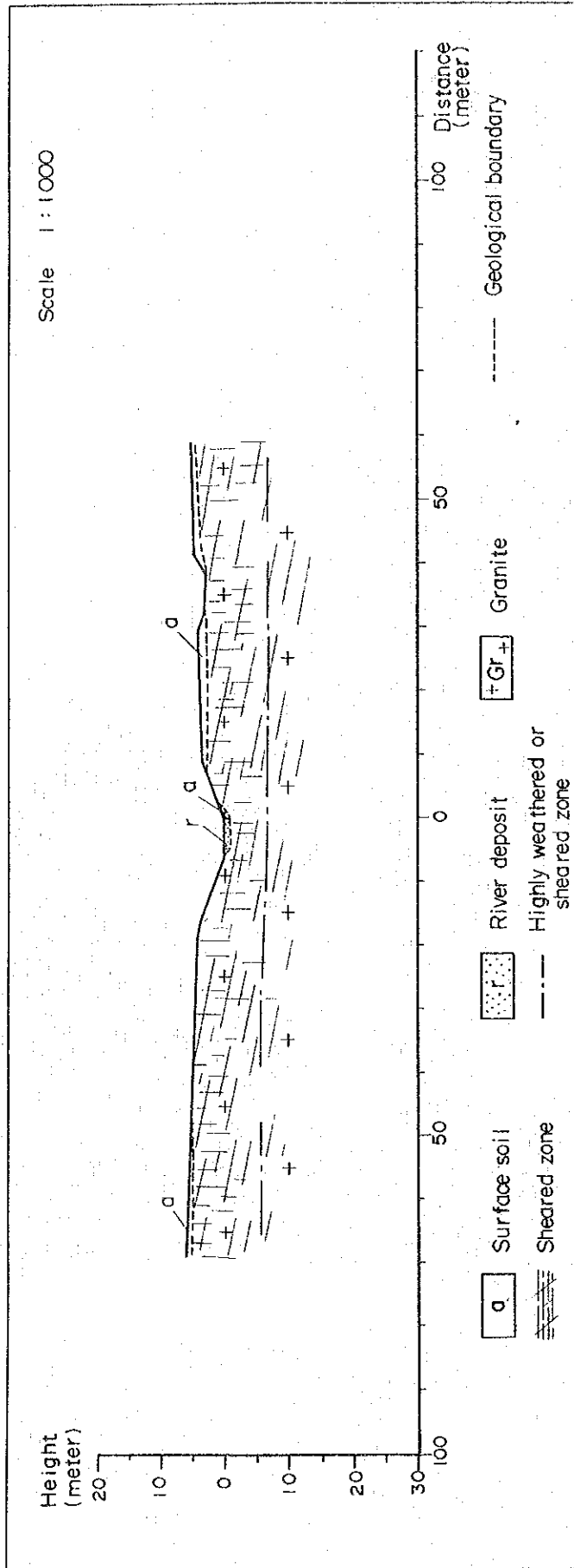
NADANGOMBE

PLAN OF DAM

Dam No.	VI- 2 - 2
District	Chivi
Communal L.	Mashaba
River	(T) Misavezana
Map Ref.	2030 A2
Coordinate	TN 209819
Catchment A.	4.4 sq.km
Design Flood	70 cum/sec
N.W.S.	EL.994.5 m
D.W.S.	EL.990.0 m
Capacity of Res.	0.38 M.C.M.
Dam Top	EL.996.5 m
Dam Height	10.5 m
Dam Length	500 m
Dam Vol.	54,000 cum



VI-2-2 Madangombe

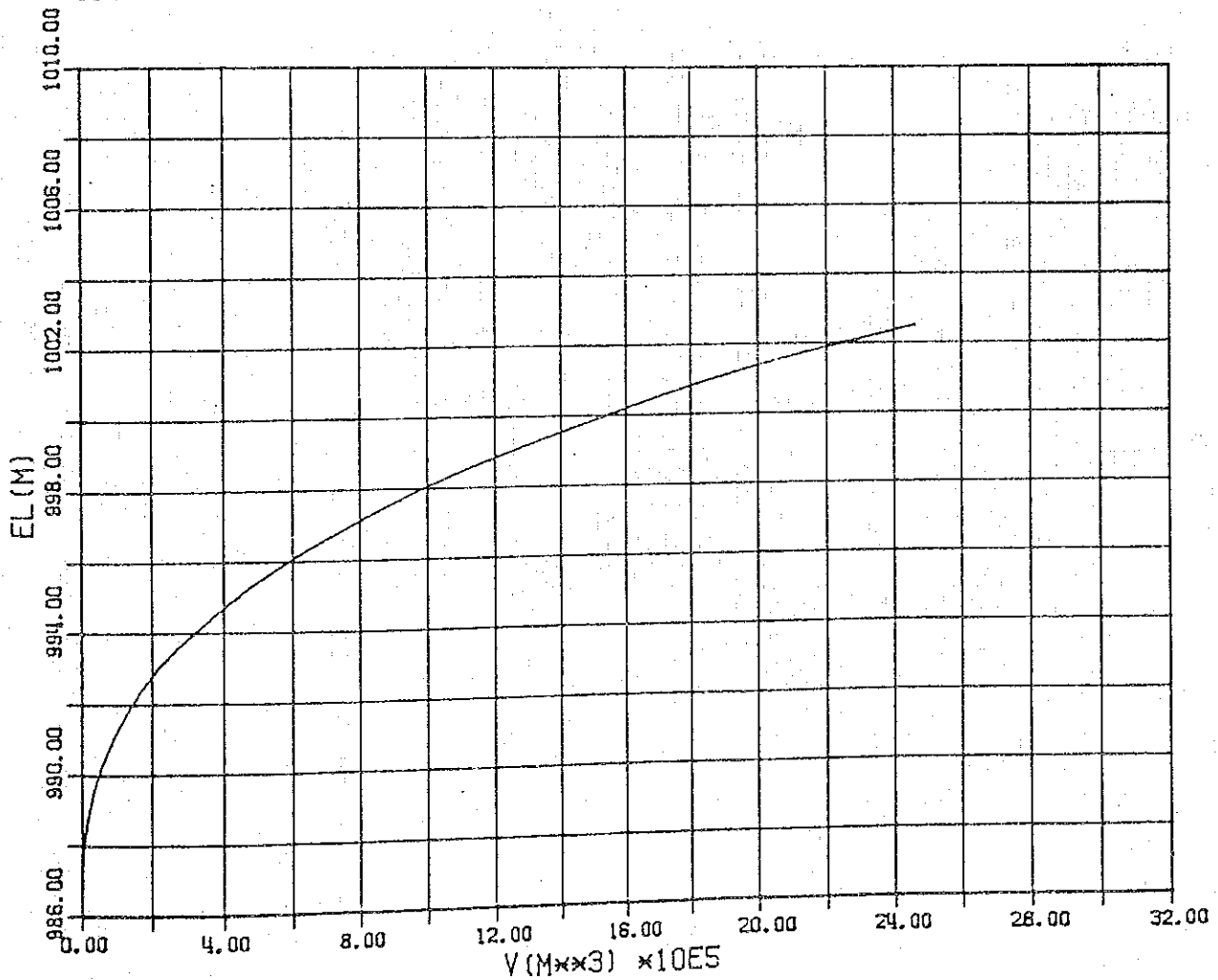


The bedrock consists of porphyritic granite and it is soft by weathering. Around the damsite it has been sheared, and the foliation trends NS direction. It is necessary to cut off the foundation strata to considerably deep, because leakage through the bedrock seems to be large. The estimated thickness of unconsolidated deposits seems to be 0.5 to 2.0 meters.

TABLE STORAGE VOLUME OF RESERVOIR

NØ	MAP	GRID	VER	HØR
VI-2-2	2030A2	TN	209	819

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
986.6	0.0	0	0	0	0.00	
987.5	0.9	5500	2750	2475	2.47	
990.0	2.5	30400	17950	44875	47.35	
992.5	2.5	73400	51900	129750	177.10	
995.0	2.5	134100	103750	259375	436.47	
997.5	2.5	217200	175650	439125	875.60	
1000.0	2.5	311500	264350	660875	1536.47	
1002.5	2.5	428700	370100	925250	2461.72	



