

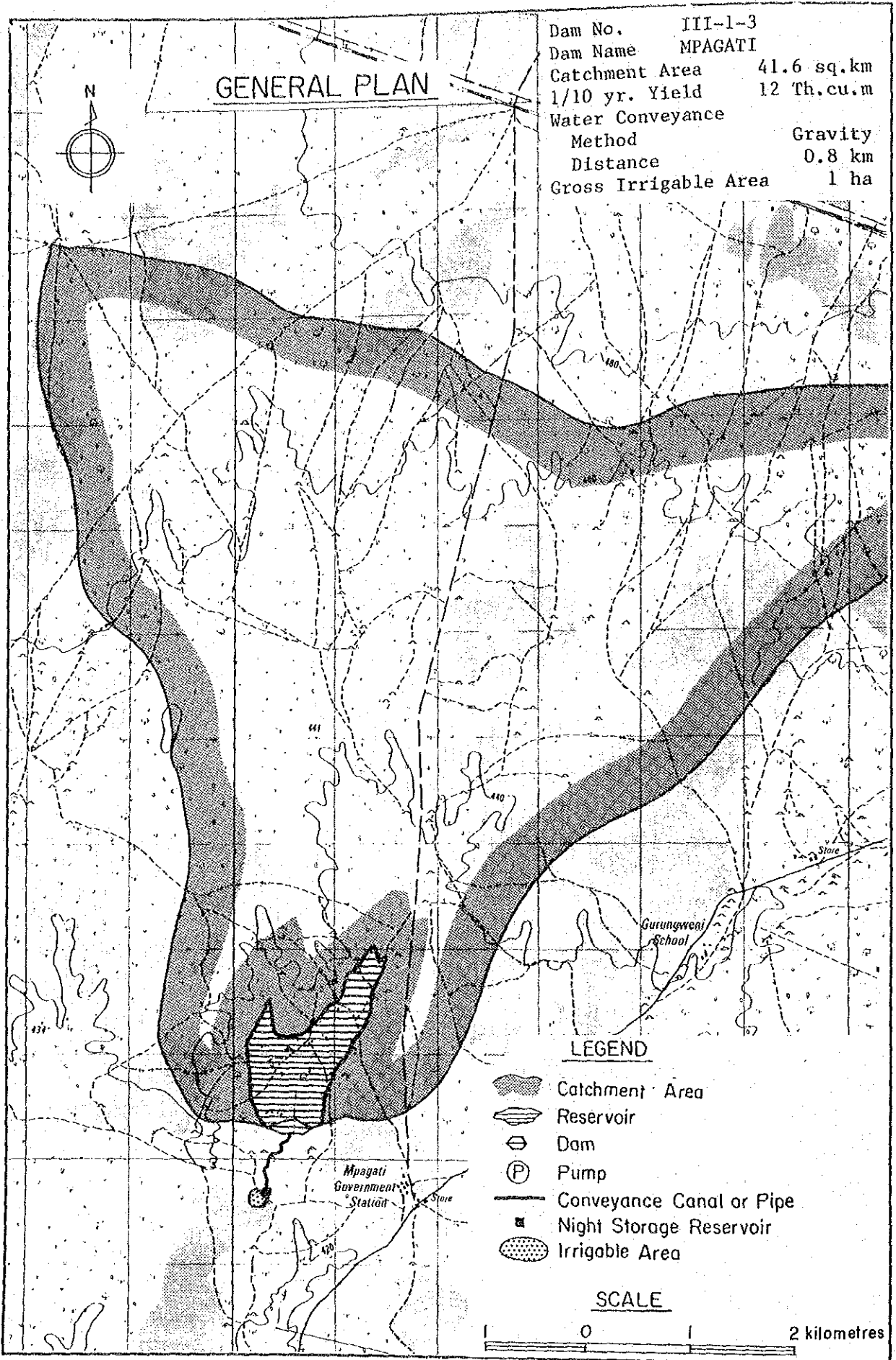
No. III-1-3

Name of Dam Mpagati

Location	District	Gaza Komanani		Communal Land	Matibi No.2
	Map Ref.	2131G2		Coordinates	UM306103
Geology	Basalt, highly weathering and fracturing.				
Hydrology	River	(T) Chimombozi		Hydrological Zone	B-N1
	Catchment Area	41.6	sq.km	M.A. Rainfall	520 mm
	M.A. Runoff	14	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	0.410	MCM	1/10 Yr. Yield	0.012 MCM
	Dead Capacity	0.010	MCM	D.W.S.	425 m
	Total Capacity	0.420	MCM	N.W.S.	430 m
Dam	Height	9	m	Length	650 m
	Embankment Volume	48 000	cu.m	Spillway	168 m
Agriculture	Natural Region	V		Soil	CL
	Potential Irrigable Area				180 ha
	Proposed Cropping Pattern	C			
Irrigation	Net Irrigable Area	0.6 ha	Dist. 0.8 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	1 710 person		13 cu.m/day	
	Livestock	550 unit		25 cu.m/day	
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 2 409 000	Z\$ 173 000		Z\$ 2 582 000	
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	C
	Z\$ 4 466 /year	Z\$ 52 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

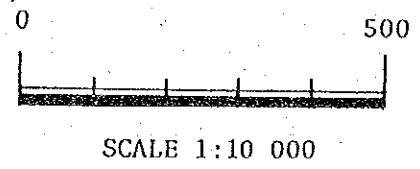
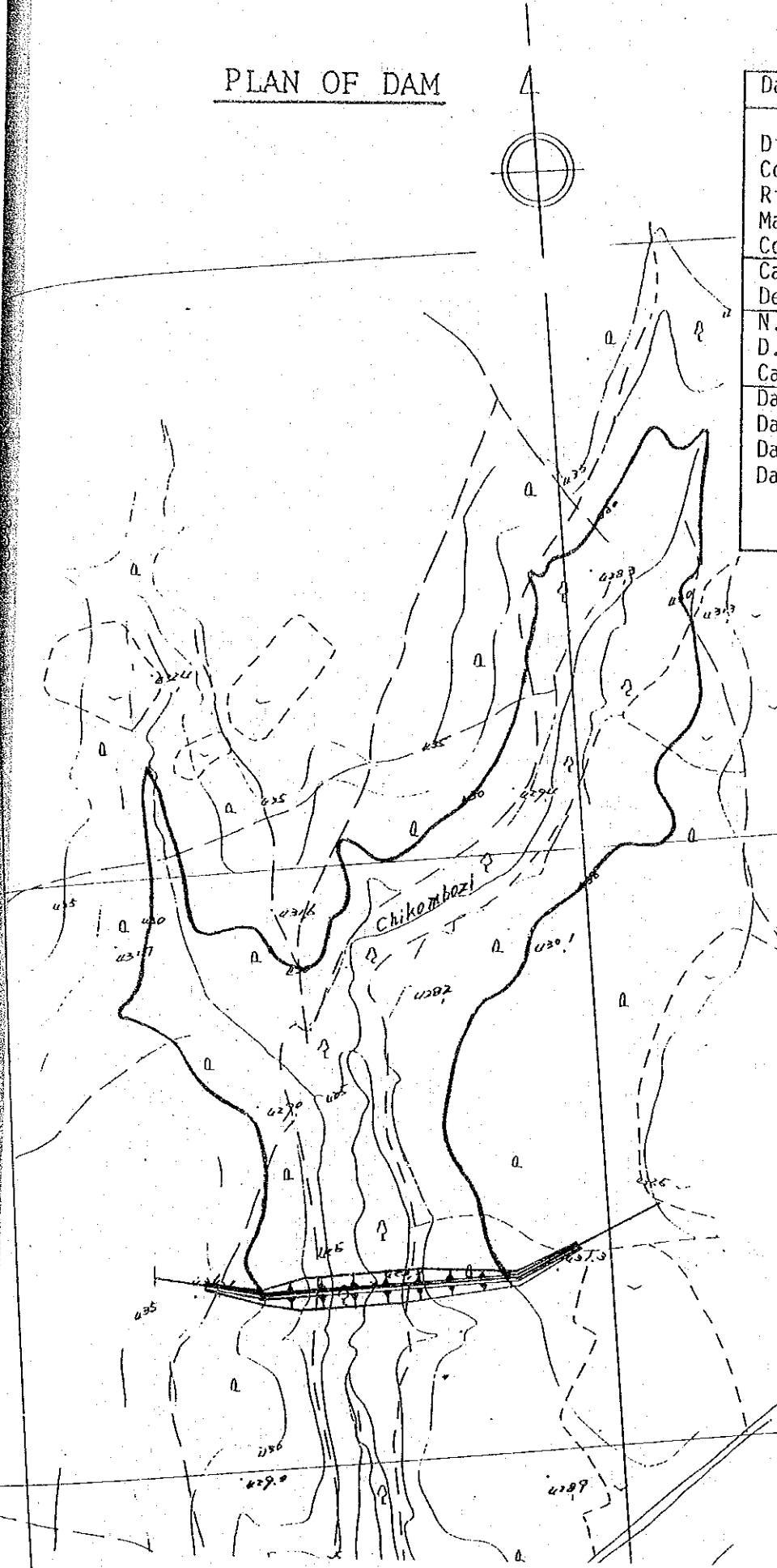
Ward Name	7		Area	19 000 ha	
Demography	Population Density		34.2	persons/sq.km	
	Family Size		10.8	Persons/household	
Agriculture	Arable Area		6 000 ha	Grazing Area 13 000 ha	
	Maize	1.7	ha/household	7	bags/ha
	Sorghum	3.3	ha/household	11	bags/ha
	Livestock	3.5	LSUs/household	11.0	LSUs/sq.km
Rural Water Supply	Borehole	0.03	units/sq.km	1 083	persons/unit
	Well	-	units/sq.km	-	persons/unit



PLAN OF DAM

MPAGATI

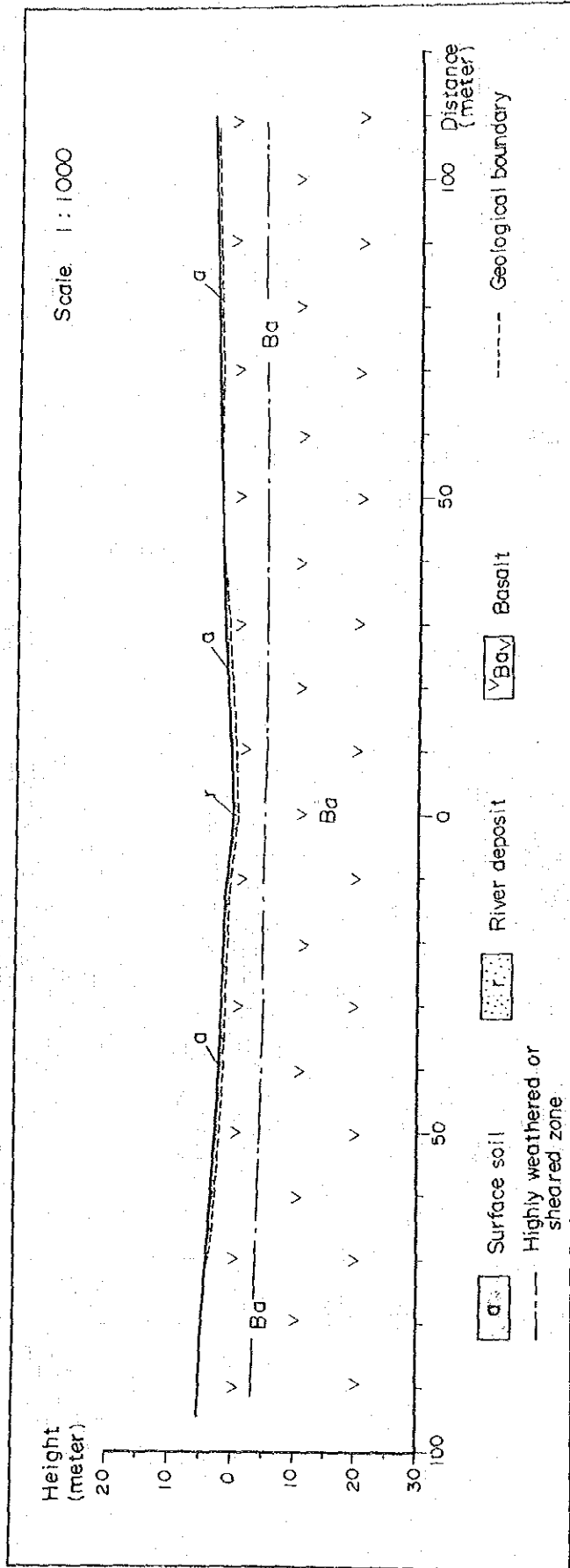
Dam No.	III- 1 - 3
District	Gaza Komanani
Communal L.	Matibi No.2
River	(T)Chimombozi
Map Ref.	2131 C2
Coordinate	UM 306103
Catchment A.	41.6 sq.km
Design Flood	302 cum/sec
N.W.S.	EL.430.0 m
D.W.S.	EL.425.0 m
Capacity of Res.	1.16 M.C.M.
Dam Top	EL.432.0 m
Dam Height	9.0 m
Dam Length	650 m
Dam Vol.	48,000 cum



7611

7610

III-1-3 Mpagati



The Chikombozi River around the damsite forms a wide and shallow valley.

The bedrock consists of basalt. It is soft to very soft, and has been changed into boulders and patches by highly weathering.

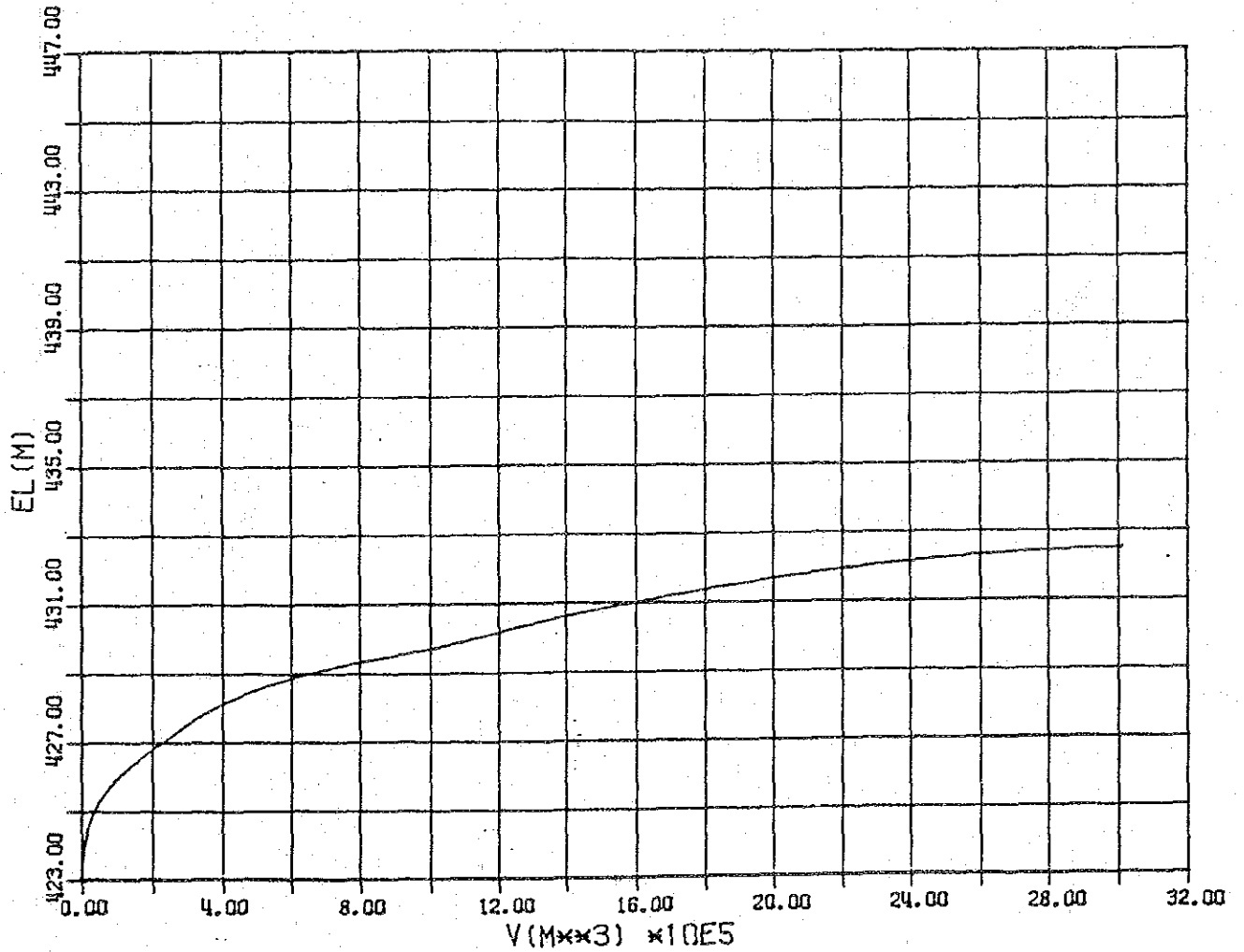
The depth of the weathered layer is more than 5 meters. It seems that leakage through the bedrock is very large.