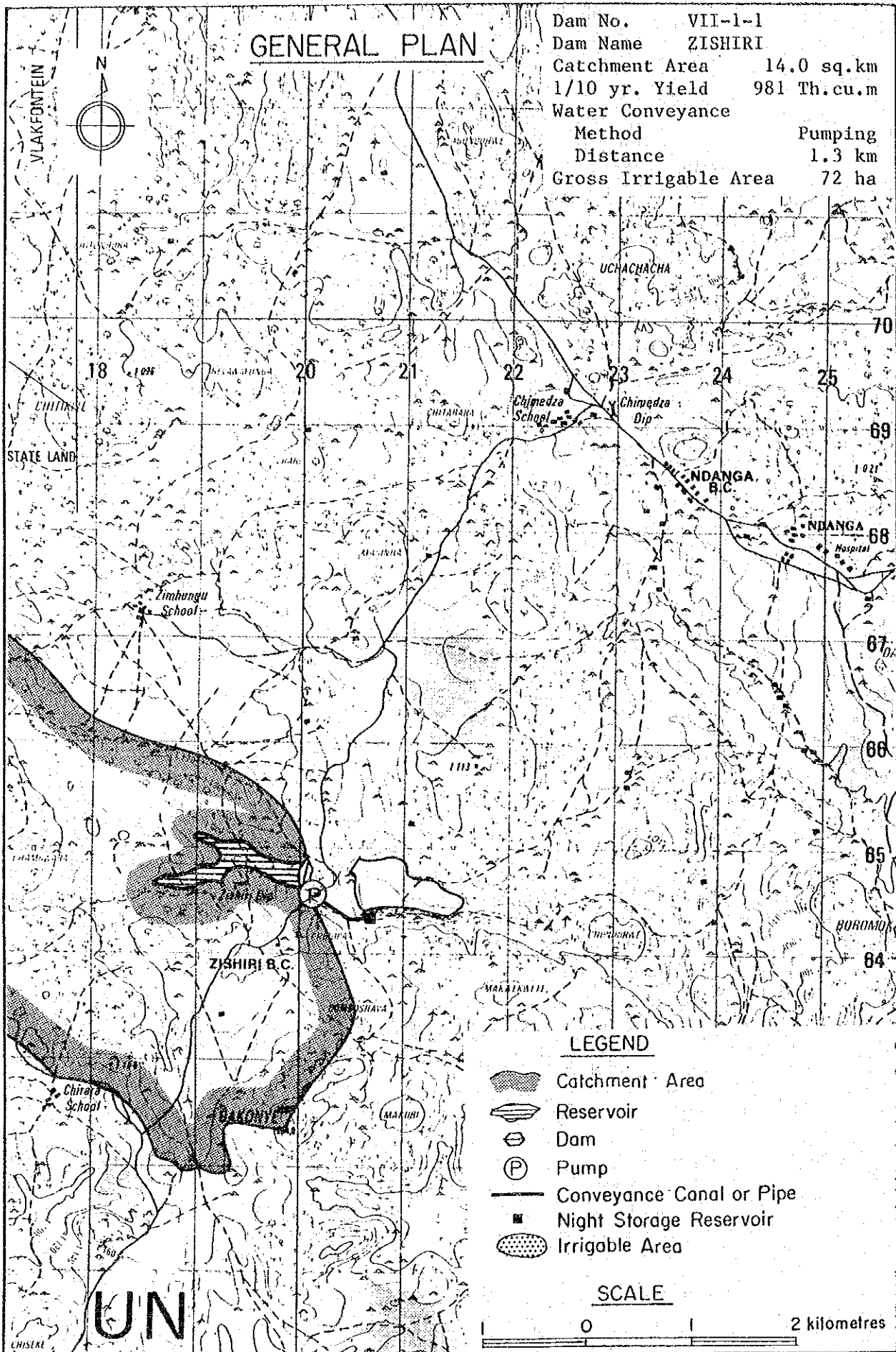
No. VII-1-1

Name of Dam Zishiri

Location	District Zaka		Communal Land Ndanga		
	Map Ref. 2031A2		Coordinates UN201648		
Geology	Granite, generally massive and hard. Partly weathering and very soft.				
Hydrology	River Chiwaka		Hydrological Zone E-C2		
	Catchment Area	14.0 sq.km	M.A. Rainfall	1000 mm	
	M.A. Runoff	206 mm	Sediment	320 tonnes km ² /yr.	
Reservoir	Effective Capacity	1.600 MCM	1/10 Yr. Yield	0.981 MCM	
	Dead Capacity	0.070 MCM	D.W.S.	1 033 m	
	Total Capacity	1.670 MCM	N.W.S.	1 045 m	
Dam	Height	18 m	Length	320 m	
	Embankment Volume	84 000 cu.m	Spillway	83 m	
Agriculture	Natural Region III		Soil L-CL		
	Potential Irrigable Area		70 ha		
	Proposed Cropping Pattern A				
Irrigation	Net Irrigable Area 57.7 ha		Dist. 1.3 km by Pump, H=27.0 m		
	Topography	Area	Complicated		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	4 191 person	84 cu.m/day		
	Livestock	1 225 unit	55 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 846 000	Z\$ 1 789 000	Z\$ 2 635 000	A	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
	Z\$ 212 186/year	Z\$ 2 467 000	13.9 per cent		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

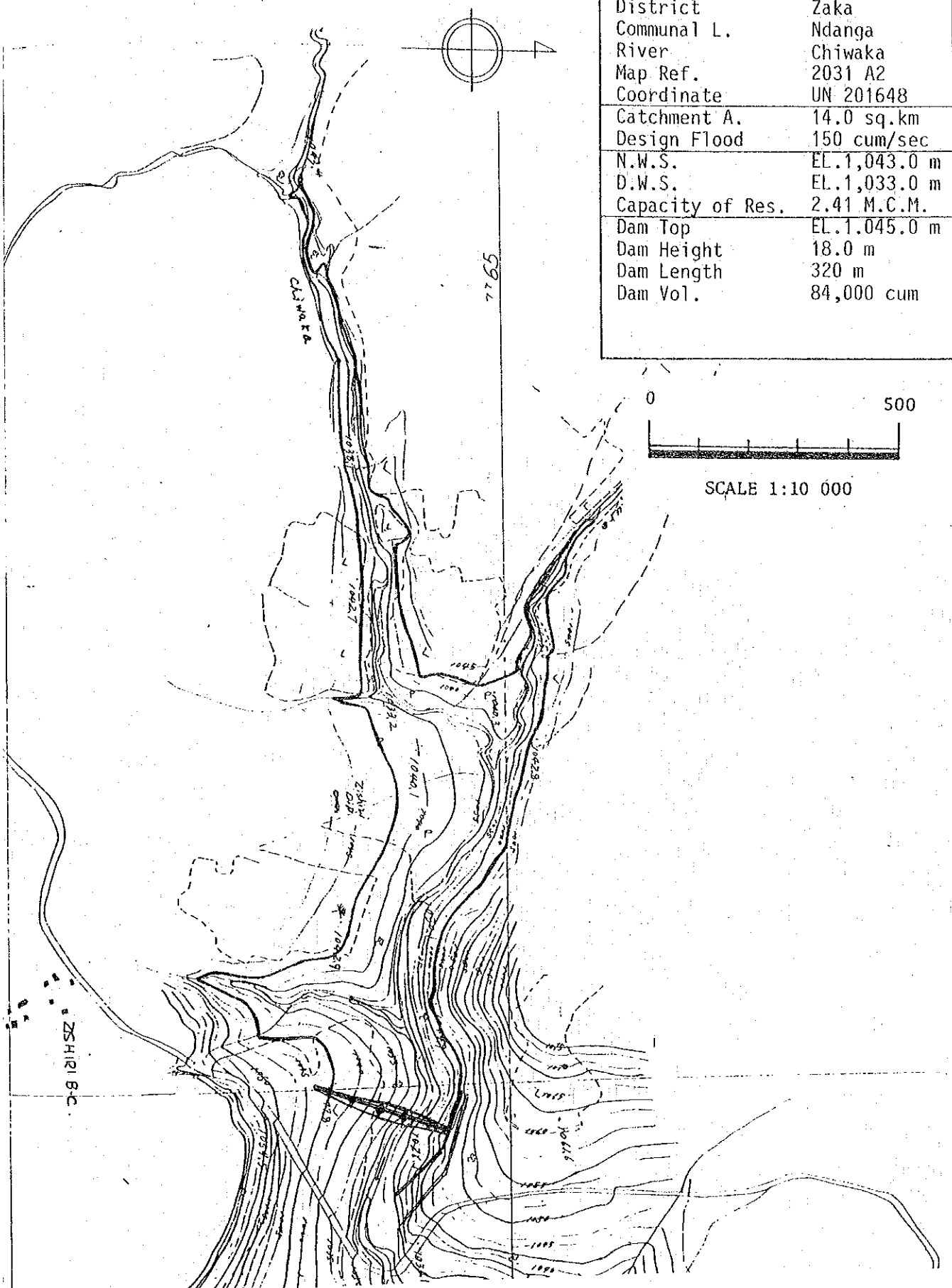
Ward Name	Tsuru		Area	5 625 ha
Demography	Population Density		139.7	persons/sq.km
	Family Size		10.0	Persons/household
Agriculture	Arable Area		994 ha	Grazing Area 4 631 ha
	Maize	0.6 ha/household	10	bags/ha
	Sorghum	0. ha/household	4	bags/ha
	Livestock	1.8 LSUs/household	24.5	LSUs/sq.km
Rural Water Supply	Borehole	0.09 units/sq.km	1 572	persons/unit
	Well	- units/sq.km	-	persons/unit



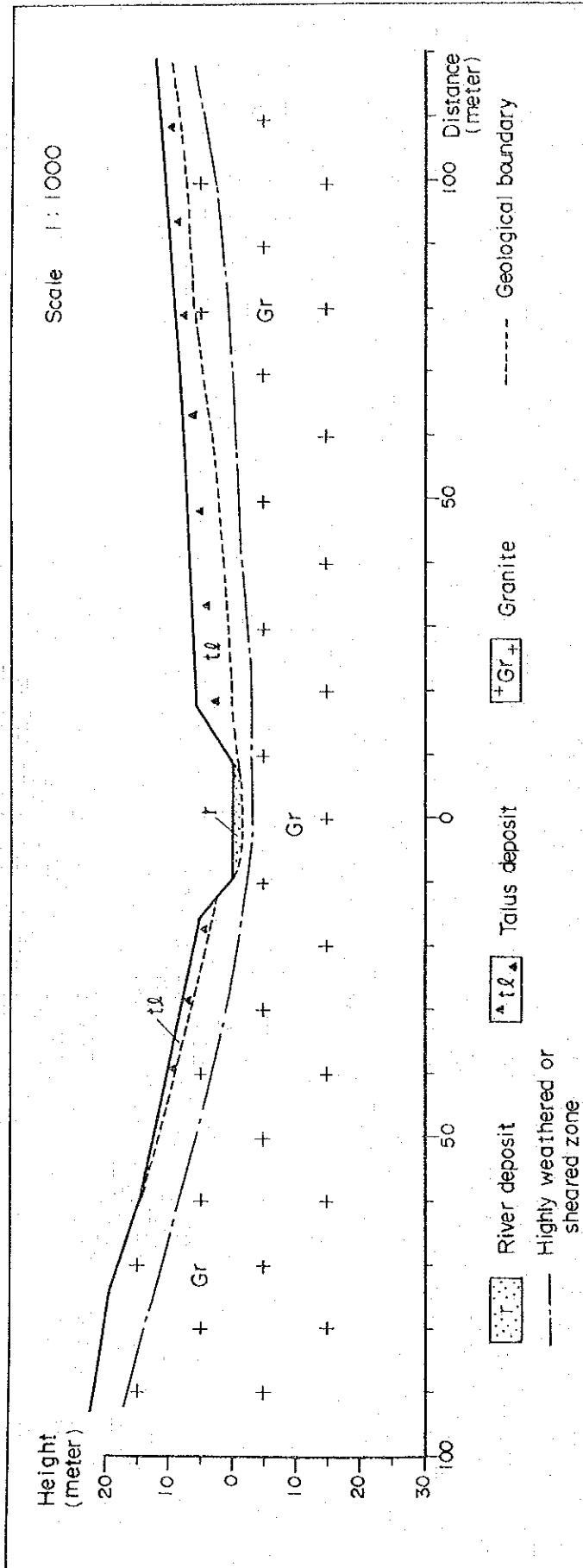
PLAN OF DAM

ZISHIRI

Dam No.	VII- 1 - 1
District	Zaka
Communal L.	Ndanga
River	Chiwaka
Map Ref.	2031 A2
Coordinate	UN 201648
Catchment A.	14.0 sq.km
Design Flood	150 cum/sec
N.W.S.	EL.1,043.0 m
D.W.S.	EL.1,033.0 m
Capacity of Res.	2.41 M.C.M.
Dam Top	EL.1,045.0 m
Dam Height	18.0 m
Dam Length	320 m
Dam Vol.	84,000 cum



VII-1-1 Zishiri



The area is relatively hilly, and the river forms a deep and narrow valley.

The bedrock consists of porphyritic granite, and in the river bed it is massive, very hard and poorly jointed.

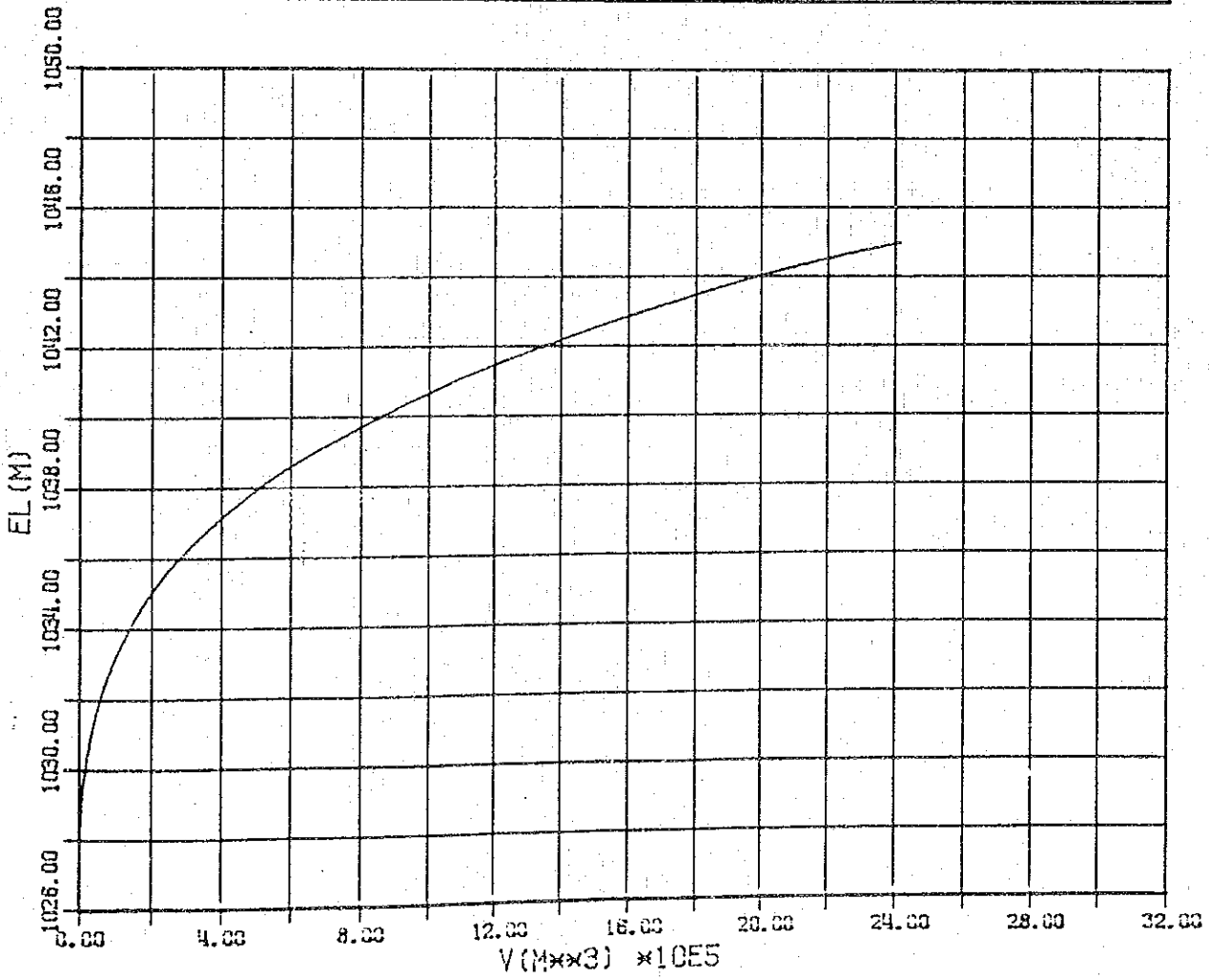
However all rocks at the surface of the both banks have been changed into boulders and they are very soft by highly weathering. The thickness of the weathering strata seems to be maximum 5 meters below surface soil. Because it seems that leakage through the bedrock is large and bearing strength is small, it is necessary to cut off the soft foundation strata for the dam safety.

The estimated thickness of unconsolidated deposits is maximum 2 meters in the river bed and maximum 5 meters at talus deposit of the both banks.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
VI-1-1	2031A2	UN	201	648

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
1026.7	0.0	0	0	0	0.00	
1027.5	0.8	1000	500	400	0.40	
1030.0	2.5	12000	6500	16250	16.65	
1032.5	2.5	32000	22000	55000	71.65	
1035.0	2.5	67500	49750	124375	196.02	
1037.5	2.5	128000	97750	244375	440.40	
1040.0	2.5	203000	165500	413750	854.15	
1042.5	2.5	304000	253500	633750	1487.90	
1045.0	2.5	435500	369750	924375	2412.27	