The estimated thickness of unconsolidated deposits is less than 1 meter.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-1-3	213102	UM	306	103

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΔV (1000M ³)	NOTE
423.3	0.0	0	0	0	0.00	
425.0	1.7	40849	20425	34721	34.72	
427.5	2.5	166939	103894	259735	294.46	
430.0	2.5	498533	332736	831840	1126.29	
432.5	2.5	1008318	753425	1883561	3009.86	



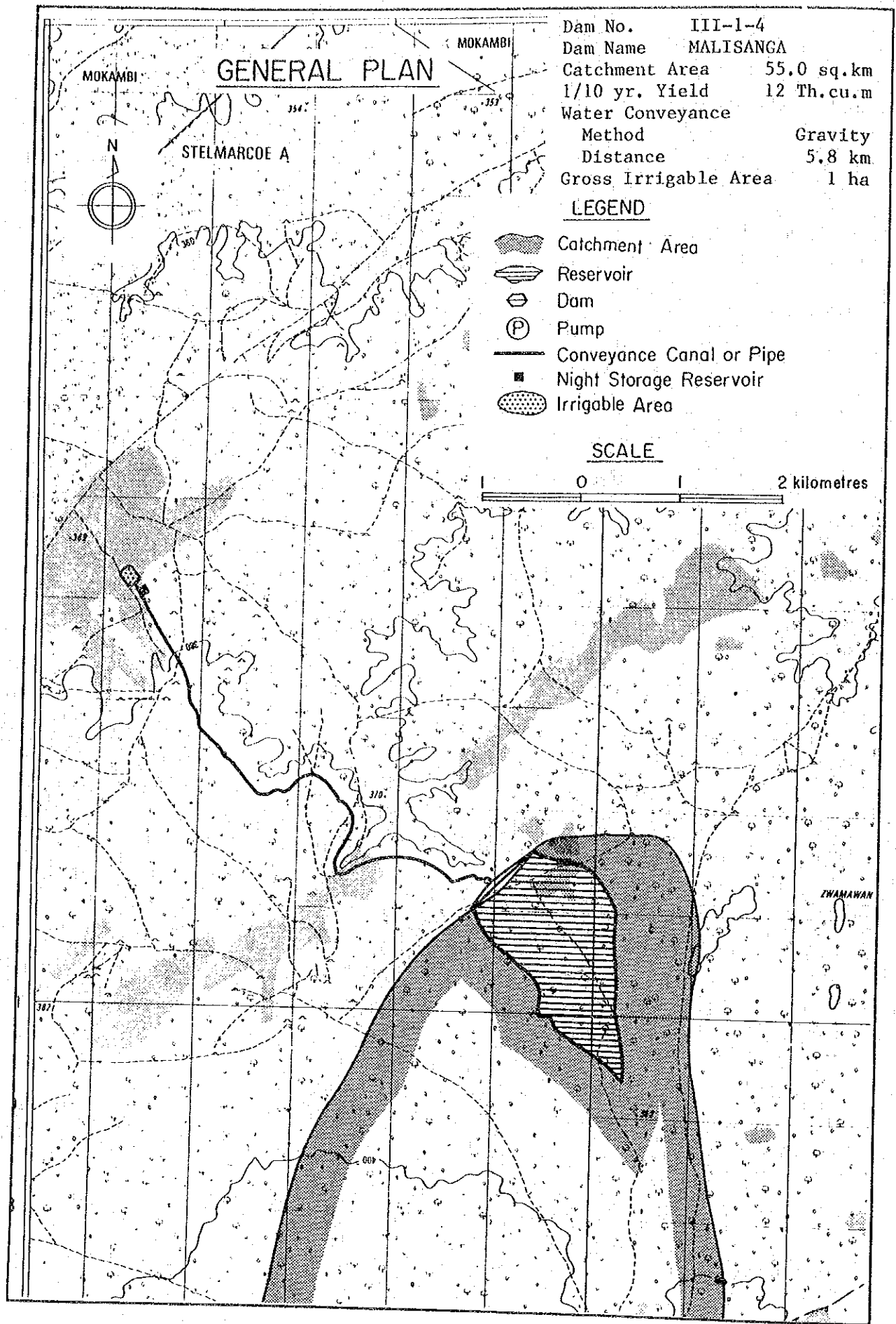
No. III-1-4

Name of Dam Malisanga

Location	District	Gaza Komanani		Communal Land	Matibi No.2
	Map Ref.	2131B3		Coordinates	UM490413
Geology	Basalt, very soft, surface soil is very deep.				
Hydrology	River	Malisanga		Hydrological Zone	B-L1
	Catchment Area	55.0	sq.km	M.A. Rainfall	530 mm
	M.A. Runoff	22	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	0.230	MCM	1/10 Yr. Yield	0.067 MCM
	Dead Capacity	0.010	MCM	D.W.S.	381 m
	Total Capacity	0.240	MCM	N.W.S.	383 m
Dam	Height	5	m	Length	1 000 m
	Embankment Volume	33 000	cu.m	Spillway	198 m
Agriculture	Natural Region	V		Soil	CL
	Potential Irrigable Area	200 ha			
	Proposed Cropping Pattern	C			
Irrigation	Net Irrigable Area	0.6 ha	Dist. 5.8 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	1 400	person	28	cu.m/day
	Livestock	520	unit	23	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 4 143 000	Z\$ 1 098 000		Z\$ 5 241 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 4 882 /year	Z\$ 57 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	N	Y	N	N
Remarks					








Present Condition on the Ward

Ward Name	3		Area	25 000 ha	
Demography	Population Density		28.0	persons/sq.km	
	Family Size		10.7	Persons/household	
Agriculture	Arable Area		8 000 ha	Grazing Area 17 000 ha	
	Maize	2.3	ha/household	7	bags/ha
	Sorghum	3.8	ha/household	11	bags/ha
	Livestock	4.0	LSUs/household	10.4	LSUs/sq.km
Rural Water Supply	Borehole	0.02	units/sq.km	1 167	persons/unit
	Well	-	units/sq.km	-	persons/unit

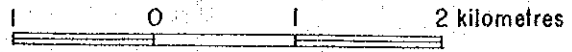


Dam No. III-1-4
 Dam Name MALISANGA
 Catchment Area 55.0 sq.km
 1/10 yr. Yield 12 Th.cu.m
 Water Conveyance Method Gravity
 Distance 5.8 km
 Gross Irrigable Area 1 ha

LEGEND

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

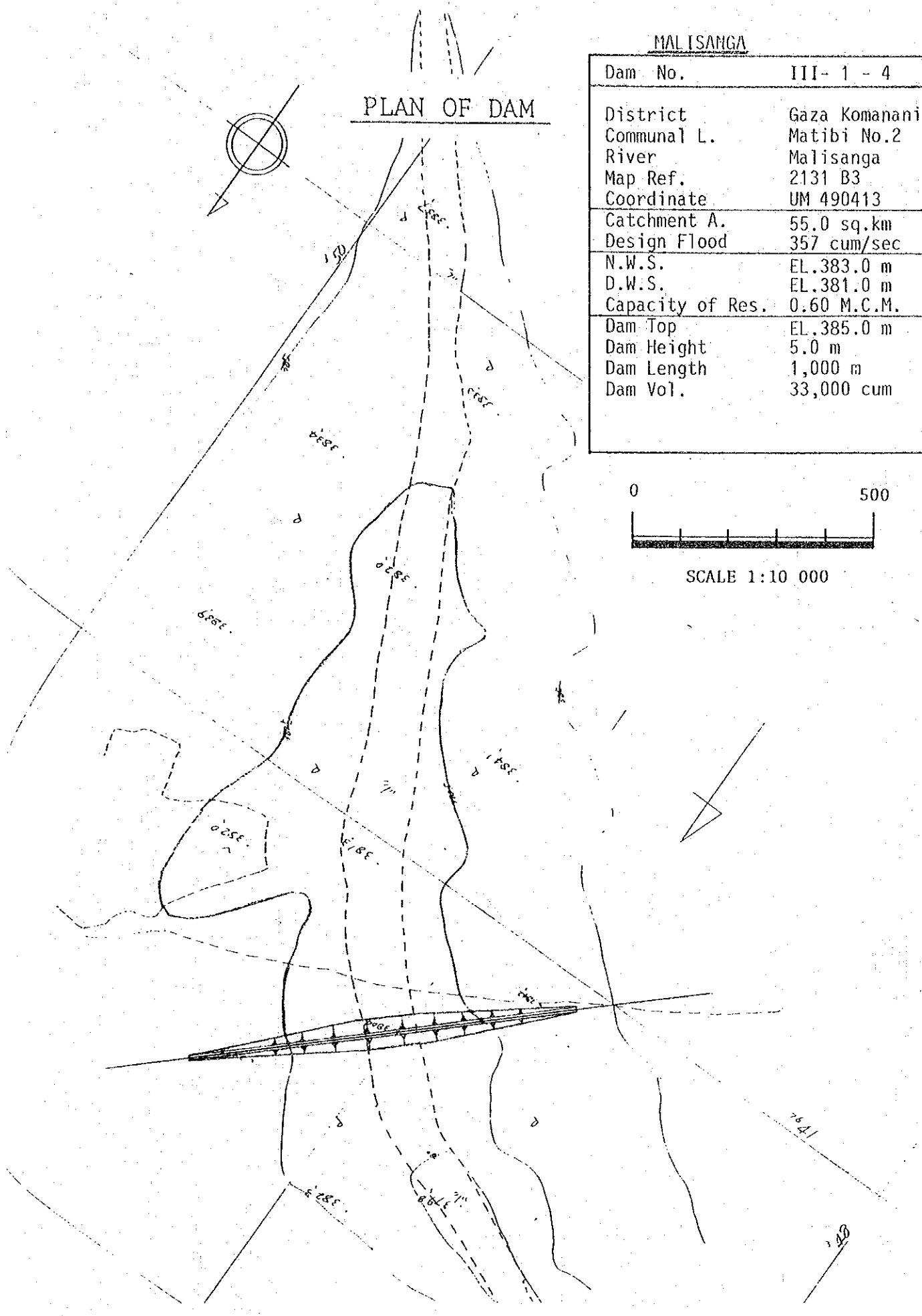
SCALE



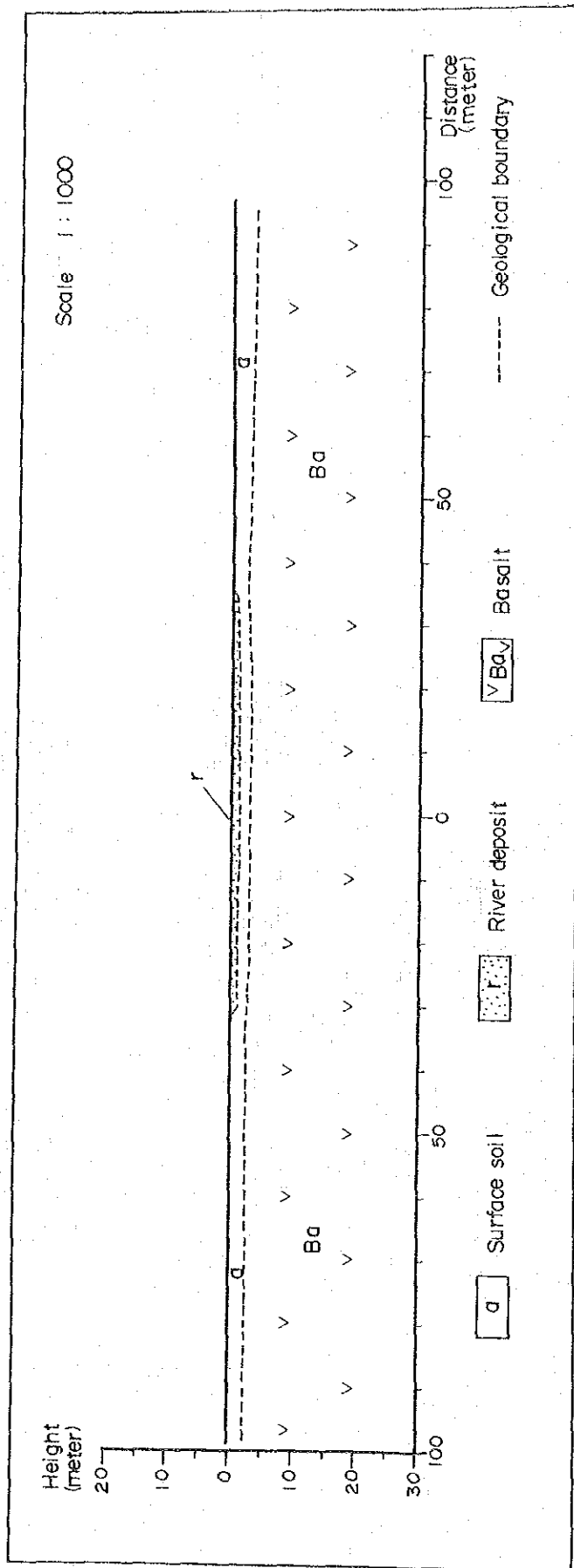
MALISANGA

PLAN OF DAM

Dam No.	III- 1 - 4
District	Gaza Komanani
Communal L.	Matibi No.2
River	Malisanga
Map Ref.	2131 B3
Coordinate	UM 490413
Catchment A.	55.0 sq.km
Design Flood	357 cum/sec
N.W.S.	EL.383.0 m
D.W.S.	EL.381.0 m
Capacity of Res.	0.60 M.C.M.
Dam Top	EL.385.0 m
Dam Height	5.0 m
Dam Length	1,000 m
Dam Vol.	33,000 cum



III-1-4 Malisanga



The area forms very flat land, and river channels are not clear. Outcrops are not found in this area, and surface soil is very thick.

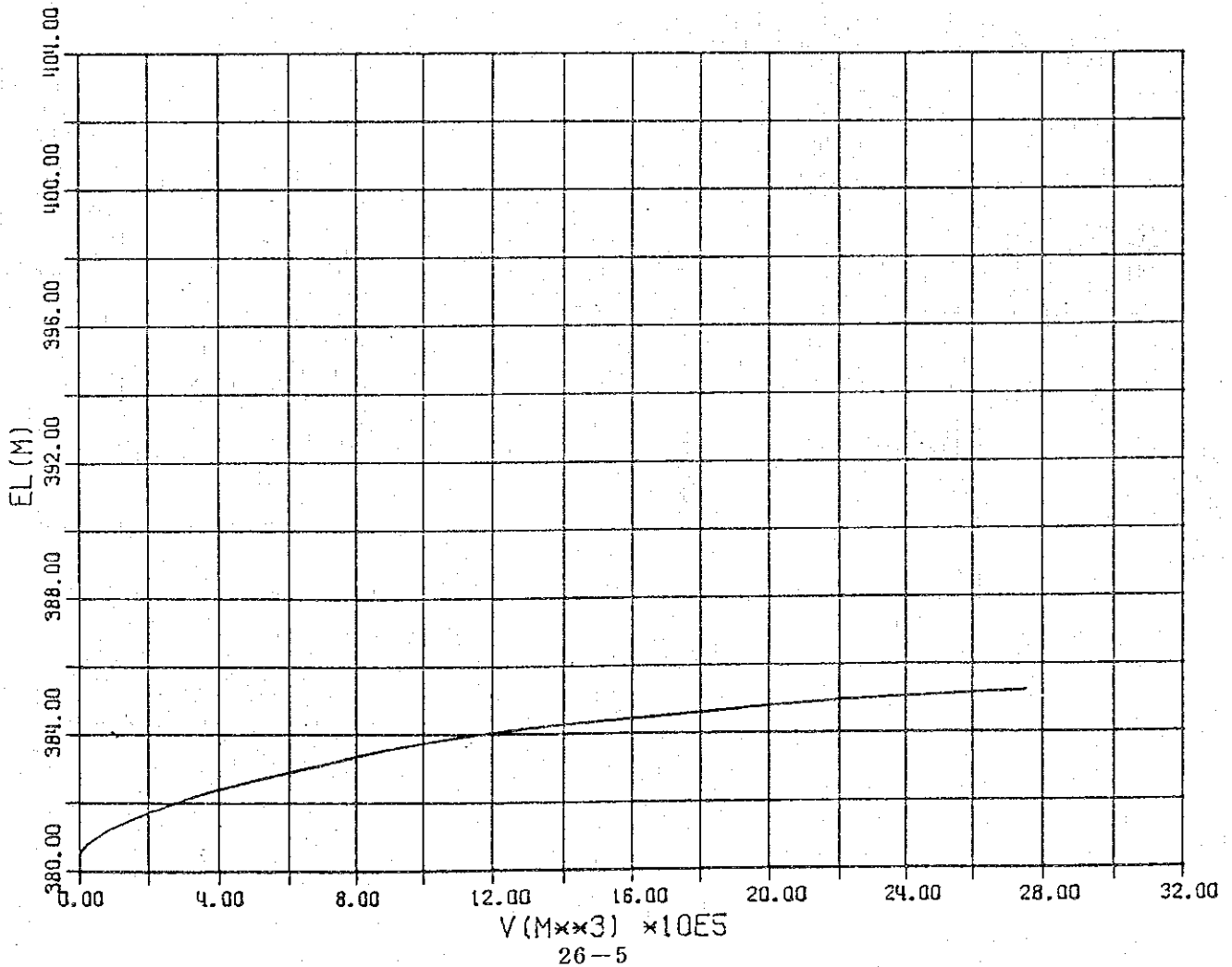
The bedrock consists of basalt, and soft rock layer seems to be very deep.

It is very difficult to find out a damsite in this area.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-1-4	2131B3	UN	490	413

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
380.4	0.0	0	0	0	0.00	
382.5	2.1	380456	190228	399497	399.50	
385.0	2.5	1493371	936914	2342283	2741.78	



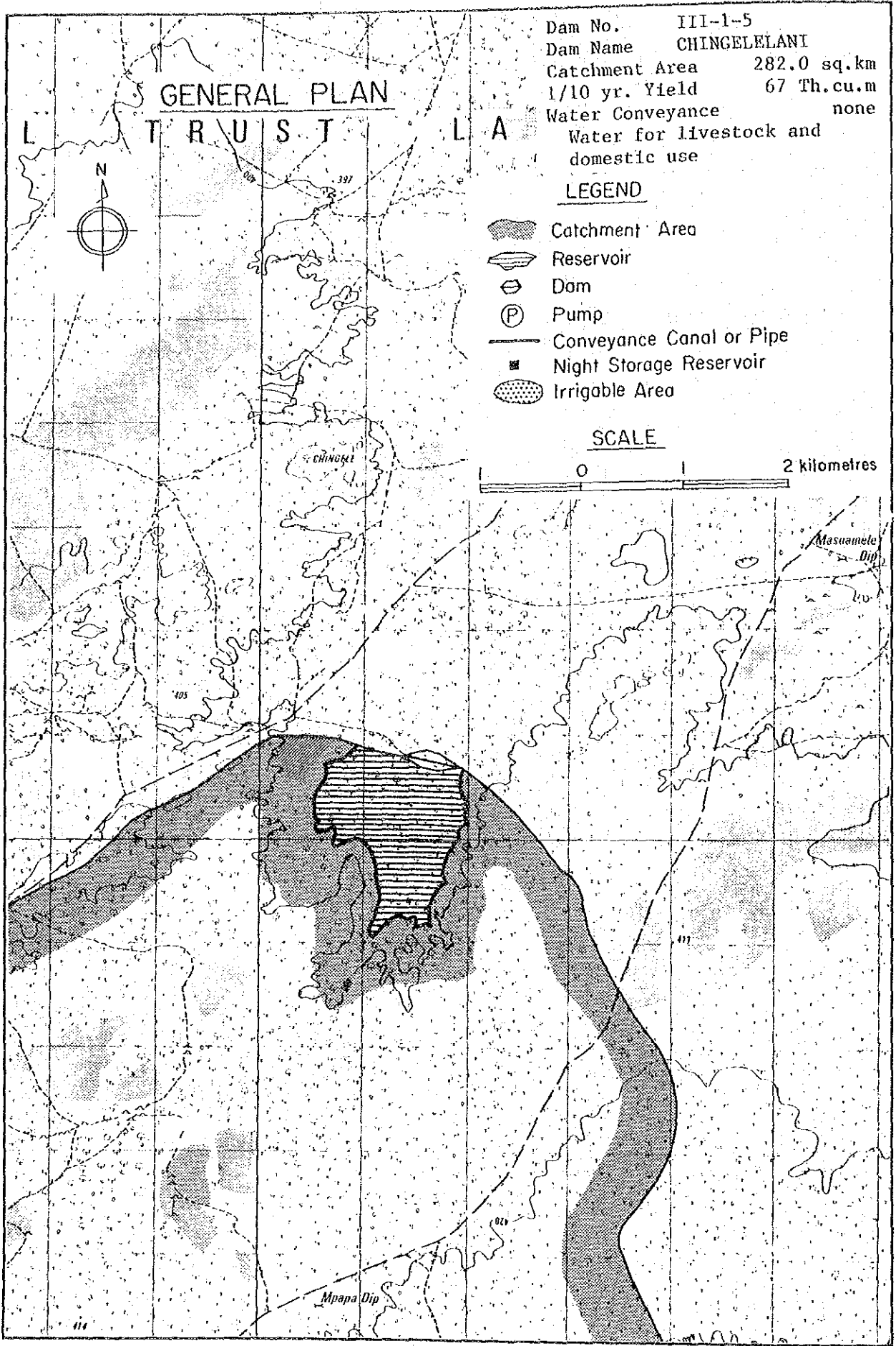
No. III-1-5

Name of Dam Chingelelani

Location	District Gaza Komanani		Communal Land Matibi No.2		
	Map Ref. 2131B3		Coordinates UM617308		
Geology	Basalt, very flat terrain, outcrops are very few.				
Hydrology	River Tsigwesi		Hydrological Zone E-L1		
	Catchment Area	282.0 sq.km	M.A. Rainfall	530 mm	
	M.A. Runoff	24 mm	Sediment	45 tonnes km ² /yr.	
Reservoir	Effective Capacity	0.440 MCM	1/10 Yr. Yield	0.277 MCM	
	Dead Capacity	0.040 MCM	D.W.S.	389 m	
	Total Capacity	0.480 MCM	N.W.S.	391 m	
Dam	Height	7 m	Length	1 000 m	
	Embankment Volume	58 000 cu.m	Spillway	118 m	
Agriculture	Natural Region V		Soil -		
	Potential Irrigable Area			- ha	
	Proposed Cropping Pattern -				
Irrigation	Net Irrigable Area - ha		Dist. - km by -		
	Topography	Area	-		
		Conveyance	-		
Rural Water Supply	Population 693 person		14 cu.m/day		
	Livestock 450 unit		20 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities		
	Z\$ 4 136 000		-		
	Annual Increment Benefit		Net Present Value		
	Z\$ 4 908 /year		Z\$ 57 000		
		Total Cost		Class	
		Z\$ 4 136 000		C	
		Economic Internal Rate of Return			
		-			
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