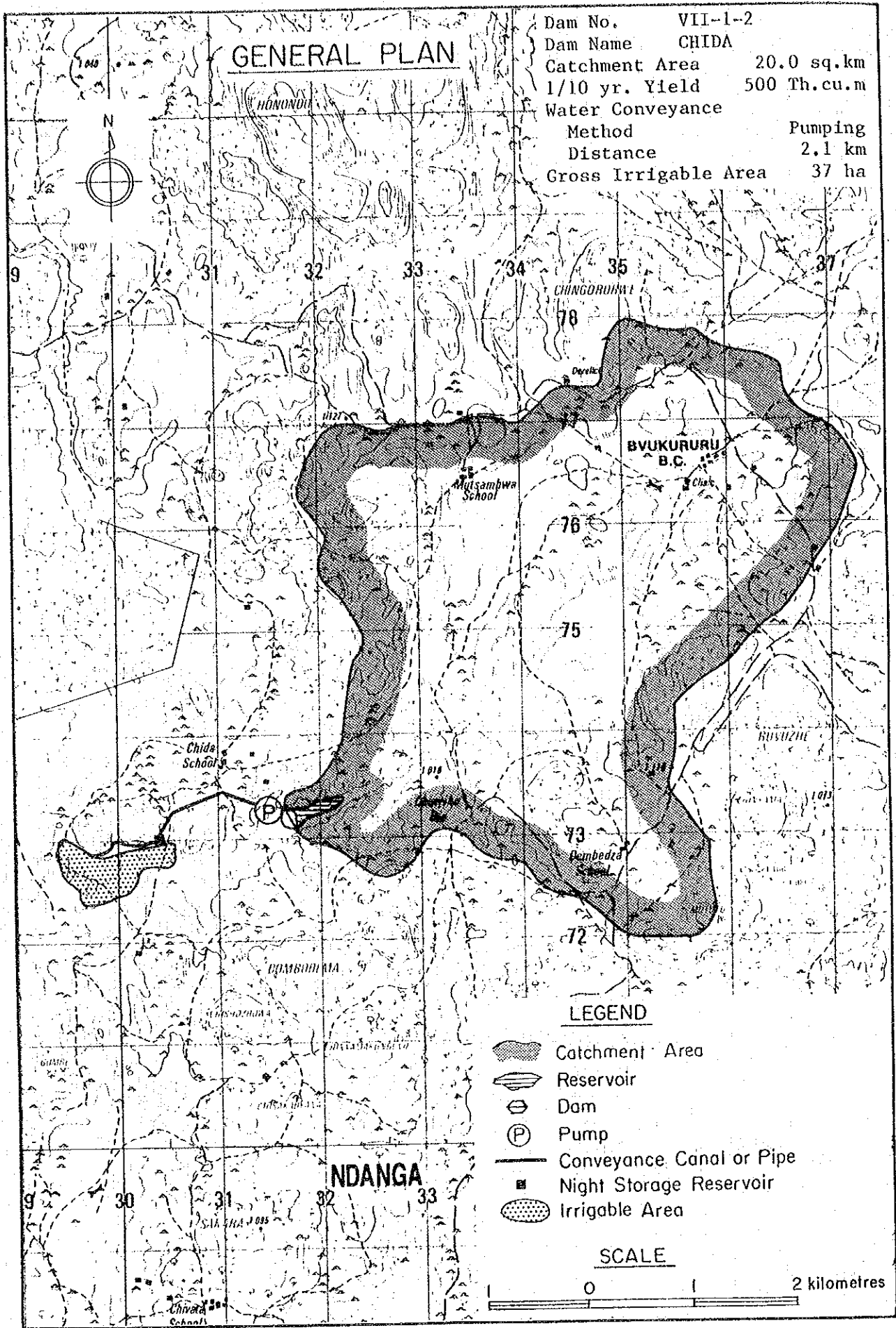
No. VII-1-2

Name of Dam Chida

Location	District Zaka		Communal Land Ndanga		
	Map Ref. 2031A2		Coordinates UN317732		
Geology	Granite, the surface soil is thin. Many photo-lineations are recognized around the damsite.				
Hydrology	River Chinyika		Hydrological Zone E-C2		
	Catchment Area	20.0 sq.km	M.A. Rainfall	1 070 mm	
	M.A. Runoff	250 mm	Sediment	320 tonnes km ² /yr.	
Reservoir	Effective Capacity	0.350 MCM	1/10 Yr. Yield	0.500 MCM	
	Dead Capacity	0.090 MCM	D.W.S.	977 m	
	Total Capacity	0.440 MCM	N.W.S.	985 m	
Dam	Height	18 m	Length	220 m	
	Embankment Volume	83 000 cu.m	Spillway	104 m	
Agriculture	Natural Region III		Soil SCL		
	Potential Irrigable Area		40 ha		
	Proposed Cropping Pattern A				
Irrigation	Net Irrigable Area 29.4ha		Dist. 2.1 km by Pump, H=23.0 m		
	Topography	Area	Complicated		
		Conveyance	Slightly sloping		
Rural Water Supply	Population 1 926 person		39 cu.m/day		
	Livestock 1 020 unit		46 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 832 000	Z\$ 1 243 000	Z\$ 2 075 000	A	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
Z\$106 855/year	Z\$ 1 242 000	8.3 per cent			
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	N	N
Remarks	Storage Ratio < 0.1				

Present Condition on the Ward

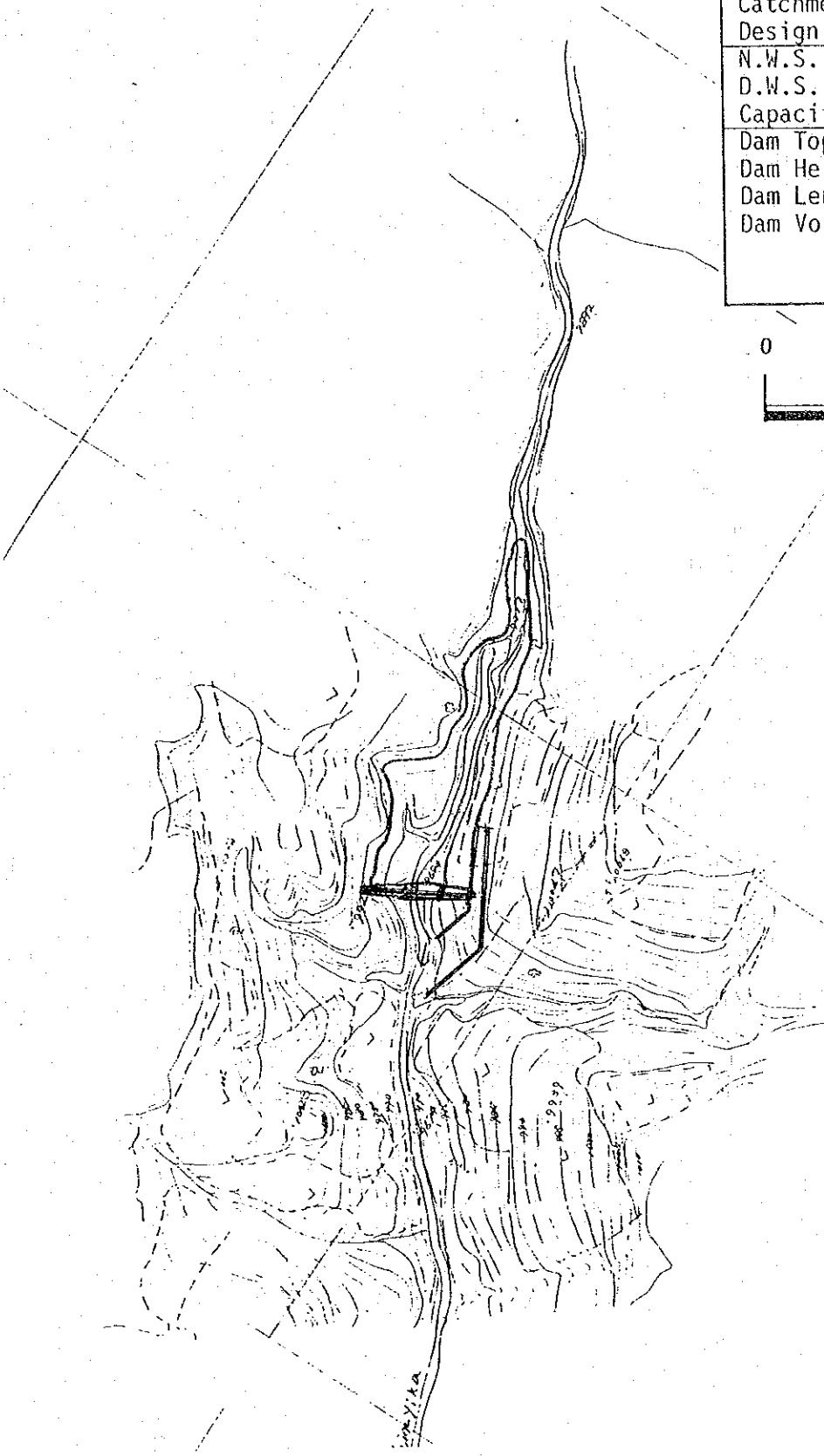
Ward Name	Mutinwi	Area	12 188 ha
Demography	Population Density	64.2	persons/sq.km
	Family Size	10.0	Persons/household
Agriculture	Arable Area	2 716 ha	Grazing Area 9 472 ha
	Maize	1.9 ha/household	8 bags/ha
	Sorghum	0. ha/household	3 bags/ha
	Livestock	3.2 LSUs/household	20.4 LSUs/sq.km
Rural Water Supply	Borehole	0.05 units/sq.km	1 303 persons/unit
	Well	0.01 units/sq.km	7 820 persons/unit



CHIDA

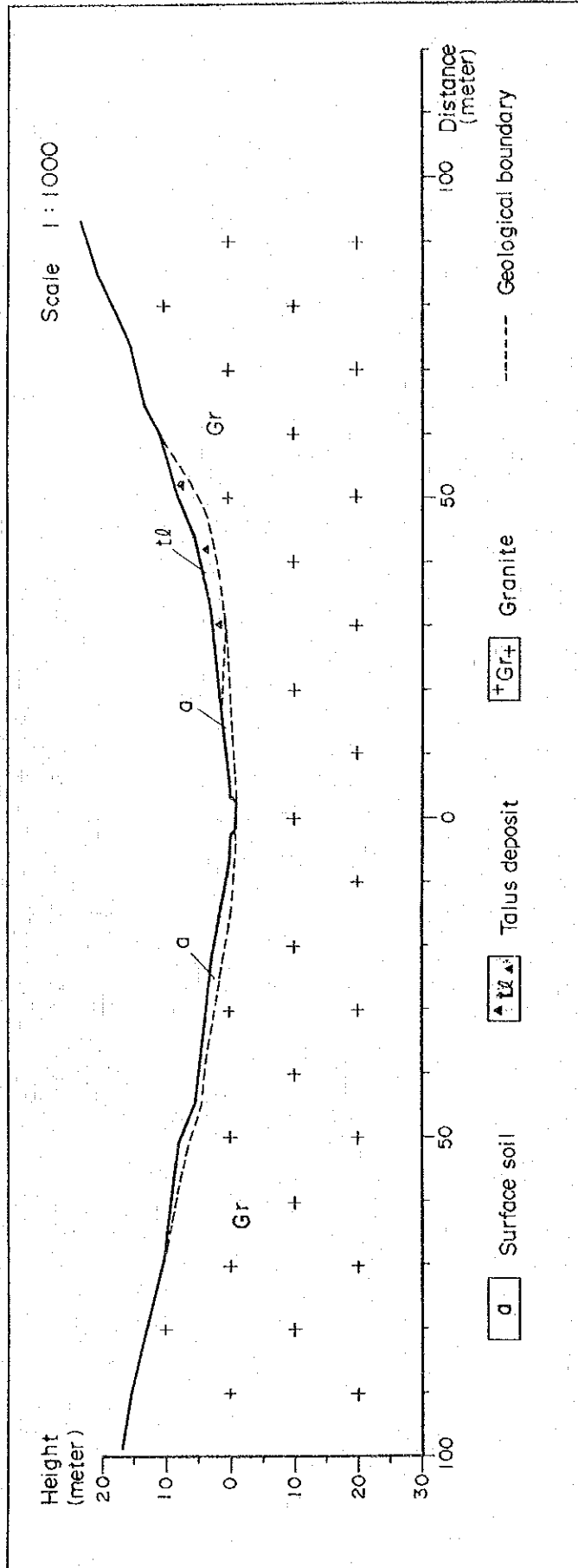
Dam No.	VII- 1 - 2
District	Zaka
Communal L.	Ndanga
River	Chinyika
Map Ref.	2031 A2
Coordinate	UN 317732
Catchment A.	20.0 sq.km
Design Flood	188 cum/sec
N.W.S.	EL.985.0 m
D.W.S.	EL.977.0 m
Capacity of Res.	0.44 M.C.M.
Dam Top	EL.987.0 m
Dam Height	18.0 m
Dam Length	220 m
Dam Vol.	83,000 cum