Present Condition on the Ward

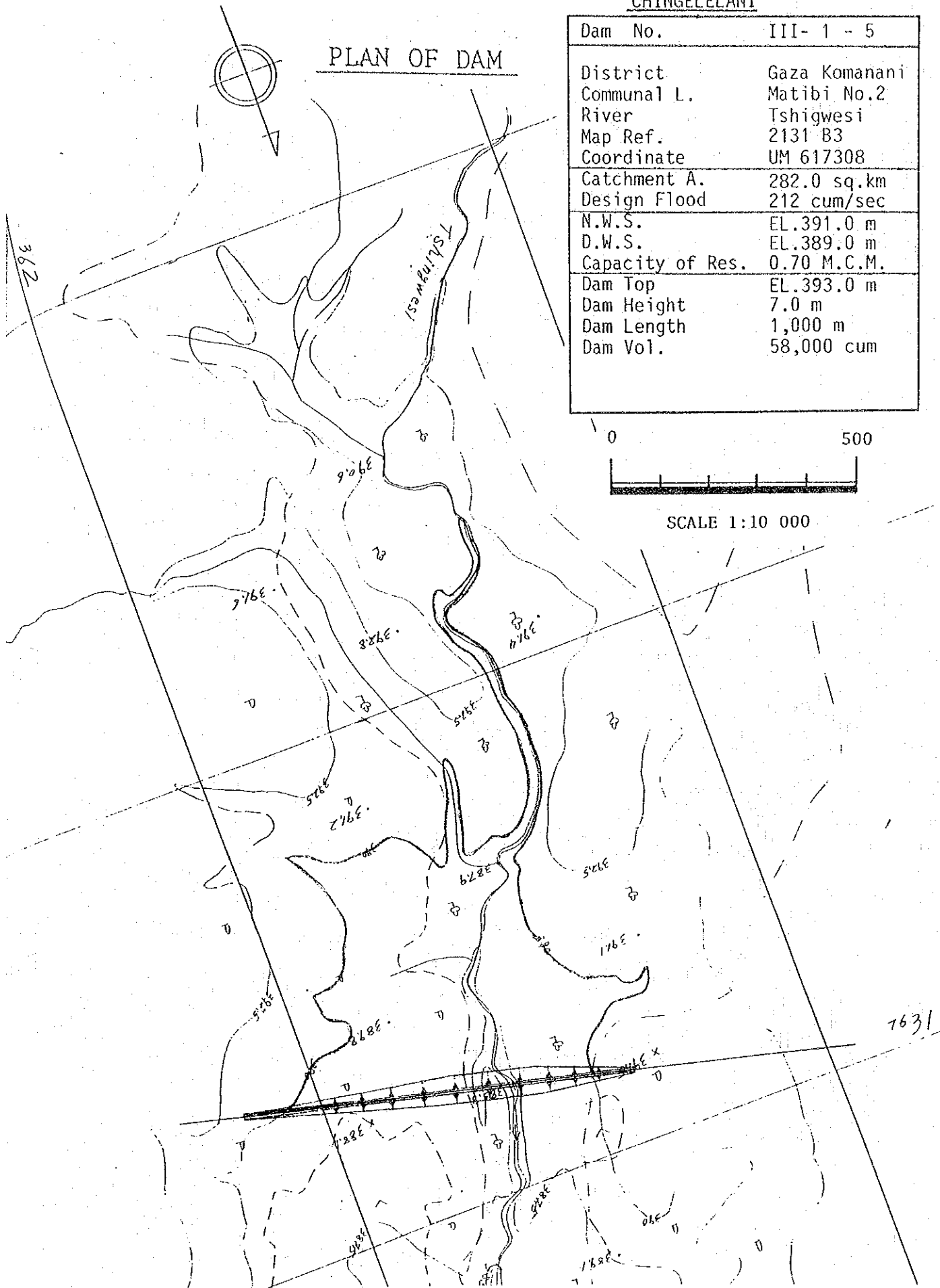
Ward Name	4		Area	26 800 ha	
Demography	Population Density		23.1 persons/sq.km		
	Family Size		10.2 Persons/household		
Agriculture	Arable Area		9 000 ha	Grazing Area 17 800 ha	
	Maize	2.5 ha/household		7 bags/ha	
	Sorghum	4.1 ha/household		11 bags/ha	
	Livestock	4.0 LSUs/household		9.0 LSUs/sq.km	
Rural Water Supply	Borehole	0.04 units/sq.km		620 persons/unit	
	Well	-		- persons/unit	



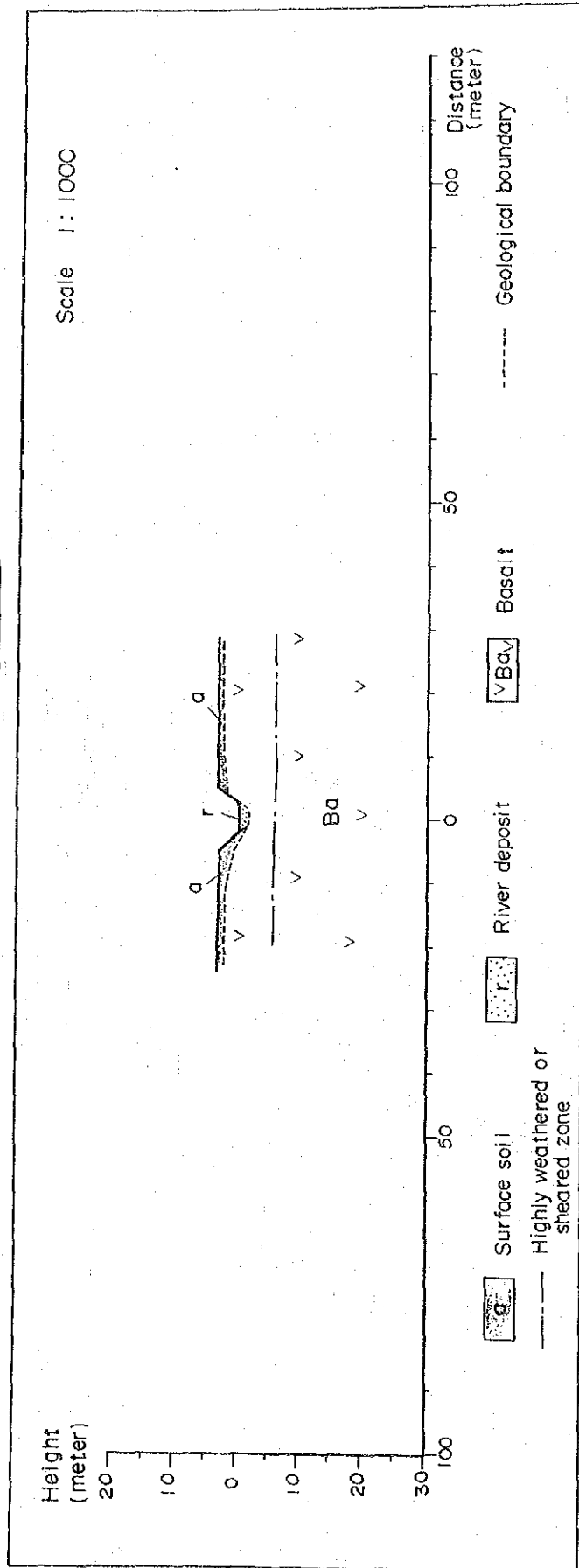
CHINGELELANI

Dam No.	III- 1 - 5
District	Gaza Komanani
Communal L.	Matibi No.2
River	Tshigwesi
Map Ref.	2131 B3
Coordinate	UM 617308
Catchment A.	282.0 sq.km
Design Flood	212 cum/sec
N.W.S.	EL.391.0 m
D.W.S.	EL.389.0 m
Capacity of Res.	0.70 M.C.M.
Dam Top	EL.393.0 m
Dam Height	7.0 m
Dam Length	1,000 m
Dam Vol.	58,000 cum

PLAN OF DAM



III-1-5 Chingelelani

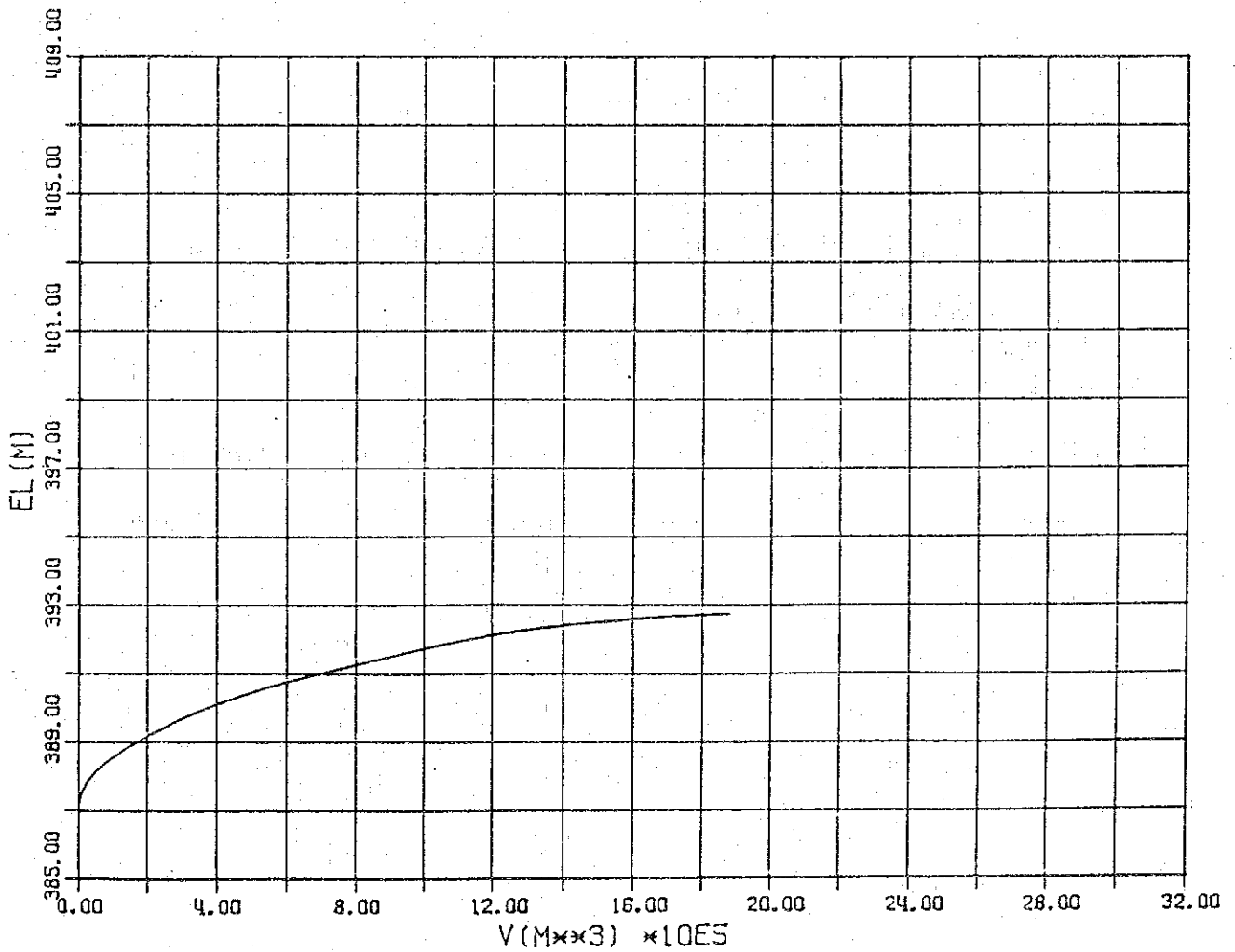


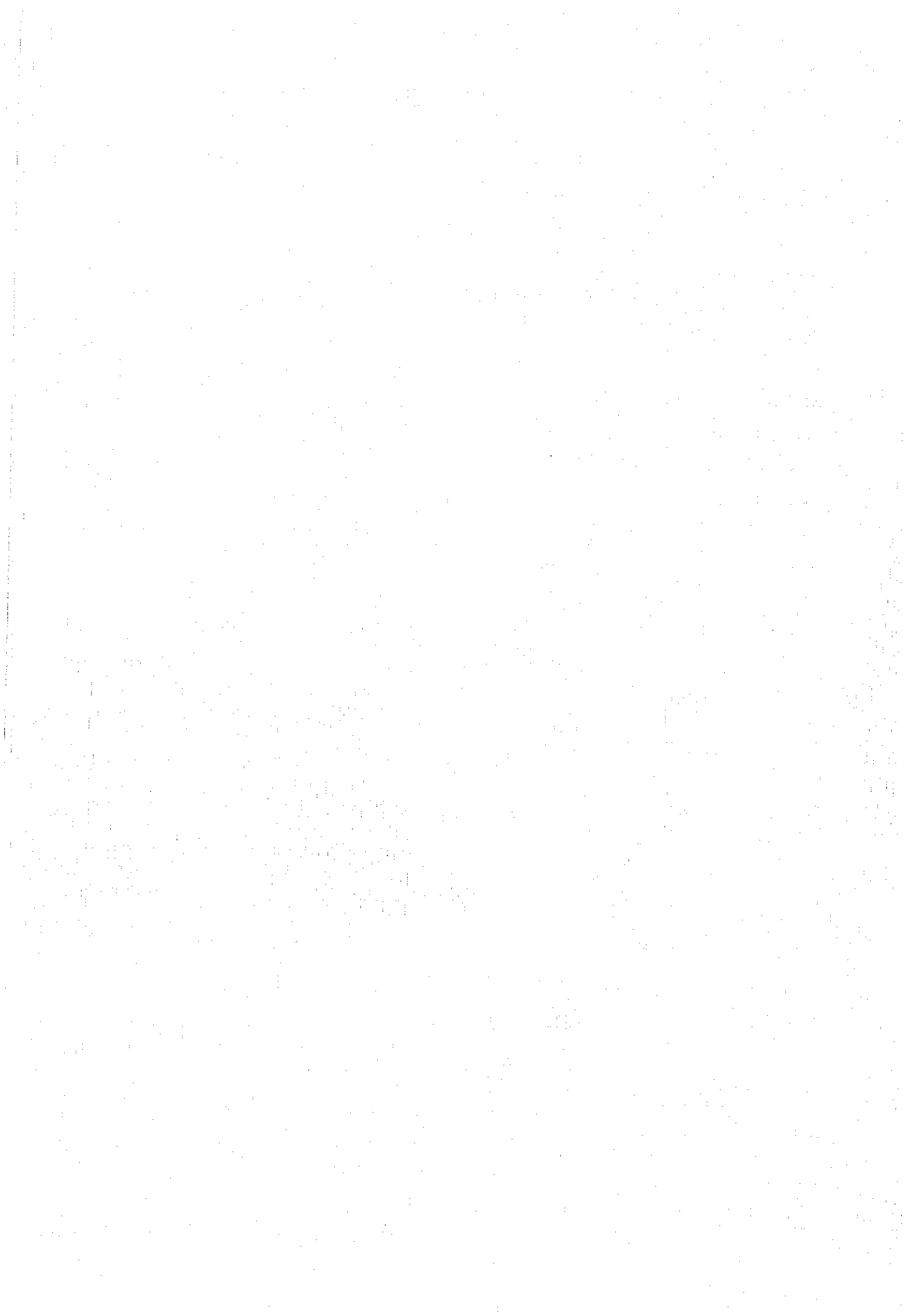
The area is very flat land, and the Thingwesi River forms a very narrow and shallow valley. The bedrock consists of basalt. According to a few outcrops, basalt is soft by highly weathering and has been changed into boulders and patches. It seems that the thickness of the weathering layer is considerably deep, and also leakage through the bedrock is large. The estimated thickness of unconsolidated deposits is less than 1 meter at the riverbed and less than 2 meters at both banks.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HØR
III-1-5	213183	UN	617	308

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
385.8	0.0	0	0	0	0.00	
387.5	1.7	10496	5248	8921	8.92	
390.0	2.5	265658	138077	345193	354.11	
392.5	2.5	947143	606401	1516001	1870.11	