PLAN OF DAM



SCALE 1:10 000

VII-1-2 Chida



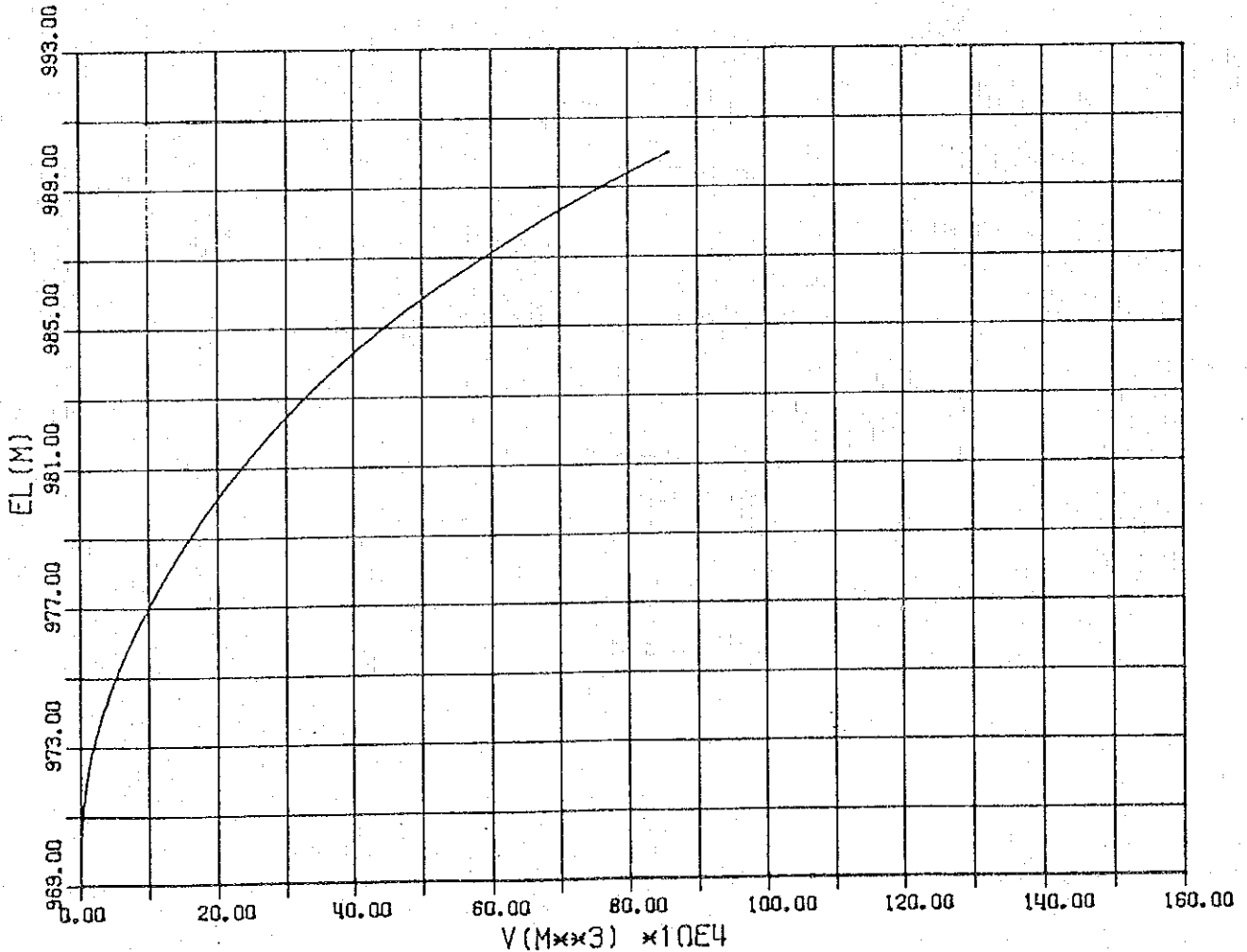
The ground survey was not carried out in this area, therefore the geographical and the geological conditions were studied from existing data.

The area is undulated land, and slopes towards the Chinyka River that forms narrow and relatively deep valley. The bedrock consists of granite, and the surface soil seems to be thin. Many lineaments are recognized in this area and one of them is distributed along the Chinyka River, therefore leakage through the bedrock seems to be large.

TABLE STORAGE VOLUME OF RESERVOIR

NØ	MAP	GRID	VER	HØR
VII-1-2	2031A2	UN	317	732

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VØL (M ³)	ΣV (1000M ³)	NØTE
969.4	0.0	0	0	0	0.00	
970.0	0.6	2000	1000	600	0.60	
972.5	2.5	9000	5500	13750	14.35	
975.0	2.5	21000	15000	37500	51.85	
977.5	2.5	28000	24500	61250	113.10	
980.0	2.5	36500	32250	80625	193.73	
982.5	2.5	50000	43250	108125	301.85	
985.0	2.5	64000	57000	142500	444.35	
987.5	2.5	83500	73750	184375	628.72	
990.0	2.5	101000	92250	230625	859.35	



No. VII-1-3

Name of Dam Veza

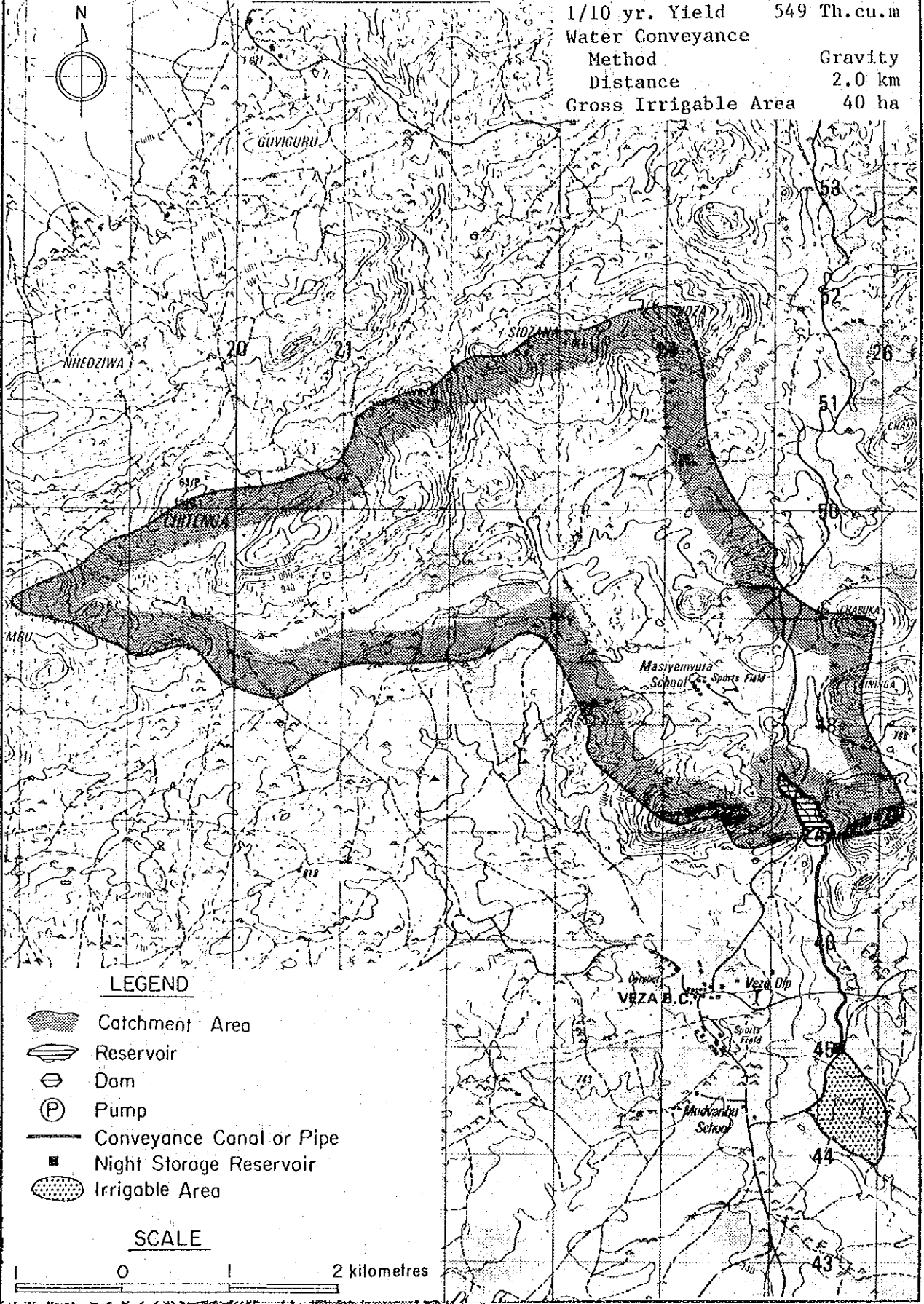
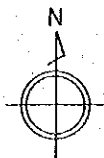
Location	District Zaka		Communal Land Ndanga		
	Map Ref. 2031A4		Coordinates UN254470		
Geology	Granite and the dyke of dolerite, massive and very hard, surface soils thin.				
Hydrology	River Veza		Hydrological Zone E-UT1		
	Catchment Area	18.3 sq.km	M.A. Rainfall	850 mm	
	M.A. Runoff	125 mm	Sediment	230 tonnes km ² /yr.	
Reservoir	Effective Capacity	1.440 MCM	1/10 Yr. Yield	0.549 MCM	
	Dead Capacity	0.060 MCM	D.W.S.	754 m	
	Total Capacity	1.500 MCM	N.W.S.	765 m	
Dam	Height	18 m	Length	270 m	
	Embankment Volume	128 000 cu.m	Spillway	98 m	
Agriculture	Natural Region IV		Soil SCL-SL		
	Potential Irrigable Area			90 ha	
	Proposed Cropping Pattern A				
Irrigation	Net Irrigable Area 32.3ha		Dist. 2.0 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Gently sloping		
Rural Water Supply	Population	2 724 person	55 cu.m/day		
	Livestock	2 830 unit	127 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 1 242 000	Z\$ 630 000	Z\$ 1 872 000	A	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
	Z\$ 122 463/year	Z\$ 1 424 000	11.6 per cent		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward








Ward Name	Mutsvangwa		Area	84 376 ha
Demography	Population Density		N.A	persons/sq.km
	Family Size		6.0	Persons/household
Agriculture	Arable Area	42 188 ha	Grazing Area	25 313 ha
	Maize	N.A ha/household	10	bags/ha
	Sorghum	N.A ha/household	2	bags/ha
	Livestock	4.1 LSUs/household	N.A	LSUs/sq.km
Rural Water Supply	Borehole	N.A units/sq.km	900	persons/unit
	Well	N.A units/sq.km	720	persons/unit

GENERAL PLAN

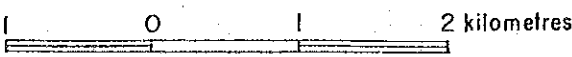
Dam No.	VII-1-3
Dam Name	VEZA
Catchment Area	18.3 sq.km
1/10 yr. Yield	549 Th.cu.m
Water Conveyance Method	Gravity
Distance	2.0 km
Gross Irrigable Area	40 ha



LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

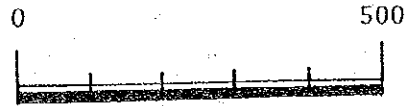
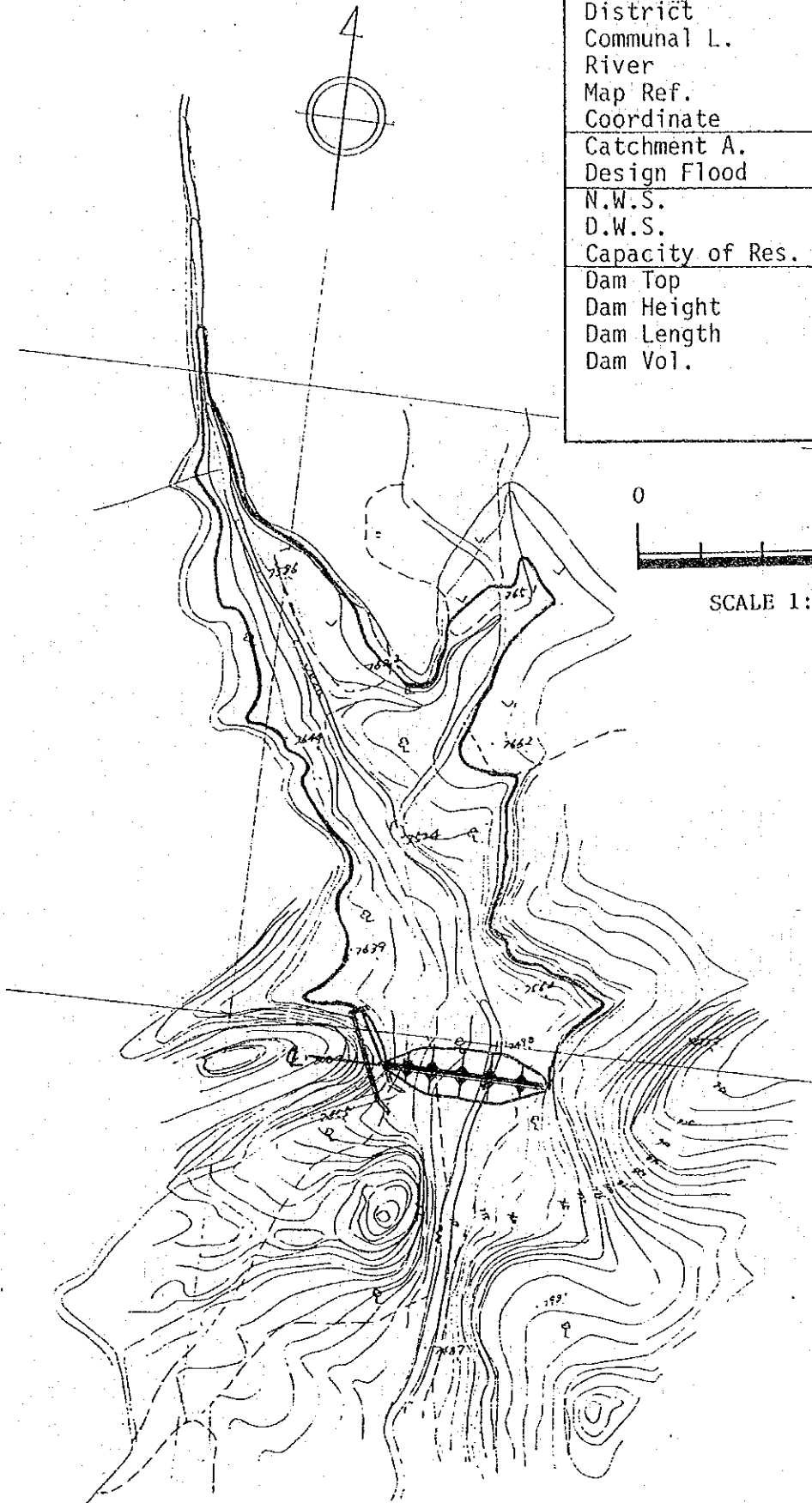
SCALE



VEZA

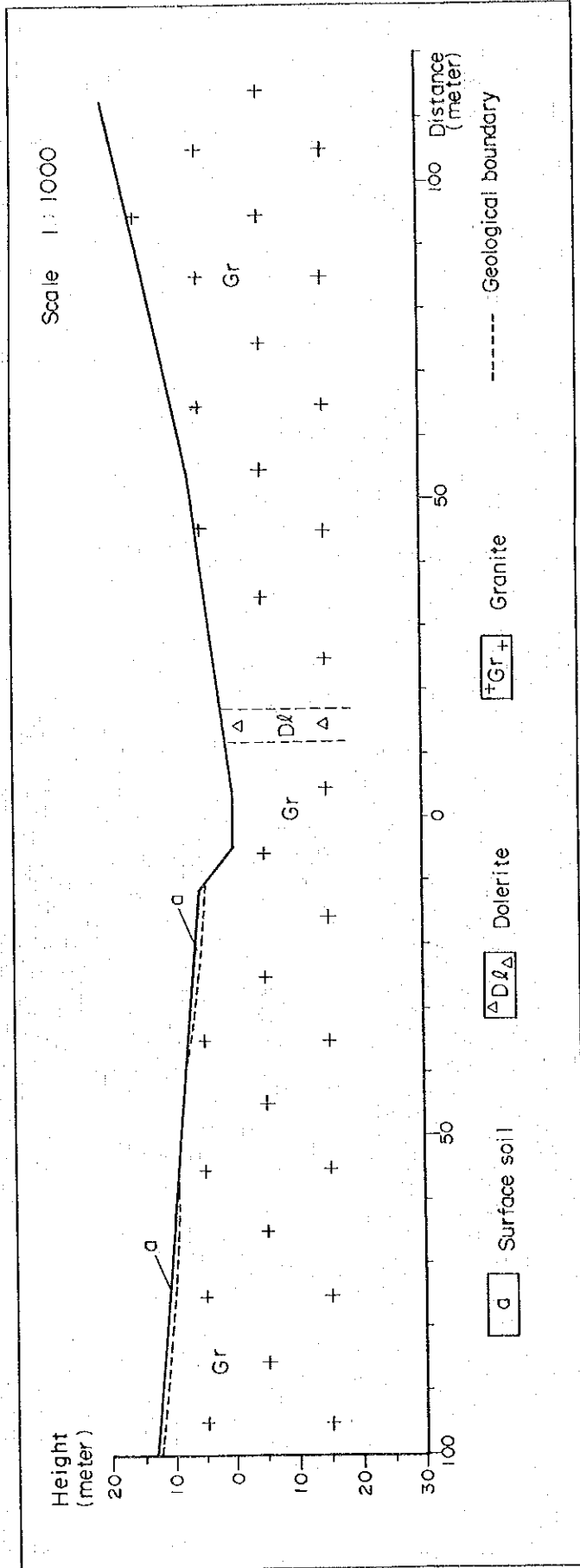
PLAN OF DAM

Dam No.	VII- 1 - 3
District	Zaka
Communal L.	Ndanga
River	Veza
Map Ref.	2031 A4
Coordinate	UN 254470
Catchment A.	18.3 sq.km
Design Flood	176 cum/sec
N.W.S.	EL.765.0 m
D.W.S.	EL.754.0 m
Capacity of Res.	1.50 M.C.M.
Dam Top	EL.767.0 m
Dam Height	18.0 m
Dam Length	270 m
Dam Vol.	128,000 cum