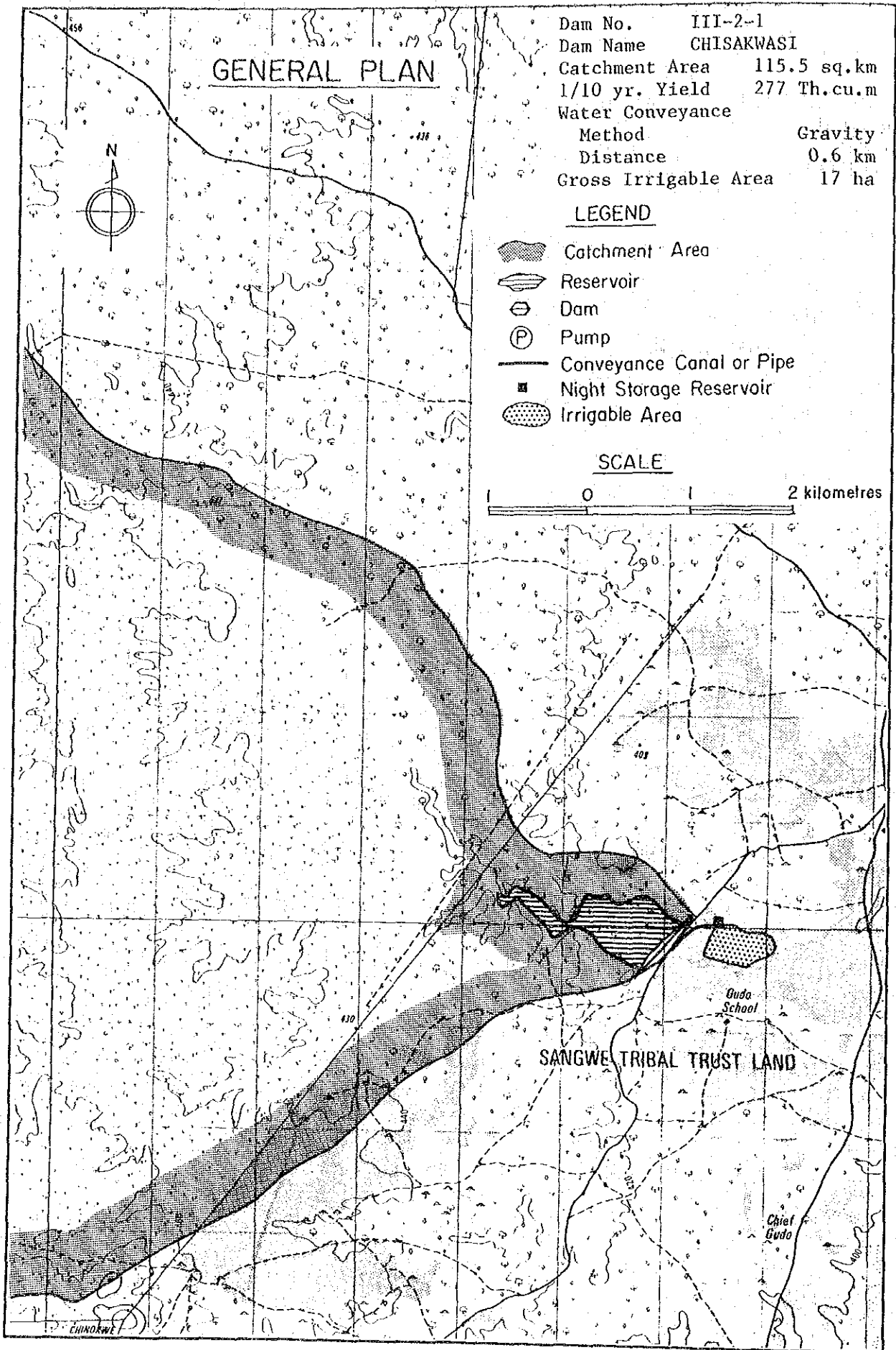
No. III-2-1

Name of Dam Chisakwasi

Location	District Gaza Komanani		Communal Land Sangwe		
	Map Ref. 2032C1		Coordinates VN159097		
Geology	Basalt and the dyke of diorite, diorite and surrounding rock have changed into boulders.				
Hydrology	River Chisakwasi		Hydrological Zone E-S2		
	Catchment Area	115.5 sq.km	M.A. Rainfall	530 mm	
	M.A. Runoff	24 mm	Sediment	45 tonnes km ² /yr.	
Reservoir	Effective Capacity	0.400 MCM	1/10 Yr. Yield	0.277 MCM	
	Dead Capacity	0.010 MCM	D.W.S.	411 m	
	Total Capacity	0.410 MCM	N.W.S.	415 m	
Dam	Height	9 m	Length	500 m	
	Embankment Volume	63 000 cu.m	Spillway	313 m	
Agriculture	Natural Region V		Soil SCL-CL		
	Potential Irrigable Area			50 ha	
	Proposed Cropping Pattern C				
Irrigation	Net Irrigable Area 13.9ha		Dist. 0.6 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	1 545 person	31 cu.m/day		
	Livestock	980 unit	44 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class B
	Z\$ 1 702 000		Z\$ 228 000	Z\$ 1 930 000	
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 40 428 /year		Z\$ 470 000	2.6 per cent	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward








Ward Name	1		Area	10 550 ha
Demography	Population Density		51.5	persons/sq.km
	Family Size		9.1	Persons/household
Agriculture	Arable Area		4 000 ha	Grazing Area 6 550 ha
	Maize	1.2	ha/household	7 bags/ha
	Sorghum	3.0	ha/household	11 bags/ha
	Livestock	N.A	LSUs/household	N.A LSUs/sq.km
Rural Water Supply	Borehole	0.06	units/sq.km	905 persons/unit
	Well	N.A	units/sq.km	N.A persons/unit



GENERAL PLAN

Dam No. III-2-1
 Dam Name CHISAKWASI
 Catchment Area 115.5 sq.km
 1/10 yr. Yield 277 Th.cu.m
 Water Conveyance
 Method Gravity
 Distance 0.6 km
 Gross Irrigable Area 17 ha

LEGEND

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

SCALE

0 1 2 kilometres

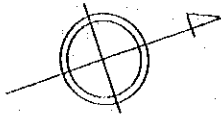
SANGWE TRIBAL TRUST LAND

Guda School

Chief Guda

CHINOKWI

PLAN OF DAM

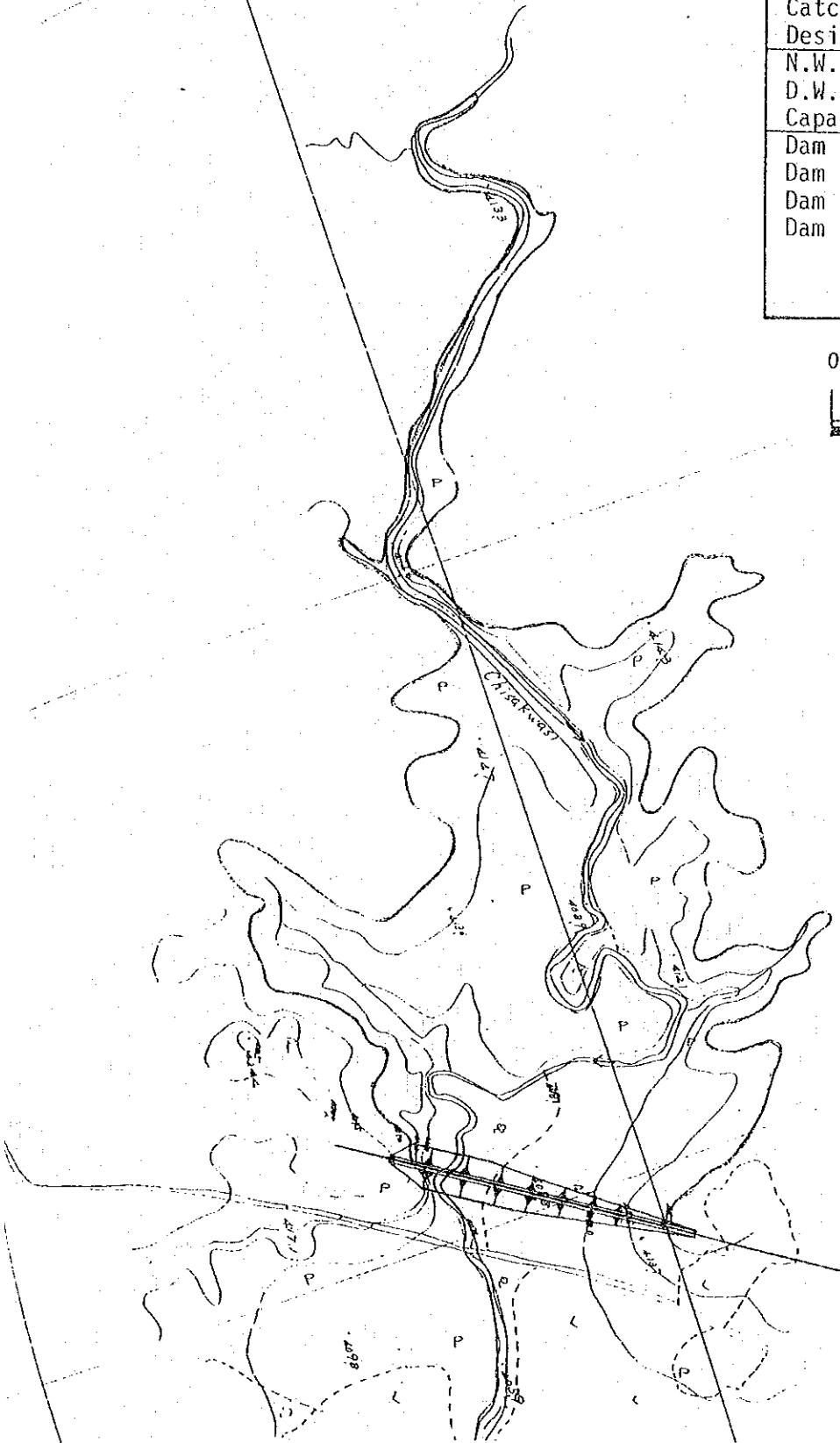


CHISAKWASI

Dam No.	III- 2 - 1
District	Gaza Komanani
Communal L.	Sangwe
River	Chisakwasi
Map Ref.	2032 C1
Coordinate	VN 159097
Catchment A.	115,5 sq.km
Design Flood	563.0 cum/sec
N.W.S.	EL.415.0 m
D.W.S.	EL.411.0 m
Capacity of Res.	1.65 M.C.M.
Dam Top	EL.417.0 m
Dam Height	9.0 m
Dam Length	500 m
Dam Vol.	63,000 cum



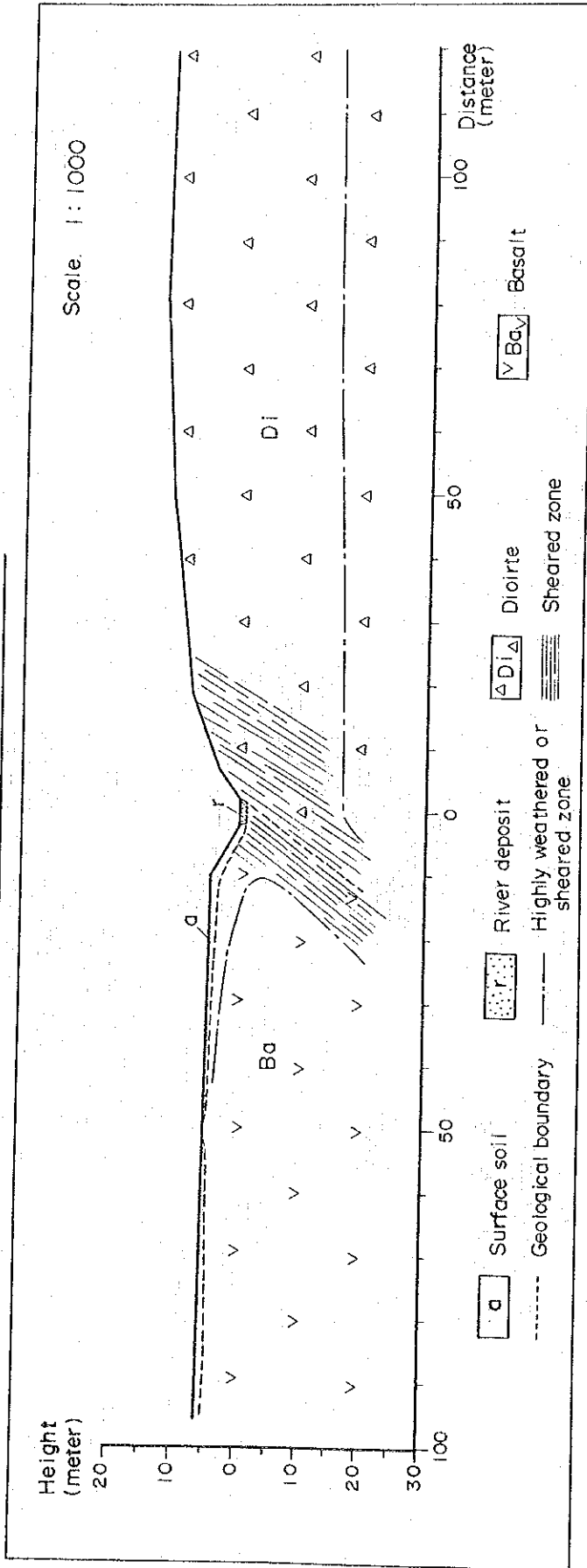
SCALE 1:10 000



771

4/6

III-2-1 Chisakwasi



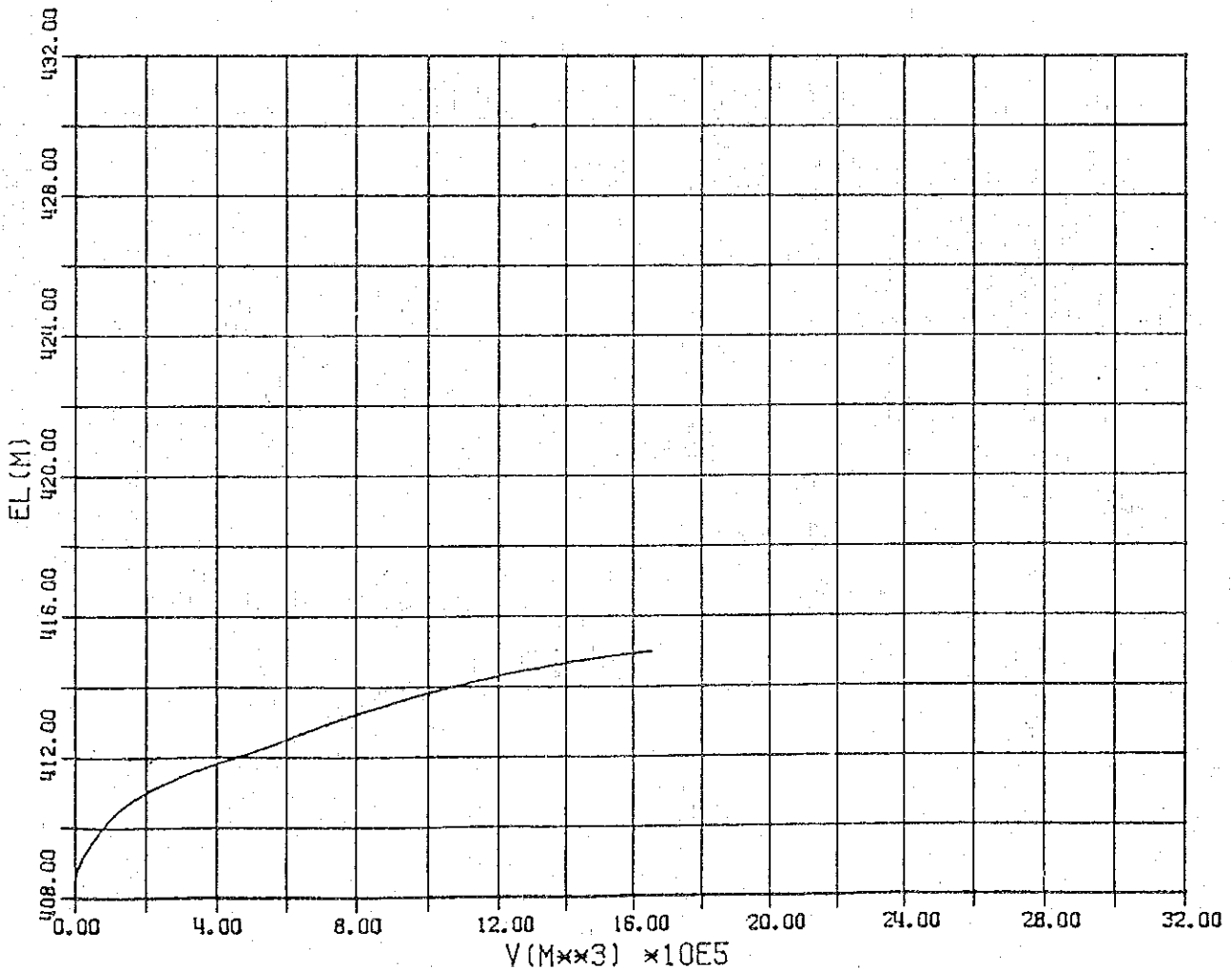
The area is very flat land, and the Chisakwasi River forms narrow and shallow valley. Outcrops are very few in this area.