SCALE 1:10 000

VII - I-3 Veza

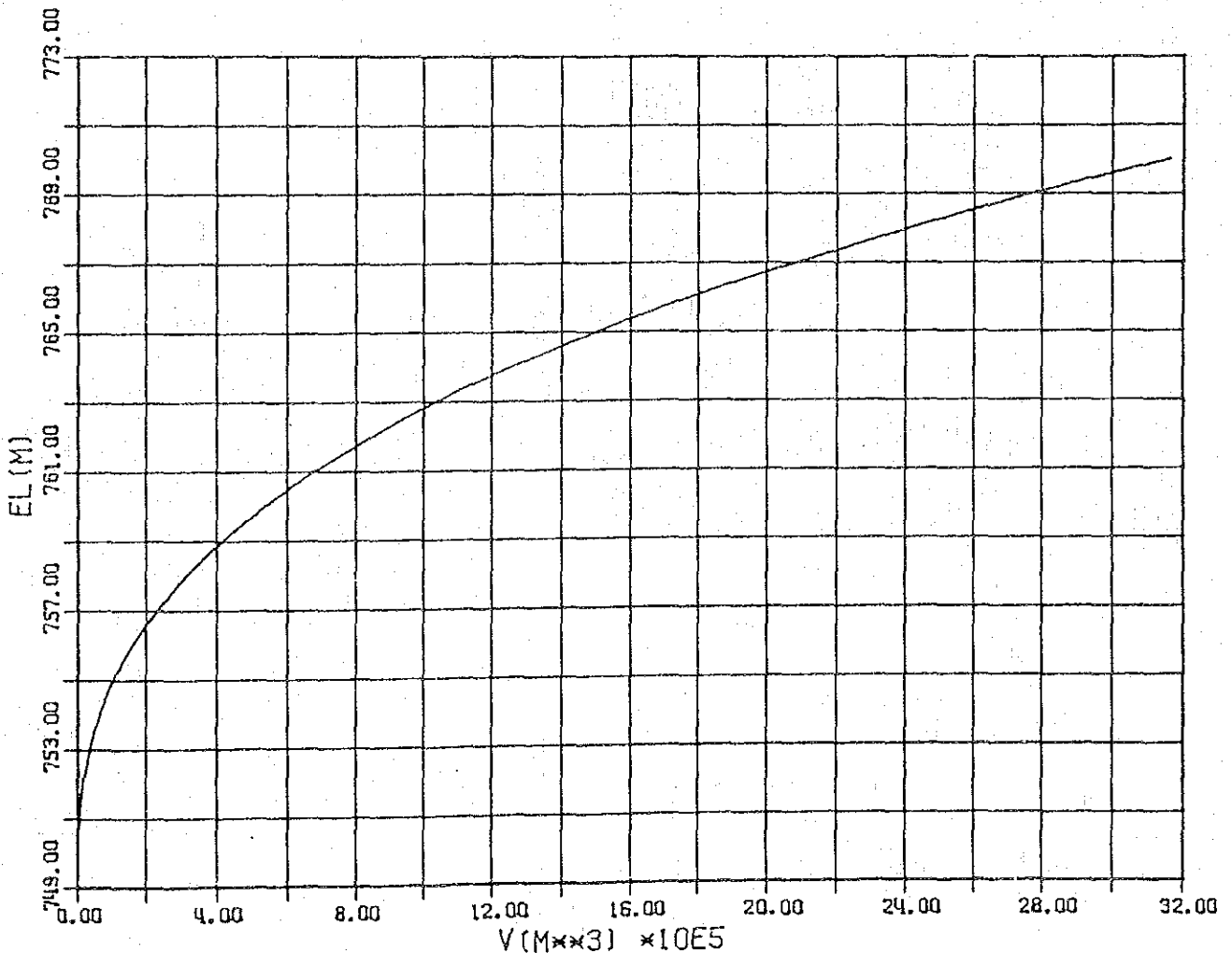


The Vega River around the damsite forms a narrow flood plane and flows straight. The bedrock consists of porphyritic granite, and it is massive and very hard and is poorly jointed. A small dolerite dyke is distributed near the damsite, and it is very hard and is poorly jointed. Surrounding the dyke have had no affect by the intrusion. Leakage through the bedrock seems to be small. The bedrock is suitable for the dam foundation from the geological point of view. The estimated thickness of unconsolidated deposits is less than 50 centimeters.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HØR
VII-1-3	2031A4	UN	254	470

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
749.0	0.0	0	0	0	0.00	
750.0	1.0	2178	1089	1089	1.09	
752.5	2.5	17084	9631	24078	25.17	
755.0	2.5	47309	32197	80491	105.66	
757.5	2.5	83874	65592	163979	269.64	
760.0	2.5	127904	105889	264723	534.36	
762.5	2.5	193595	16074	401874	936.23	
765.0	2.5	257573	225584	563960	1500.19	
767.5	2.5	339558	298566	746414	2246.60	
770.0	2.5	392035	365797	914491	3161.10	



No. VII-1-4








Name of Dam Zinguo

Location	District Zaka		Communal Land Ndanga		
	Map Ref. 2031A4		Coordinates UN285370		
Geology	Granite, shearing and highly weathering, very soft and joints are well developed.				
Hydrology	River Chihobvu		Hydrological Zone E-UT1		
	Catchment Area 9.3 sq.km		M.A. Rainfall 820 mm		
	M.A. Runoff 112 mm		Sediment 270 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.930 MCM		1/10 Yr. Yield 0.302 MCM		
	Dead Capacity 0.040 MCM		D.W.S. 675 m		
	Total Capacity 0.970 MCM		N.W.S. 685 m		
Dam	Height 18 m		Length 420 m		
	Embankment Volume 110 000 cu.m		Spillway 64 m		
Agriculture	Natural Region IV		Soil SL		
	Potential Irrigable Area			30 ha	
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 17.8ha		Dist. 2.0 km by Gravity		
	Topography	Area	Undulated and steep slope		
		Conveyance	Complicated		
Rural Water Supply	Population 1 758 person		35 cu.m/day		
	Livestock 2 115 unit		95 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 1 220 000		Z\$ 514 000	Z\$ 1 734 000	B
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 38 981/year		Z\$ 453 000	3.2 per cent	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

Present Condition on the Ward

Ward Name	Murebwe		Area 5 125 ha	
Demography	Population Density		58.6 persons/sq.km	
	Family Size		6.0 Persons/household	
Agriculture	Arable Area 2 565 ha		Grazing Area 1 538 ha	
	Maize N.A ha/household		8 bags/ha	
	Sorghum N.A ha/household		3 bags/ha	
	Livestock 4.3 LSUs/household		42.3 LSUs/sq.km	
Rural Water Supply	Borehole 0.08 units/sq.km		751 persons/unit	
	Well 0.12 units/sq.km		500 persons/unit	

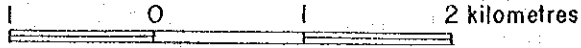
LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

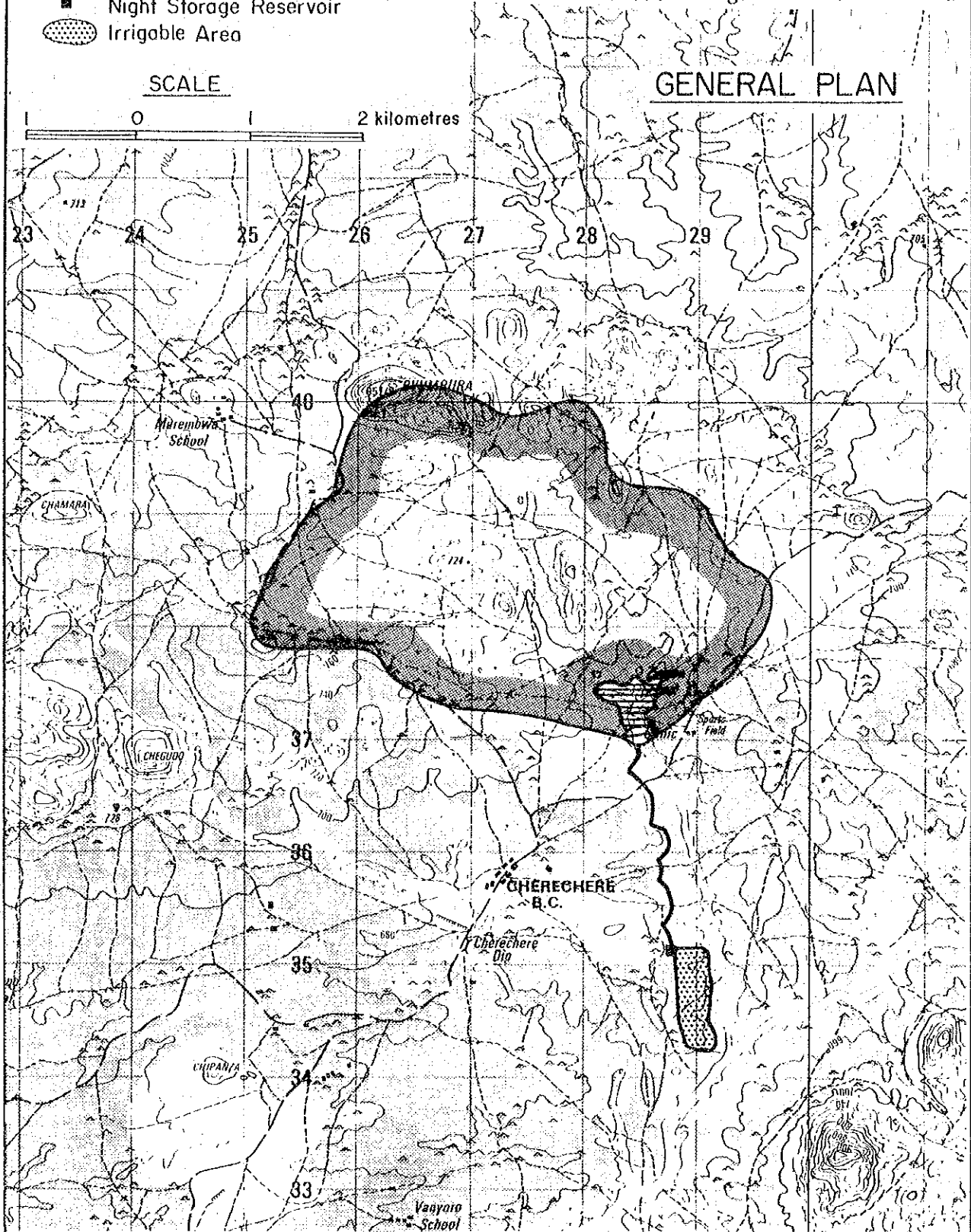
Dam No. VII-1-4
 Dam Name ZINGUO
 Catchment Area 9.3 sq.km
 1/10 yr. Yield 302 Th.cu.m
 Water Conveyance
 Method Gravity
 Distance 2.0 km
 Gross Irrigable Area 22 ha



SCALE

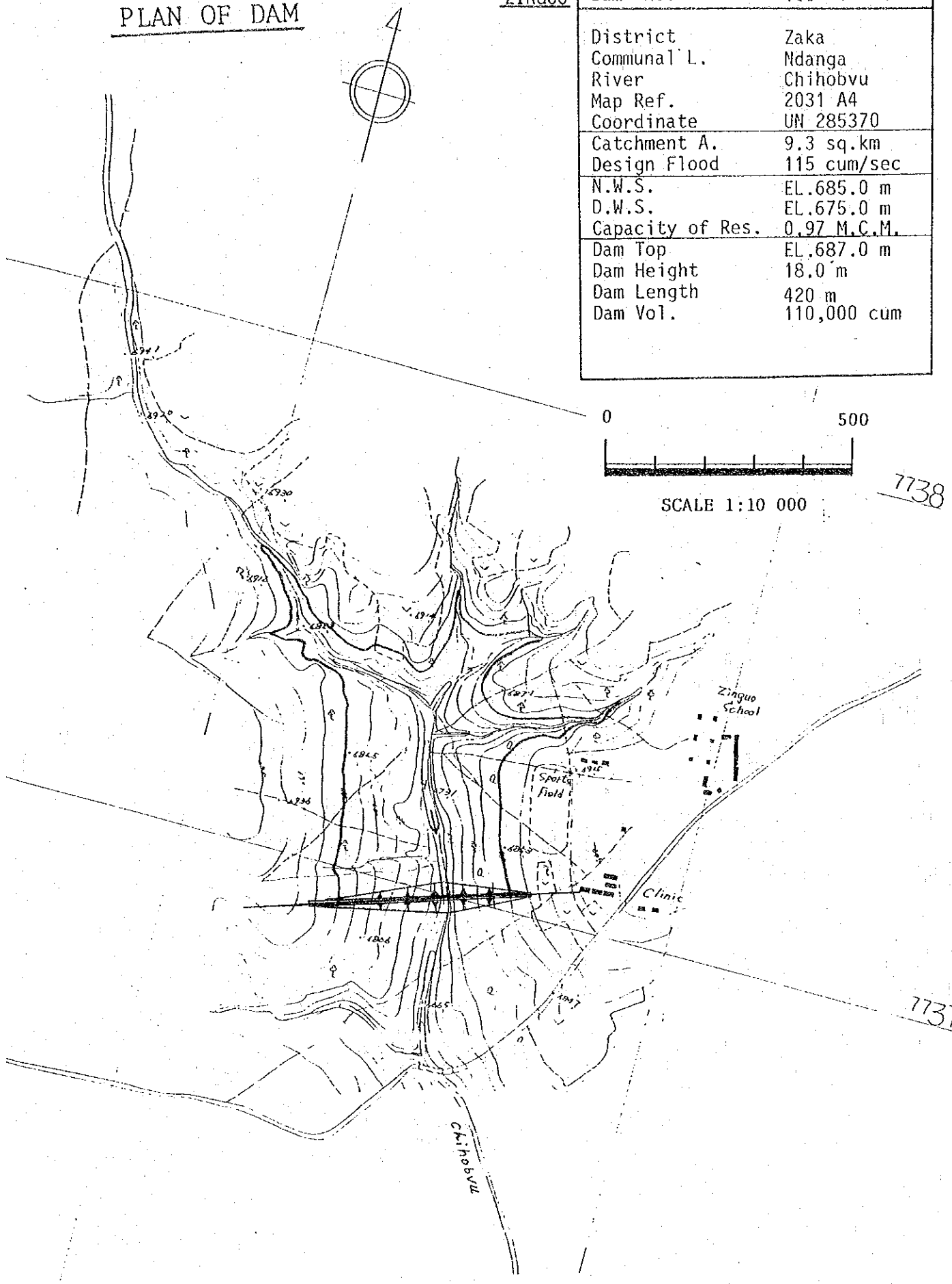


GENERAL PLAN

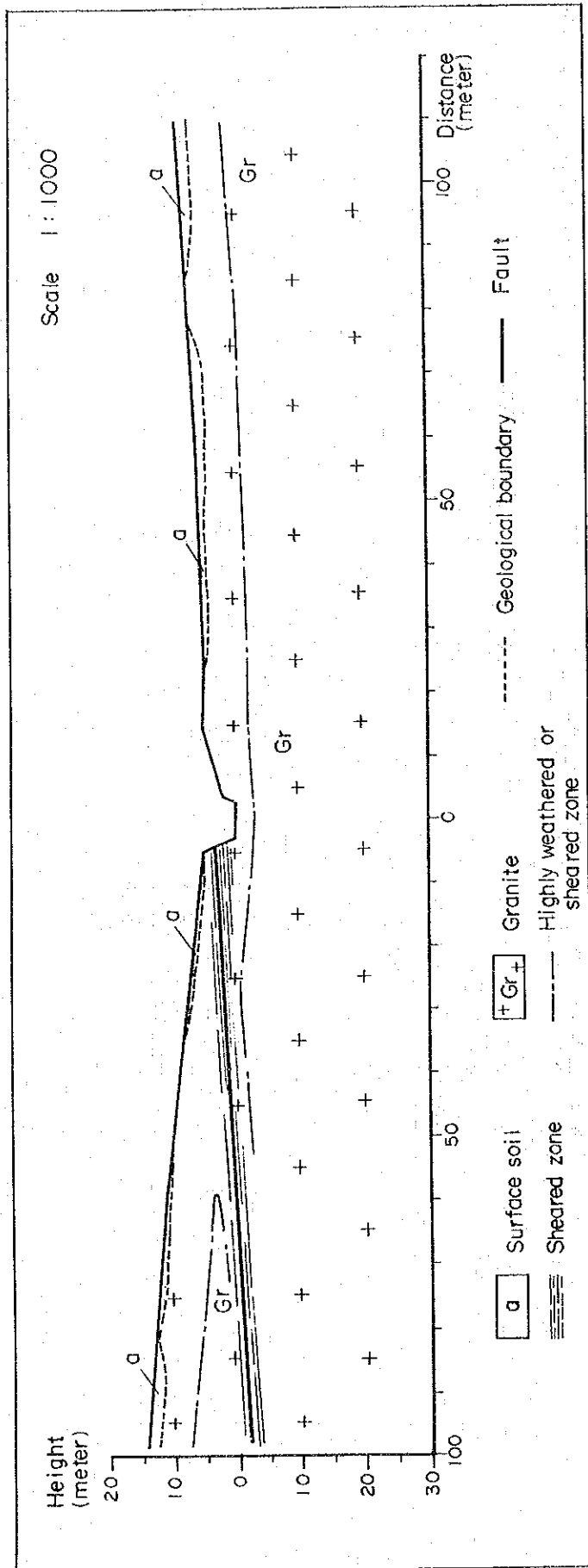


PLAN OF DAM

ZINGUO	Dam No.	VII- 1 - 4
	District	Zaka
	Communal L.	Mdanga
	River	Chihobvu
	Map Ref.	2031 A4
	Coordinate	UN 285370
	Catchment A.	9.3 sq.km
	Design Flood	115 cum/sec
	N.W.S.	EL.685.0 m
	D.W.S.	EL.675.0 m
	Capacity of Res.	0.97 M.C.M.
	Dam Top	EL.687.0 m
	Dam Height	18.0 m
	Dam Length	420 m
	Dam Vol.	110,000 cum



VII-1-4 Zinguo



The Chihovbu River forms narrow and relatively steep valley, and flows straight.

The bedrock consists of granite, and it has abundant wide opened joints trending NS or N60°E direction and is very soft. Many thin quartz veins are distributed in same direction. The granite around the damsite seems to have been sheared highly. It seems that leakage through the bedrock is large and bearing strength is small. The bedrock is less suitable for dam foundation from the geological point of view. The estimated thickness of unconsolidated deposits is less than 1 meter.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
VII-1-4	2031A4	UN	285	370

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
669.0	0.0	0	0	0	0.00	
670.0	1.0	700	350	350	0.35	
672.5	2.5	8900	4800	12000	12.35	
675.0	2.5	26300	17600	44000	56.35	
677.5	2.5	53200	39750	99375	155.72	
680.0	2.5	85600	69400	173500	329.22	
682.5	2.5	123400	104500	261250	590.47	
685.0	2.5	181900	152650	381625	972.10	
687.5	2.5	251300	216600	541500	1513.60	
690.0	2.5	337000	294150	735375	2248.97	