The bedrock consists of basalt and diorite dyke. The former is massive and hard, however, surrounding rocks of the latter have been changed into boulders by highly weathering. Therefore leakage through the bedrock is large. The bedrock seems to be less suitable for dam foundations in view of large leakage and high cost of foundation treatments.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-2-1	2032C1	VN	159	097

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
408.5	0.0	0	0	0	0.00	
410.0	1.5	103600	51800	77700	77.70	
412.5	2.5	310400	207000	517500	595.20	
415.0	2.5	532700	421550	1053875	1649.07	



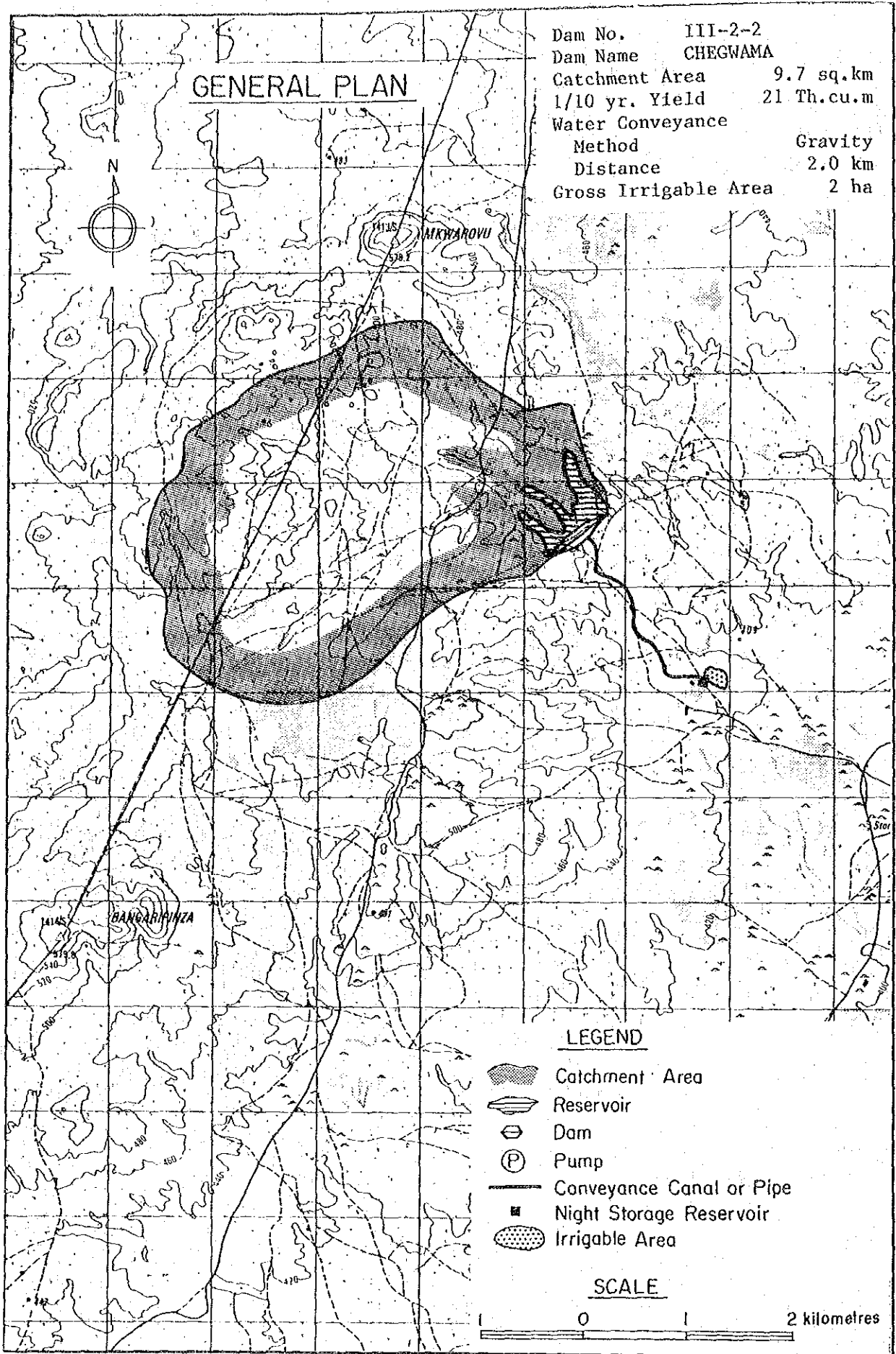
No. III-2-2

Name of Dam Chegwama

Location	District	Gaza Komanani		Communal Land	Sangwe
	Map Ref.	2032C3		Coordinates	VN115005
Geology	Basalt, many photo-lineations are recognized around the damsite, bedrock seems to be soft.				
Hydrology	River	Chegwama		Hydrological Zone	E-S2
	Catchment Area	9.7	sq.km	M.A. Rainfall	570 mm
	M.A. Runoff	31	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	0.880	MCM	1/10 Yr. Yield	0.021 MCM
	Dead Capacity	0.020	MCM	D.W.S.	430 m
	Total Capacity	0.900	MCM	N.W.S.	436 m
Dam	Height	8	m	Length	530 m
	Embankment Volume	60 000	cu.m	Spillway	67 m
Agriculture	Natural Region	V		Soil	SCL-CL
	Potential Irrigable Area	50 ha			
	Proposed Cropping Pattern	C			
Irrigation	Net Irrigable Area	1.1 ha	Dist. 2.0 km by Gravity		
	Topography	Area	Very gentle slope		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	1 545	person	31	cu.m/day
	Livestock	980	unit	44	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 1 363 000	Z\$ 363 000		Z\$ 1 726 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 4 107 /year	Z\$ 48 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	Y	Y
Remarks					

Present Condition on the Ward

Ward Name	1		Area	10 550 ha	
Demography	Population Density		51.5	persons/sq.km	
	Family Size		9.1	Persons/household	
Agriculture	Arable Area		4 000 ha	Grazing Area	6 550 ha
	Maize	1.2	ha/household	7	bags/ha
	Sorghum	3.0	ha/household	11	bags/ha
	Livestock	N.A.	LSUs/household	N.A.	LSUs/sq.km
Rural Water Supply	Borehole	0.06	units/sq.km	905	persons/unit
	Well	N.A.	units/sq.km	N.A.	persons/unit



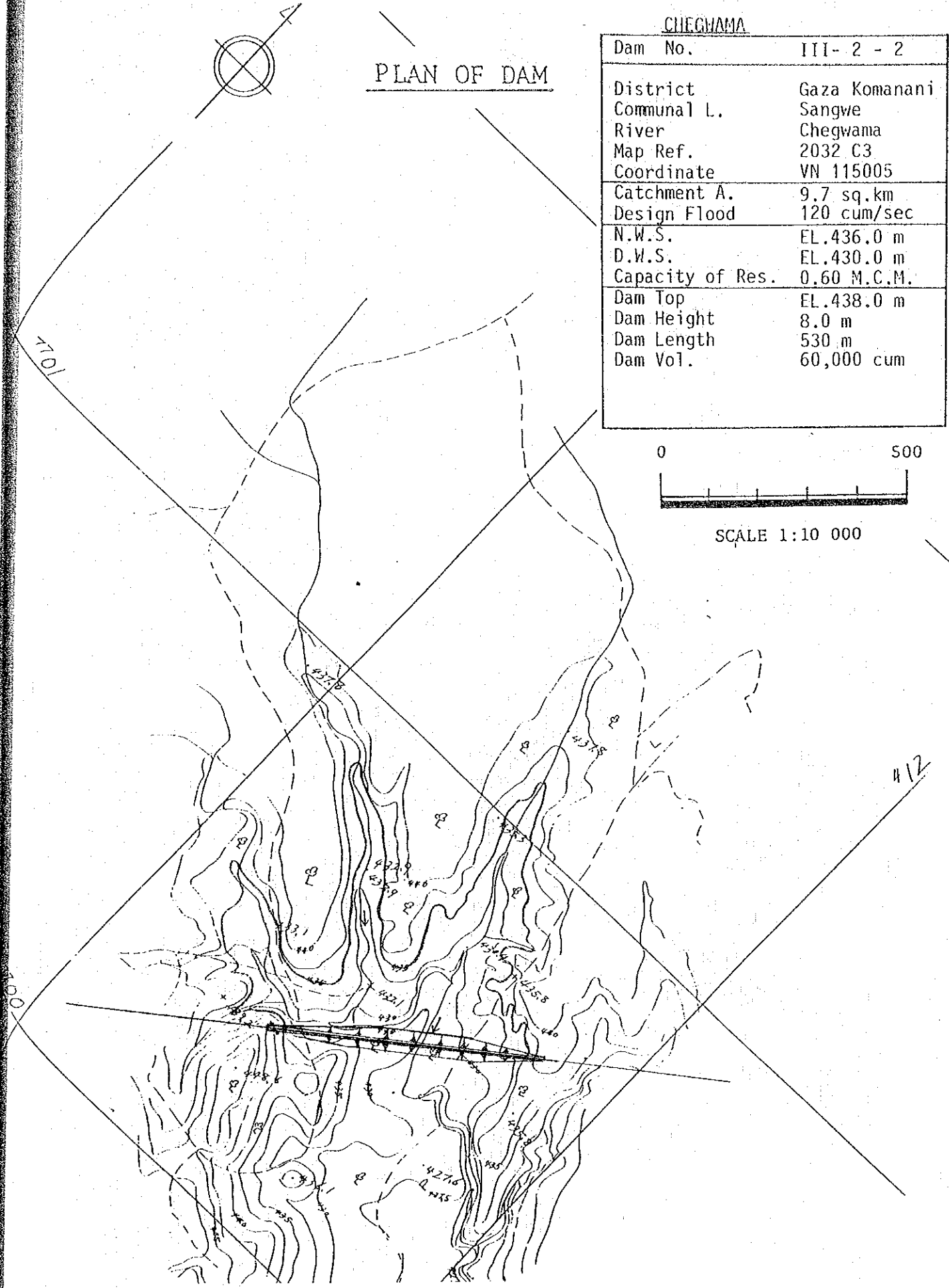
CHEGWAMA

PLAN OF DAM

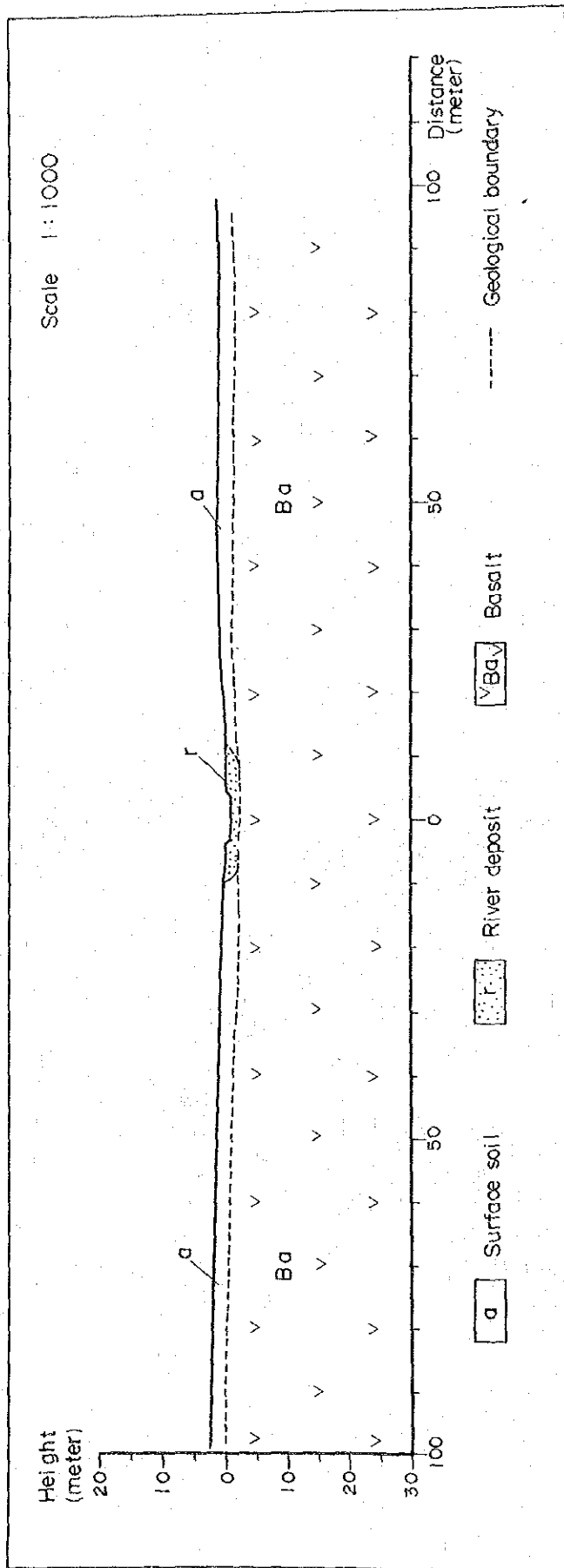
Dam No.	III- 2 - 2
District	Gaza Komanani
Communal L.	Sangwe
River	Chegwama
Map Ref.	2032 C3
Coordinate	VN 115005
Catchment A.	9.7 sq.km
Design Flood	120 cum/sec
N.W.S.	EL.436.0 m
D.W.S.	EL.430.0 m
Capacity of Res.	0.60 M.C.M.
Dam Top	EL.438.0 m
Dam Height	8.0 m
Dam Length	530 m
Dam Vol.	60,000 cum



SCALE 1:10 000



III - 2 - 2 Chegwama



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

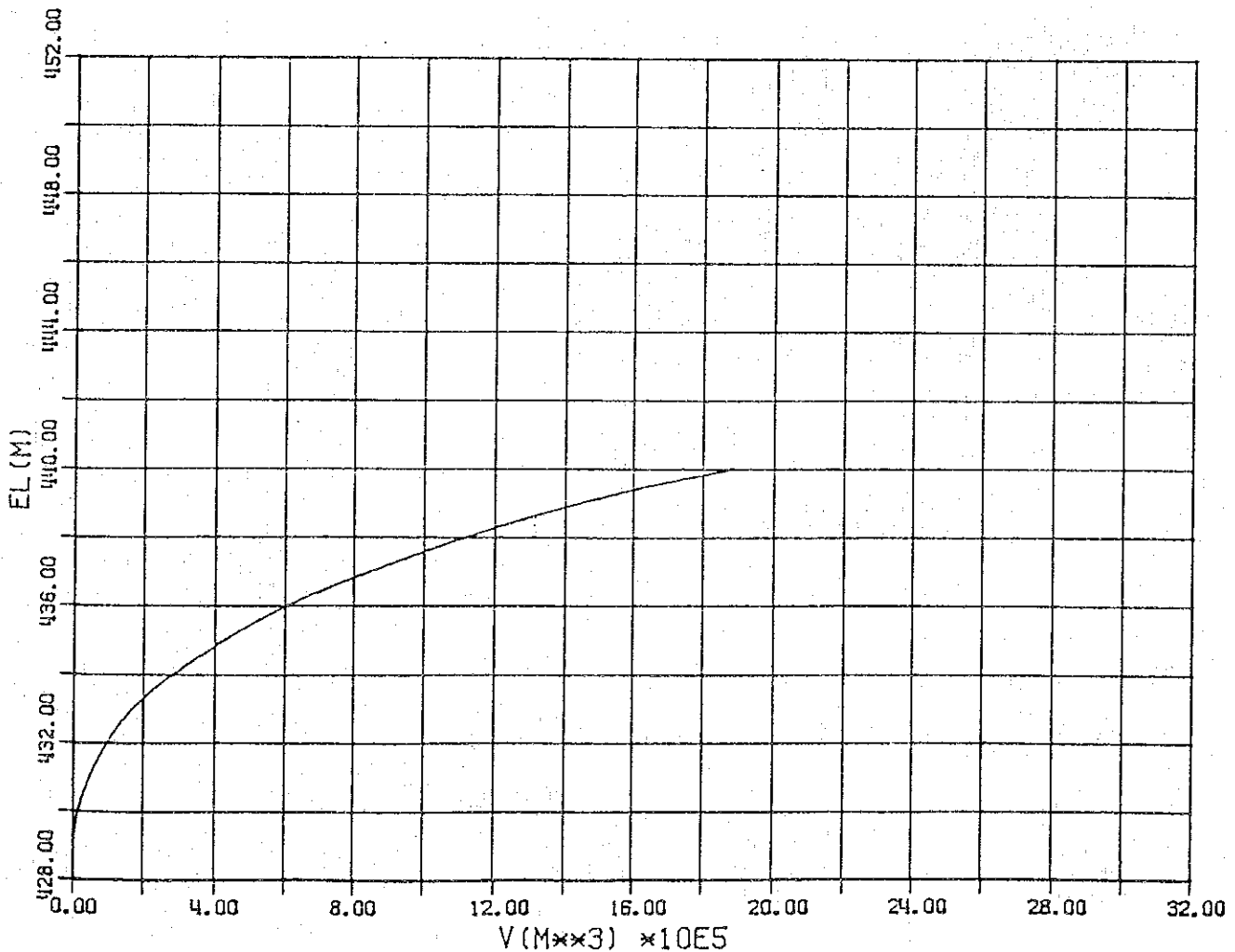
The area is very flat land, and the Chegwama River forms a very shallow and relatively wide valley. Outcrops are very few in this area.

The bedrock consists of basalt. Air-photograph indicates that many lineaments including faults and dykes are distributed along the river, and one of them goes across the damsite. Therefore the bedrock seems to be soft and leakage through the bedrock is large.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-2-2	2032C3	VN	115	005

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
428.5	0.0	0	0	0	0.00	
430.0	1.5	19000	9500	14250	14.25	
432.5	2.5	71200	45100	112750	127.00	
435.0	2.5	165400	118300	295750	422.75	
437.5	2.5	275600	220500	551250	974.00	
440.0	2.5	449500	362550	906375	1880.37	



No. III-2-3

Name of Dam Chompimbi

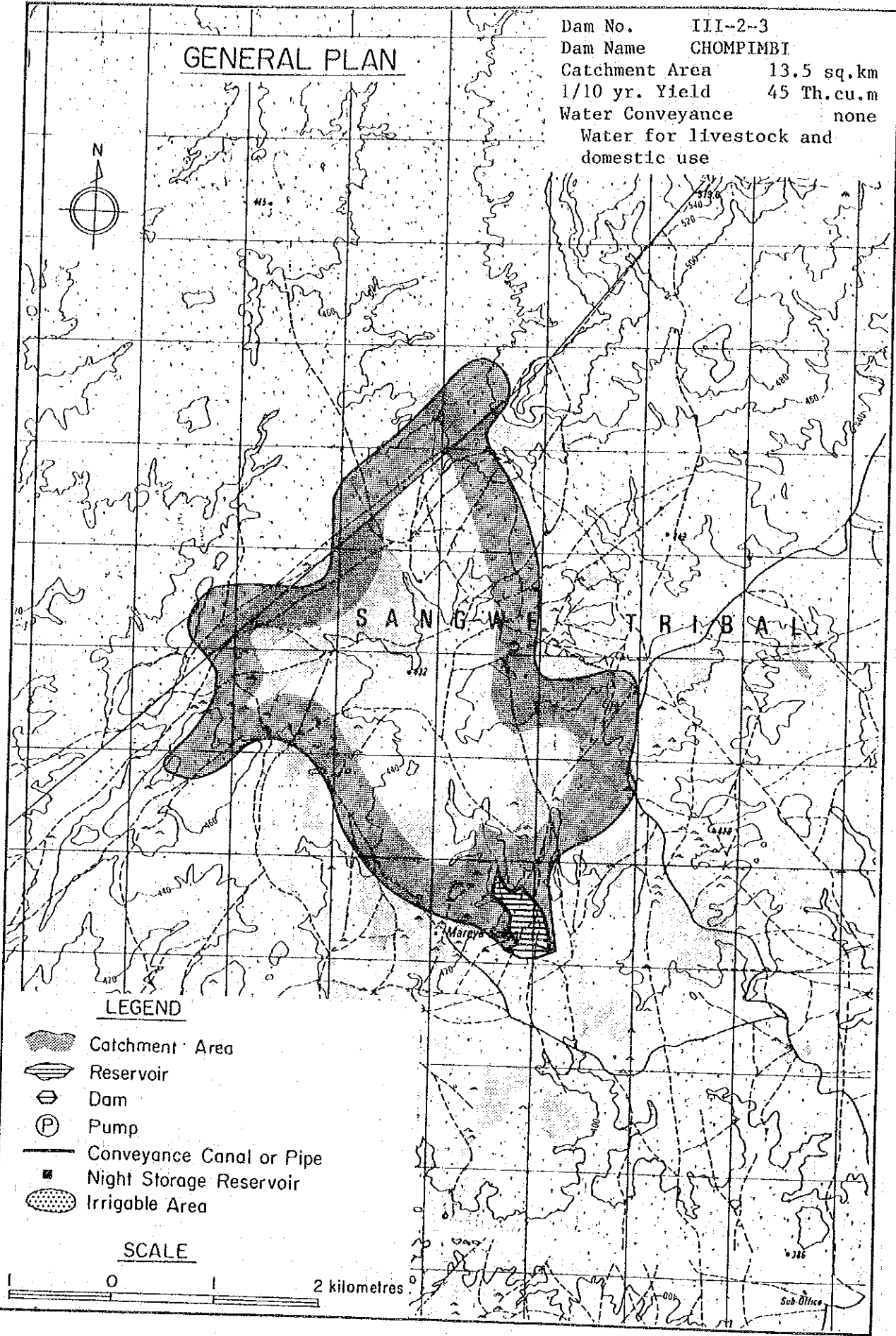
Location	District	Gaza Komanani		Communal Land	Sangwe	
	Map Ref.	2032C3		Coordinates	VM050892	
Geology	Sandstone and the dyke of dolerite. Hard but opened joints are well developed.					
Hydrology	River	Chompimbi		Hydrological Zone	E-S1	
	Catchment Area	13.5	sq.km	M.A. Rainfall	580	mm
	M.A. Runoff	33	mm	Sediment	45	tonnes km ² /yr.
Reservoir	Effective Capacity	0.820	MCM	1/10 Yr. Yield	0.045	MCM
	Dead Capacity	0.030	MCM	D.W.S.	409	m
	Total Capacity	0.850	MCM	N.W.S.	415	m
Dam	Height	9	m	Length	450	m
	Embankment Volume	45 000	cu.m	Spillway	83	m
Agriculture	Natural Region	V		Soil	-	
	Potential Irrigable Area				-	ha
	Proposed Cropping Pattern	-				
Irrigation	Net Irrigable Area	-	ha	Dist.	-	km by -
	Topography	Area	-			
		Conveyance	-			
Rural Water Supply	Population	1 140	person		23	cu.m/day
	Livestock	980	unit		44	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class	
	Z\$ 564 000	-		Z\$ 564 000		
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	C	
	Z\$ 2 301 /year	Z\$ 27 000		-		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist	
	Y	Y	Y	Y	Y	
Remarks						

Present Condition on the Ward








Ward Name	2		Area	15 000 ha	
Demography	Population Density		38.0	persons/sq.km	
	Family Size		9.3	Persons/household	
Agriculture	Arable Area		6 900 ha	Grazing Area 8 100 ha	
	Maize	0.2	ha/household	7	bags/ha
	Sorghum	4.9	ha/household	11	bags/ha
	Livestock	N.A	LSUs/household	N.A	LSUs/sq.km
Rural Water Supply	Borehole		0.04	units/sq.km	950 persons/unit
	Well		N.A	units/sq.km	N.A persons/unit

GENERAL PLAN

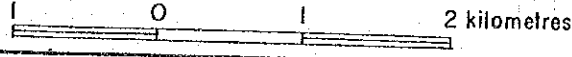
Dam No. III-2-3
Dam Name CHOMPIMBI
Catchment Area 13.5 sq.km
1/10 yr. Yield 45 Th.cu.m
Water Conveyance none
Water for livestock and domestic use



LEGEND

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

SCALE



CHOMPIBI

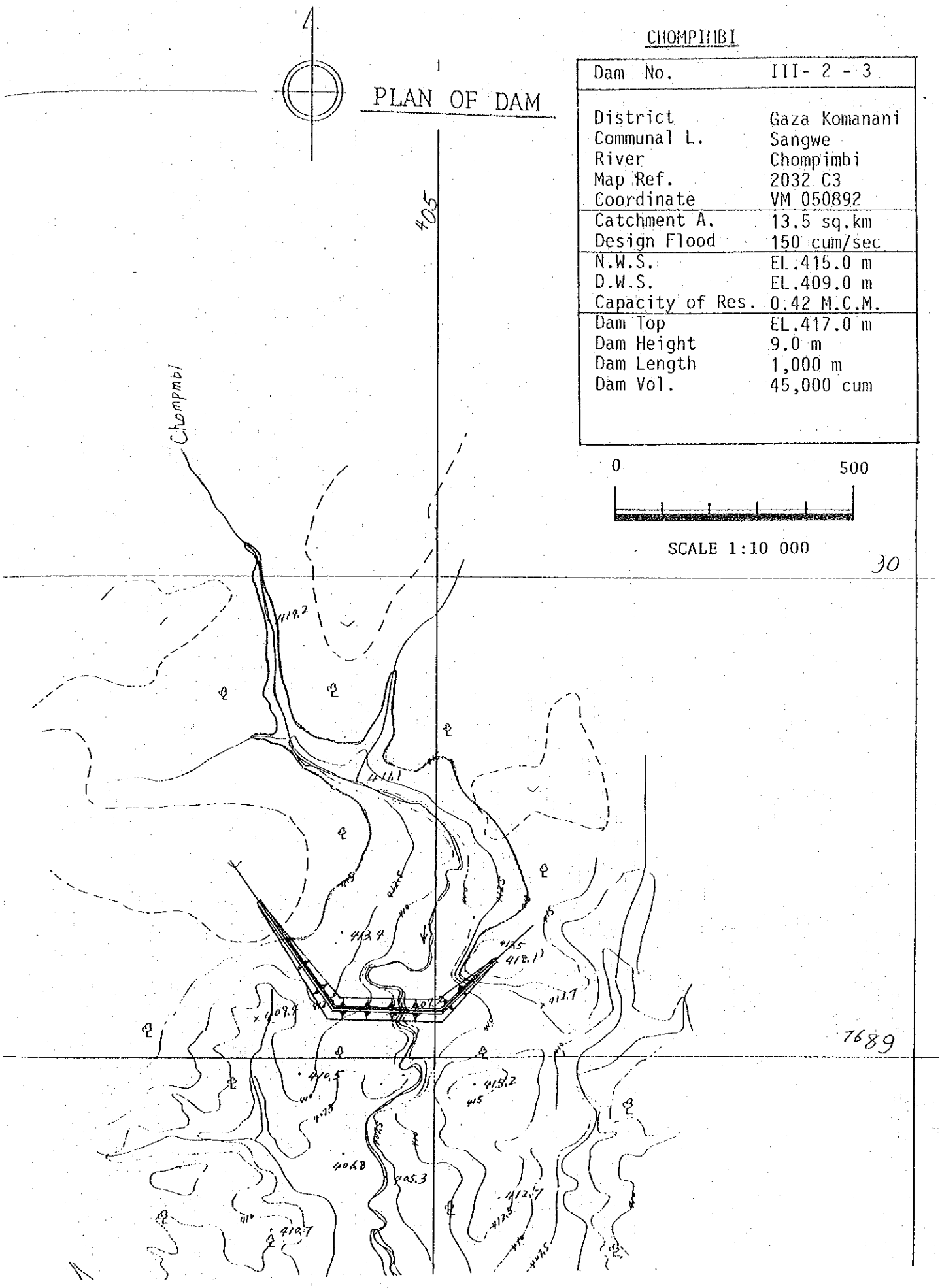
PLAN OF DAM

Dam No.	III- 2 - 3
District	Gaza Komanani
Communal L.	Sangwe
River	Chompimbi
Map Ref.	2032 C3
Coordinate	VM 050892
Catchment A.	13.5 sq.km
Design Flood	150 cum/sec
N.W.S.	EL.415.0 m
D.W.S.	EL.409.0 m
Capacity of Res.	0.42 M.C.M.
Dam Top	EL.417.0 m
Dam Height	9.0 m
Dam Length	1,000 m
Dam Vol.	45,000 cum



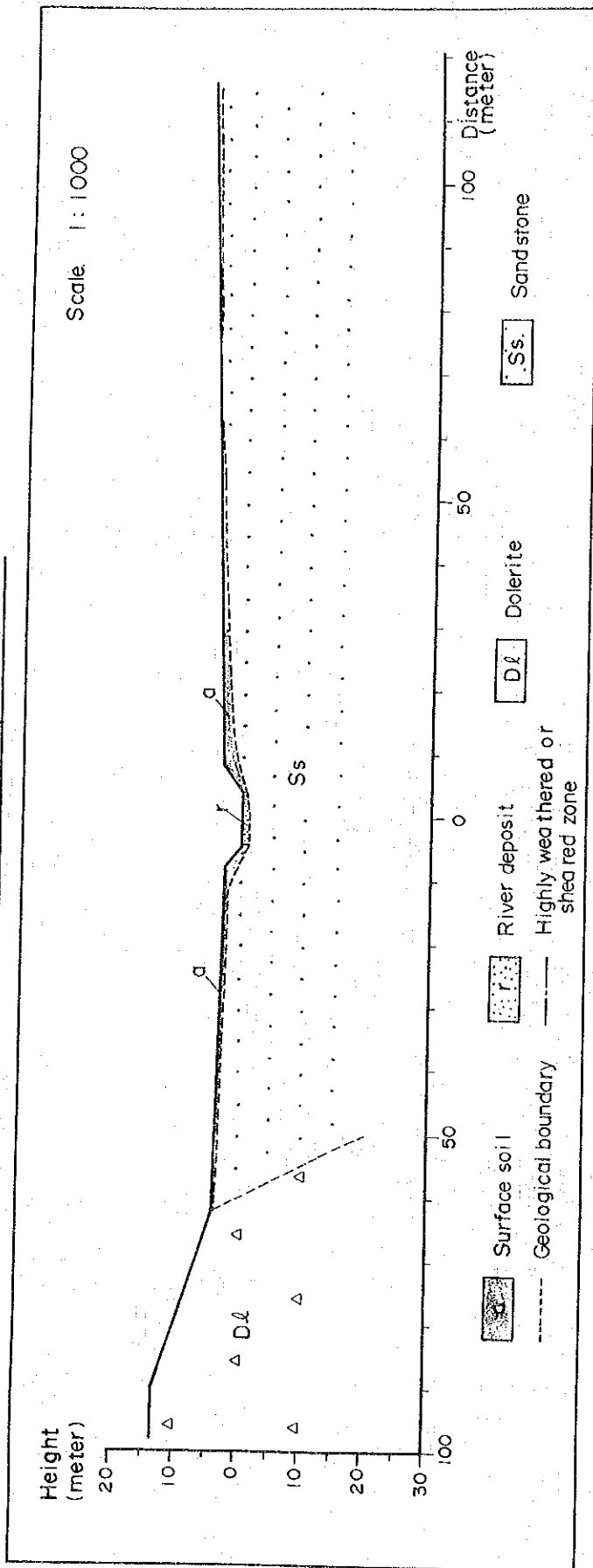
SCALE 1:10 000

30



7689

III-2-3 Chompimbi



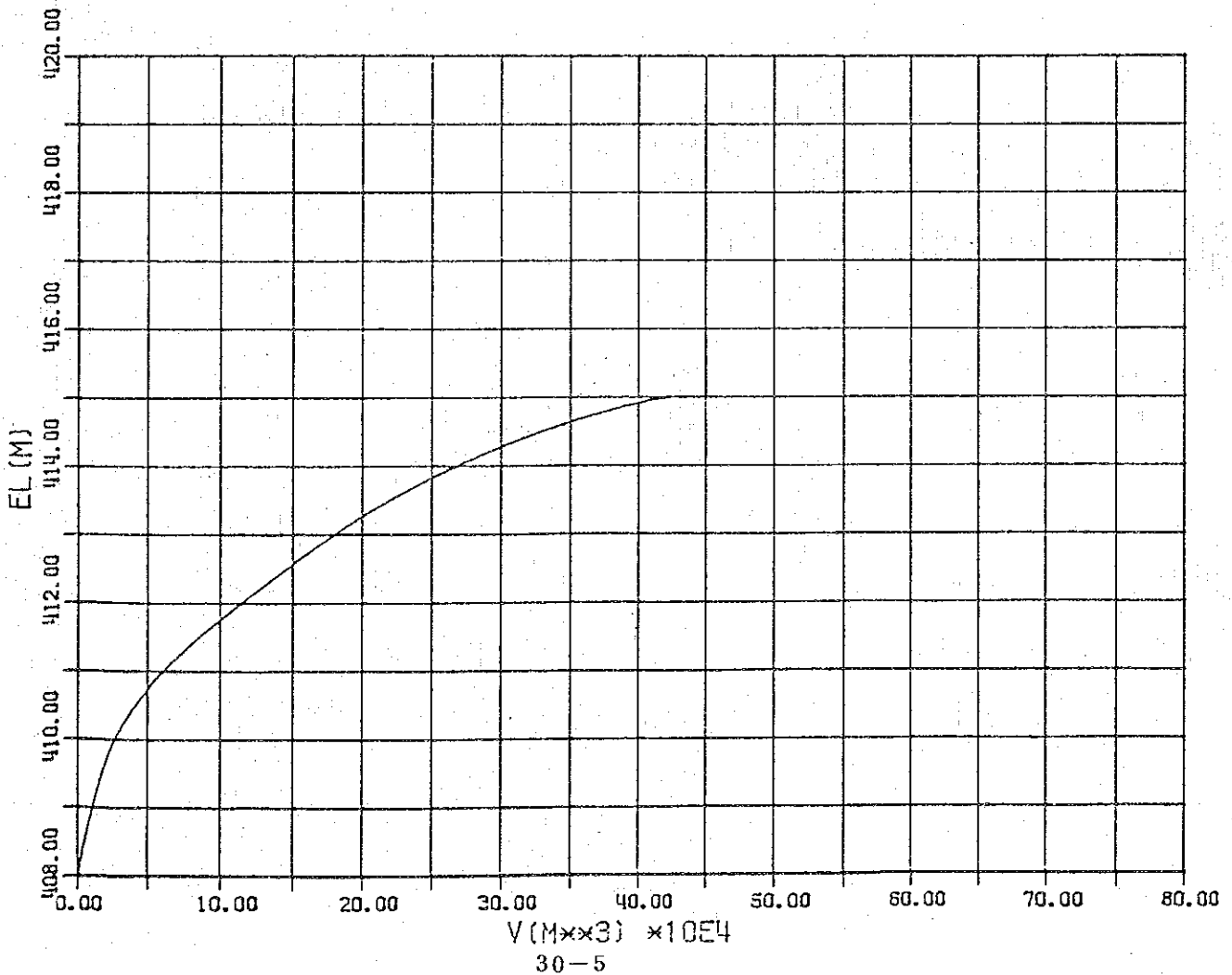
The bedrock consists of fine sandstone and dolerite dyke. Both of them are fine grained and hard. However they are well jointed, and partly have been changed into boulders. Leakage through the bedrock seems to be considerably large. The body of the right abutment of the dam is very thin, therefore leakage through the body also must be taken into consideration.

Unconsolidated deposit is estimated to be less than 1 meter.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-2-3	2032C3	VM	050	892

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
408.0	0.0	0	0	0	0.00	
410.0	2.0	26500	13250	26500	26.50	
412.5	2.5	68700	47600	119000	145.50	
415.0	2.5	152700	110700	276750	422.25	



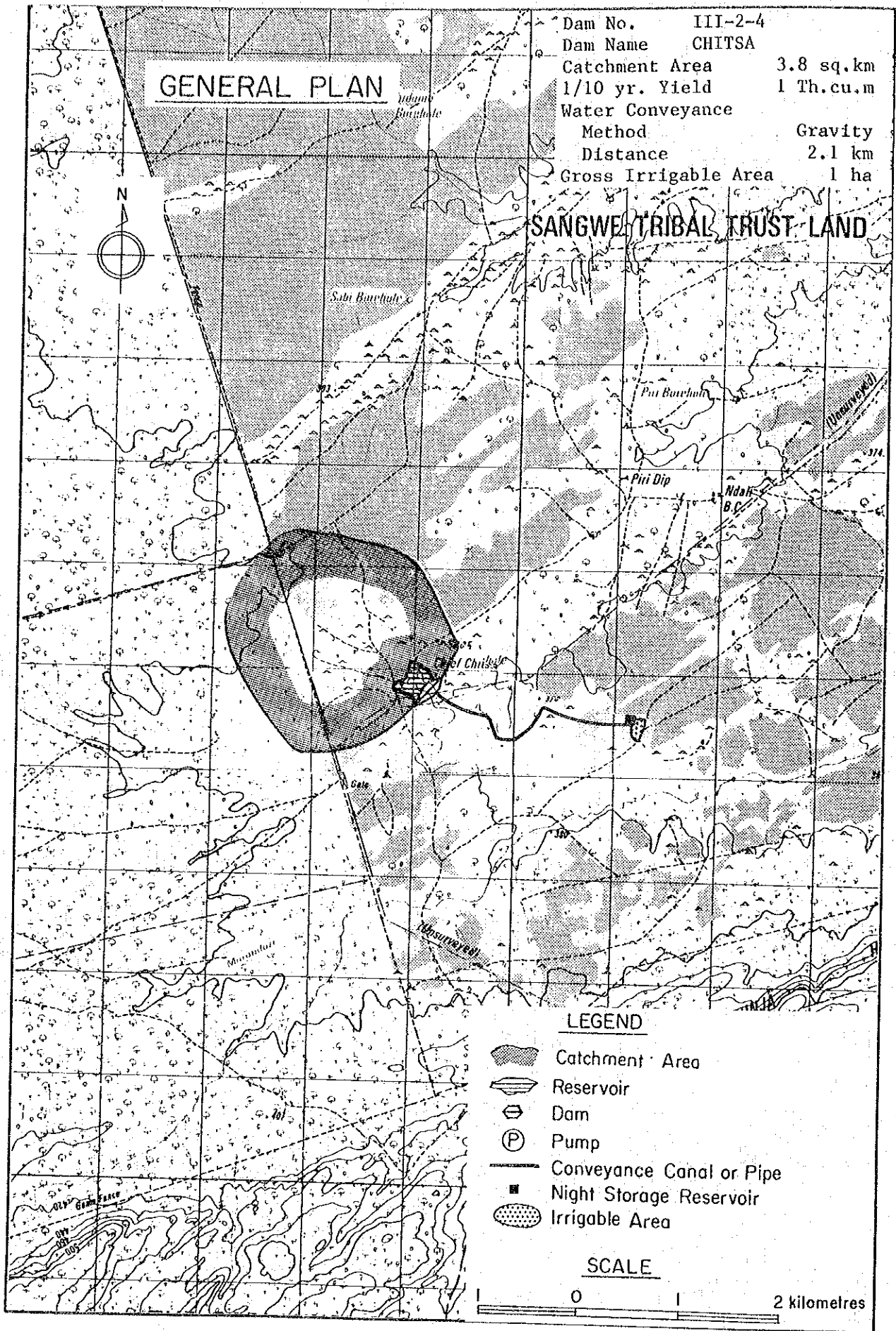
No. III-2-4

Name of Dam Chitsa

Location	District	Gaza Komanani		Communal Land	Sangwe
	Map Ref.	2132A1		Coordinates	VM092649
Geology	Basalt and the dyke of diorite, very flat terrain.				
Hydrology	River	(T) Murondozi		Hydrological Zone	E-S1
	Catchment Area	3.8	sq.km	M.A. Rainfall	570 mm
	M.A. Runoff	31	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	0.330	MCM	1/10 Yr. Yield	0.001 MCM
	Dead Capacity	0.020	MCM	D.W.S.	381 m
	Total Capacity	0.350	MCM	N.W.S.	385 m
Dam	Height	7	m	Length	1 000 m
	Embankment Volume	57 000	cu.m	Spillway	36 m
Agriculture	Natural Region	V		Soil	SL
	Potential Irrigable Area	100 ha			
	Proposed Cropping Pattern	D			
Irrigation	Net Irrigable Area	0.1 ha	Dist. 2.1 km by Gravity		
	Topography	Area	Gentle slope		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	4 428	person	89	cu.m/day
	Livestock	980	unit	44	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 745 000	Z\$ 367 000		Z\$1 112 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 4 360 /year	Z\$ 51 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

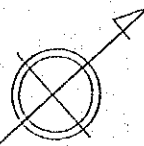
Ward Name	3		Area	4 200 ha	
Demography	Population Density		147.6	persons/sq.km	
	Family Size		10.2	Persons/household	
Agriculture	Arable Area		2 200 ha	Grazing Area 2 000 ha	
	Maize	0.7	ha/household	7	bags/ha
	Sorghum	1.7	ha/household	11	bags/ha
	Livestock	N.A	LSUs/household	N.A	LSUs/sq.km
Rural Water Supply	Borehole	0.17	units/sq.km	886	persons/unit
	Well	0.02	units/sq.km	6 200	persons/unit



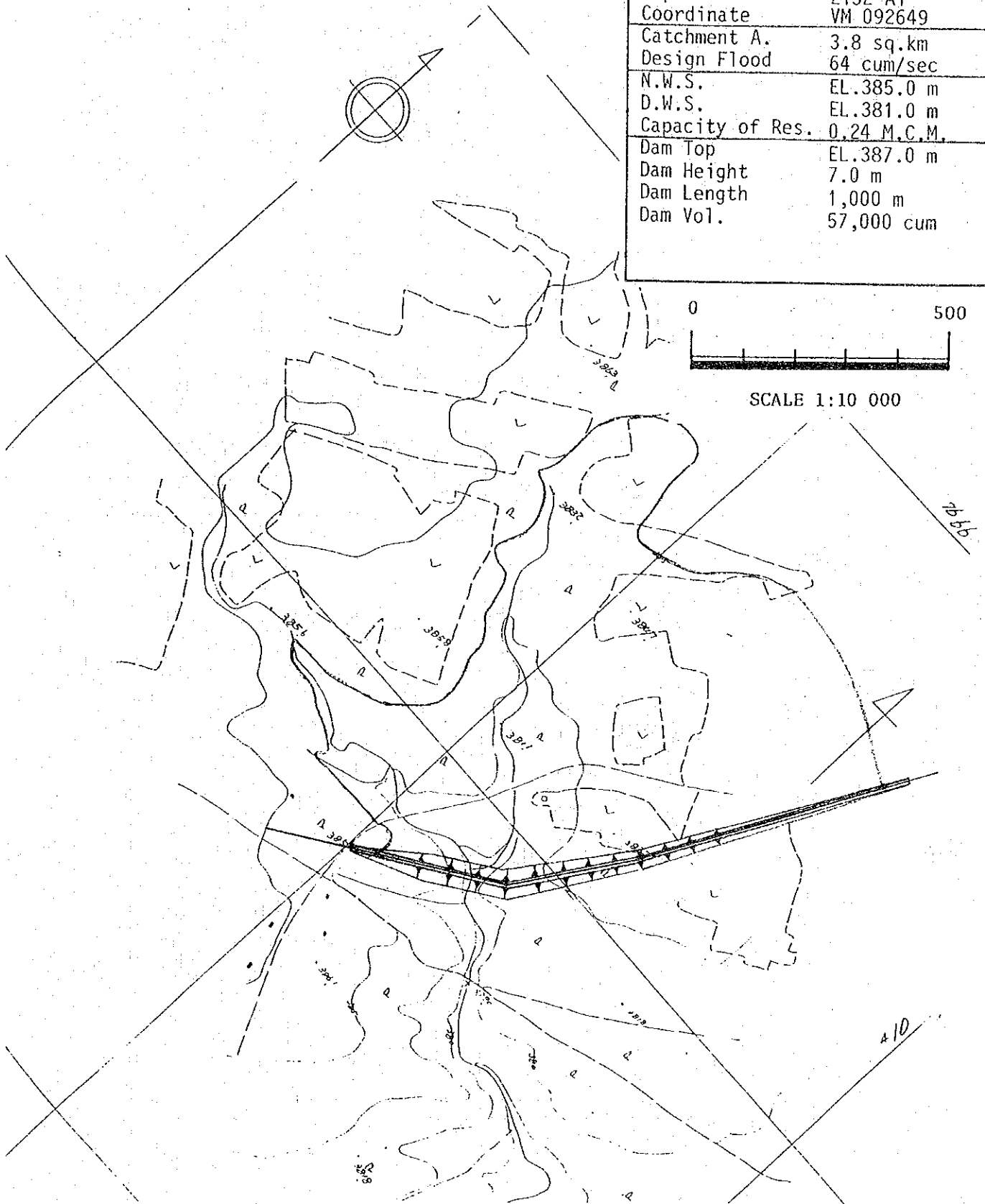
CHITSA

PLAN OF DAM

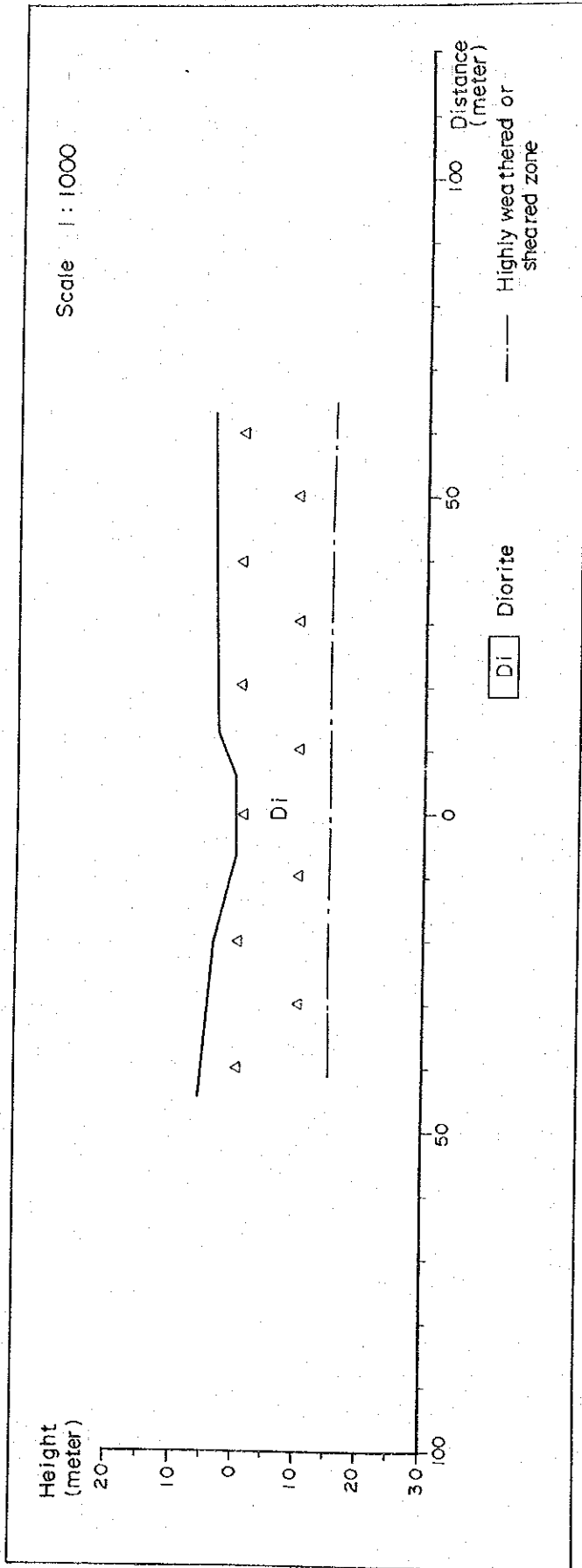
Dam No.	III- 2 - 4
District	Gaza Komanani
Communal L.	Sangwe
River	(T)Murondozi
Map Ref.	2132 A1
Coordinate	VM 092649
Catchment A.	3.8 sq.km
Design Flood	64 cum/sec
N.W.S.	EL.385.0 m
D.W.S.	EL.381.0 m
Capacity of Res.	0.24 M.C.M.
Dam Top	EL.387.0 m
Dam Height	7.0 m
Dam Length	1,000 m
Dam Vol.	57,000 cum



SCALE 1:10 000



III-2-4 Chitso

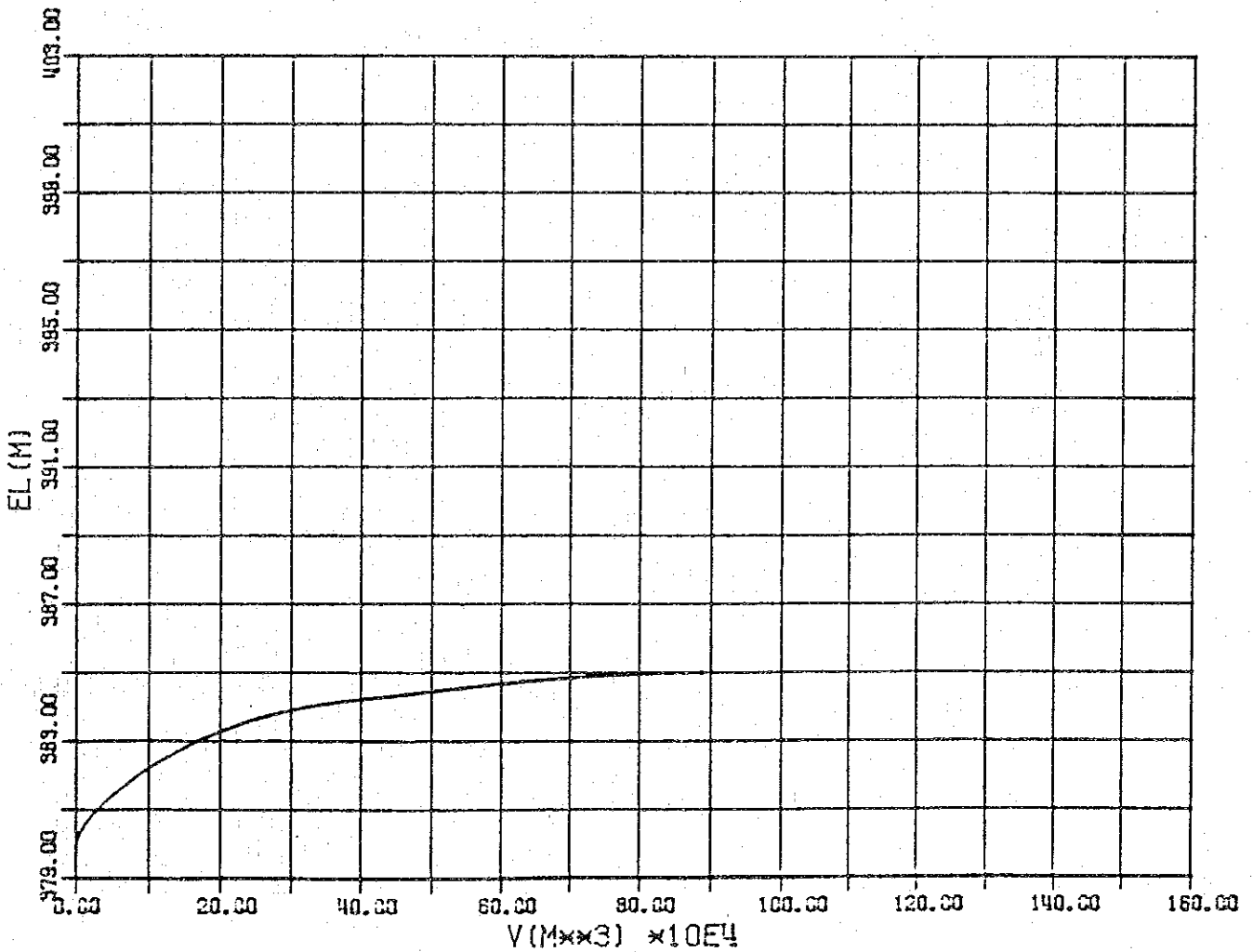


The area is very flat land, and the River forms very shallow and narrow valley. Outcrops are very few. The bedrock consists of basalt and diorite dyke. The former is generally massive and hard. The latter is fine grained, hard and in parallel with the damaxis, however it is well jointed at intervals of 50 to 20 centimeters. Leakage through the bedrock is considerably large.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
III-2-4	2132A1	VM	092	649

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
379.4	0.0	0	0	0	0.00	
380.0	0.6	5000	2500	1500	1.50	
382.5	2.5	86000	45500	119750	115.25	
385.0	2.5	532000	309000	772500	887.75	



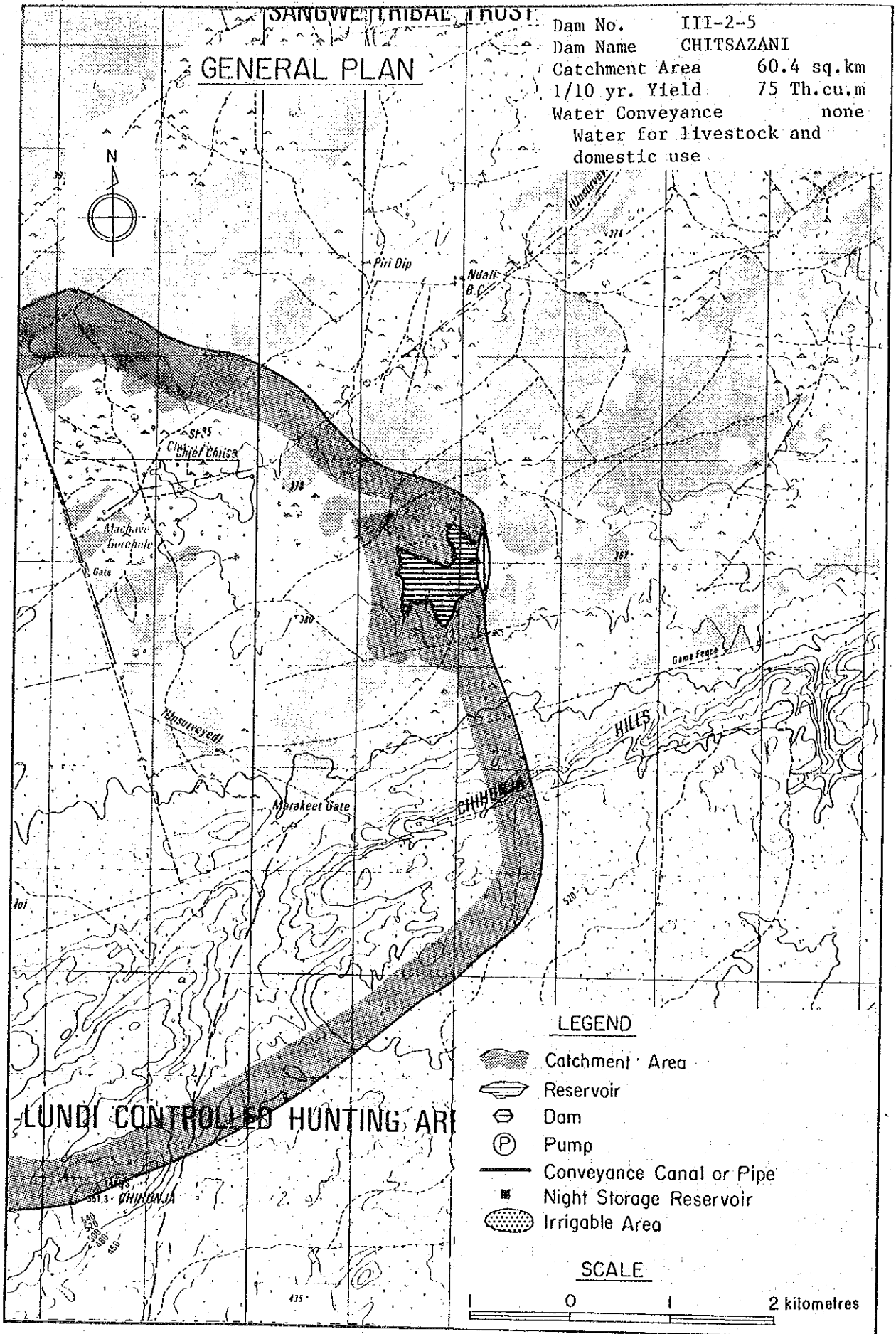
No. III-2-5

Name of Dam Chitsazani

Location	District	Gaza Komanani		Communal Land	Sangwe	
	Map Ref.	2132A1		Coordinates	VM122640	
Geology	Basalt, very flat terrain, highly weathered and very soft.					
Hydrology	River	Murondozi		Hydrological Zone	E-S1	
	Catchment Area	60.4	sq.km	M.A. Rainfall	570 mm	
	M.A. Runoff	31	mm	Sediment	45 tonnes km ² /yr.	
Reservoir	Effective Capacity	0.330	MCM	1/10 Yr. Yield	0.075 MCM	
	Dead Capacity	0.020	MCM	D.W.S.	372 m	
	Total Capacity	0.350	MCM	N.W.S.	375 m	
Dam	Height	7	m	Length	1 000 m	
	Embankment Volume	69 000	cu.m	Spillway	210 m	
Agriculture	Natural Region	V		Soil	-	
	Potential Irrigable Area				- ha	
	Proposed Cropping Pattern				-	
Irrigation	Net Irrigable Area	-	ha	Dist.	- km by -	
	Topography	Area			-	
		Conveyance				-
Rural Water Supply	Population	1 887 person			38 cu.m/day	
	Livestock	980 unit			44 cu.m/day	
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class	
	Z\$ 2 241 000	-		Z\$ 2 241 000		
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	C	
	Z\$ 3 572 /year	Z\$ 42 000		-		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist	
	Y	Y	Y	N	N	
Remarks						

Present Condition on the Ward

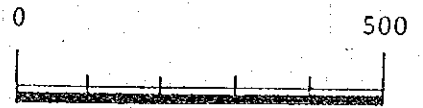
Ward Name	5		Area	9 700 ha	
Demography	Population Density		62.9	persons/sq.km	
	Family Size		10.2	Persons/household	
Agriculture	Arable Area	4 500 ha	Grazing Area	5 200 ha	
	Maize	1.2 ha/household	7	bags/ha	
	Sorghum	3.2 ha/household	11	bags/ha	
	Livestock	N.A LSUs/household	N.A	LSUs/sq.km	
Rural Water Supply	Borehole	0.09 units/sq.km	678	persons/unit	
	Well	0.02 units/sq.km	3 050	persons/unit	



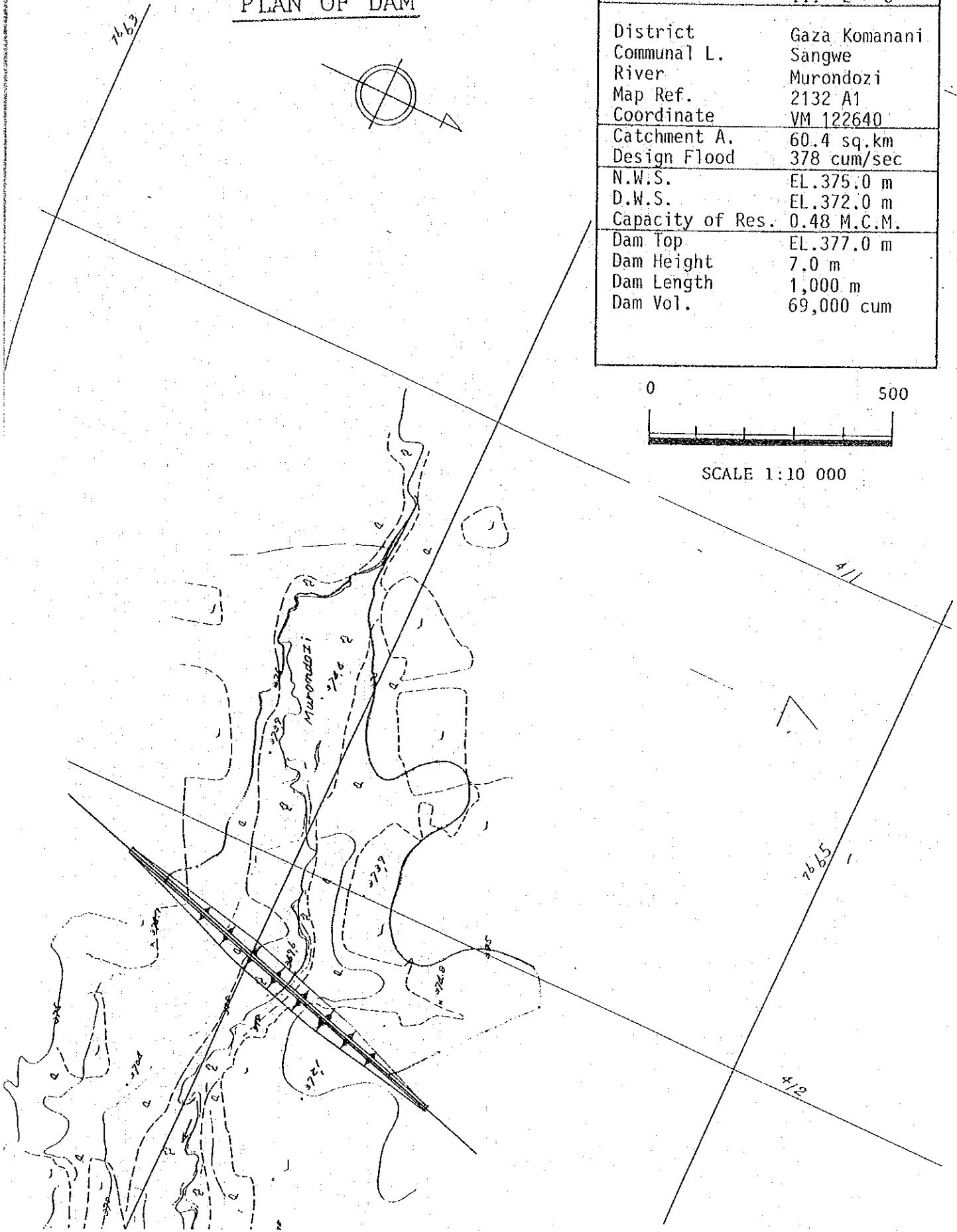
PLAN OF DAM

CHITSAZANI

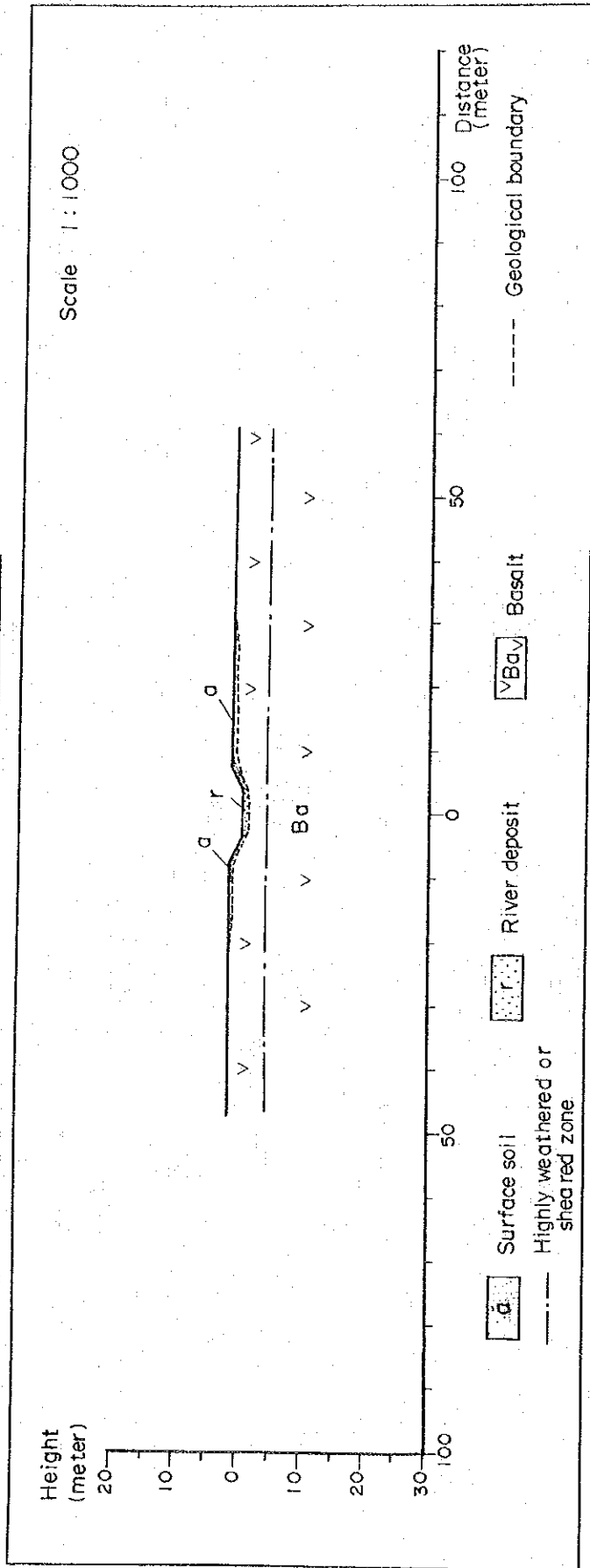
Dam No.	III- 2 - 5
District	Gaza Komanani
Communal L.	Sangwe
River	Murondozi
Map Ref.	2132 A1
Coordinate	VM 122640
Catchment A.	60.4 sq.km
Design Flood	378 cum/sec
N.W.S.	EL.375.0 m
D.W.S.	EL.372.0 m
Capacity of Res.	0.48 M.C.M.
Dam Top	EL.377.0 m
Dam Height	7.0 m
Dam Length	1,000 m
Dam Vol.	69,000 cum



SCALE 1:10 000



III-2-5 Chitsazani



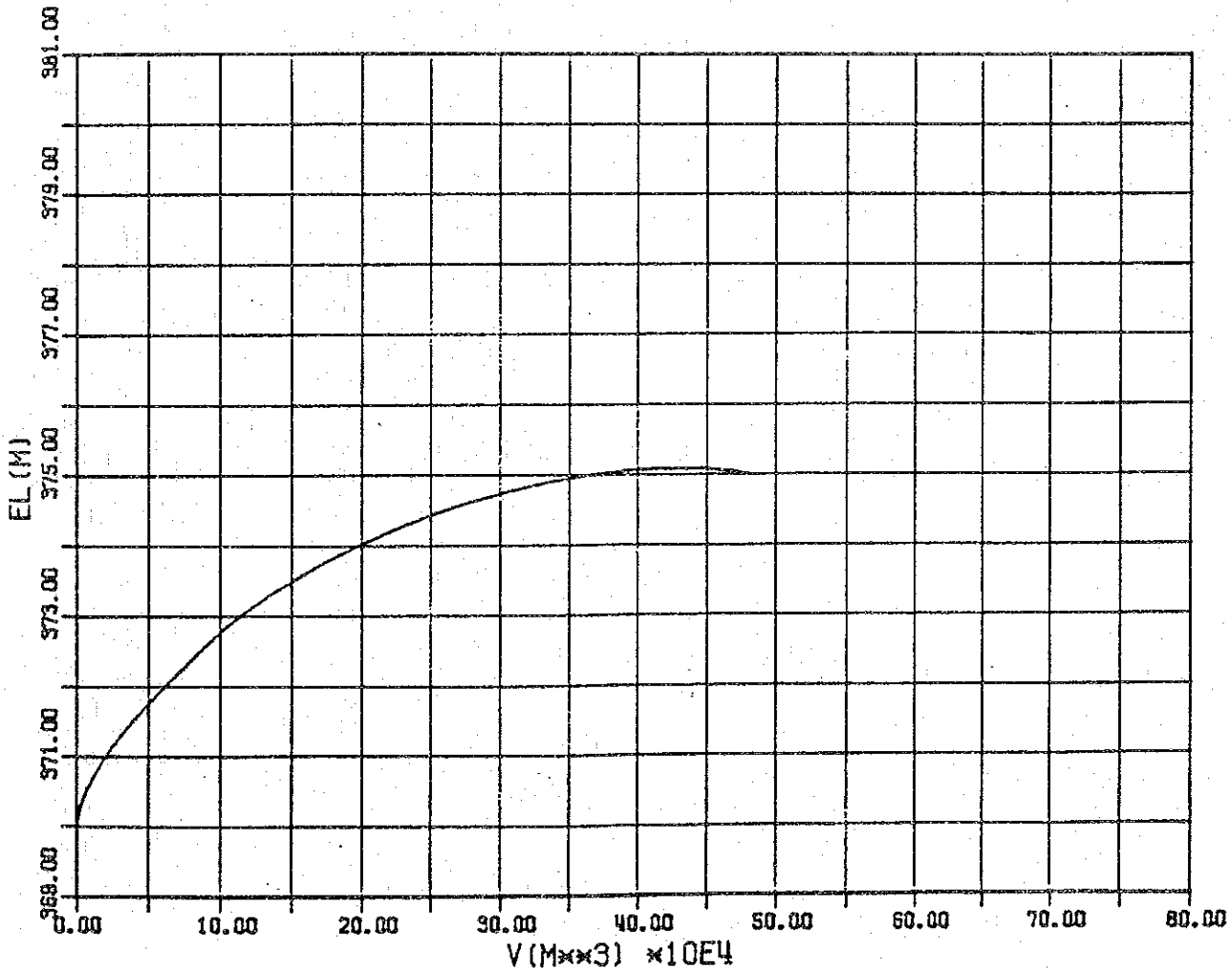
The area is very flat land, and the Murondozi River forms very shallow and narrow valley. Outcrops are very few.

The bedrock consists of basalt. It is massive, however at the surface it is very soft by weathering. The weathering layer is estimated to be more than 10 meters thick. Leakage through the bedrock seems to be very large. The estimated thickness of unconsolidated deposits is less than 2 meters.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
III-2-5	2132A1	VM	122	641

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΔV (100CM ³)	NOTE
369.6	0.0	0	0	0	0.00	
370.0	0.4	2000	1000	400	0.40	
372.5	2.5	66000	34000	85000	85.40	
375.0	2.5	250000	158000	395000	480.40	



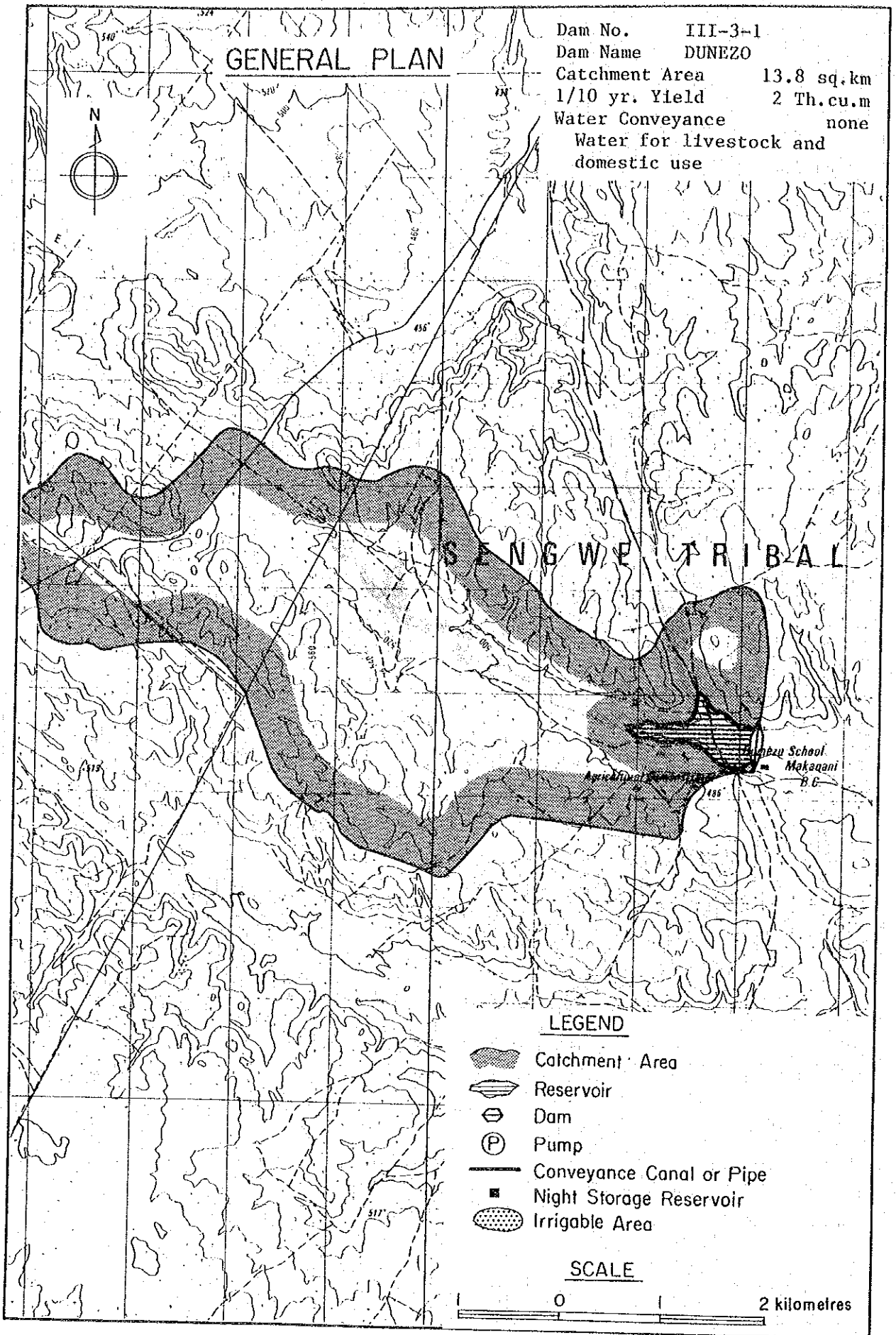
No. III-3-1

Name of Dam Dunezo

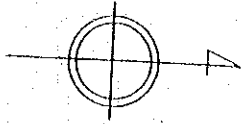
Location	District	Gaza Komanani		Communal Land	Sengwe
	Map Ref.	2131C3		Coordinates	UL132736
Geology	Basalt, it seems to be soft and well jointed from the airphoto-reading.				
Hydrology	River	(T) Mase		Hydrological Zone	B-N1
	Catchment Area	13.8	sq.km	M.A. Rainfall	470 mm
	M.A. Runoff	15	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	0.200	MCM	1/10 Yr. Yield	0.002 MCM
	Dead Capacity	0.010	MCM	D.W.S.	474 m
	Total Capacity	0.210	MCM	N.W.S.	479 m
Dam	Height	9	m	Length	350 m
	Embankment Volume	31 000	cu.m	Spillway	83 m
Agriculture	Natural Region	V		Soil	-
	Potential Irrigable Area	- ha			
	Proposed Cropping Pattern	-			
Irrigation	Net Irrigable Area	-	ha	Dist.	- km by -
	Topography	Area	-		
		Conveyance	-		
Rural Water Supply	Population	395	person	8	cu.m/day
	Livestock	910	unit	41	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 1 455 000	-		Z\$ 1 455 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 1 253 /year	Z\$ 15 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	N	Y	Y	Y
Remarks					

Present Condition on the Ward

Ward Name	I		Area	89 000	ha
Demography	Population Density		7.9	persons/sq.km	
	Family Size		8.8	Persons/household	
Agriculture	Arable Area		9 000	ha	
	Maize	1.3	ha/household	7	bags/ha
	Sorghum	3.8	ha/household	11	bags/ha
	Livestock	3.7	LSUs/household	3.4	LSUs/sq.km
Rural Water Supply	Borehole	0.01	units/sq.km	875	persons/unit
	Well	-	units/sq.km	-	persons/unit

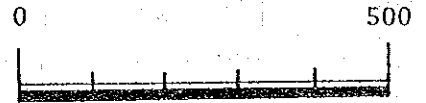


DUMEZO



PLAN OF DAM

Dam No.	III- 3 - 1
District	Gaza Komanani
Communal L.	Sengwe
River	(T)Mase
Map Ref.	2131 C3
Coordinate	UL 132736
Catchment A.	13.8 sq.km
Design Flood	150 cum/sec
N.W.S.	EL.479.0 m
D.W.S.	EL.474.0 m
Capacity of Res.	0.41 M.C.M.
Dam Top	EL.481.0 m
Dam Height	9.0 m
Dam Length	350 m
Dam Vol.	31,000 cum

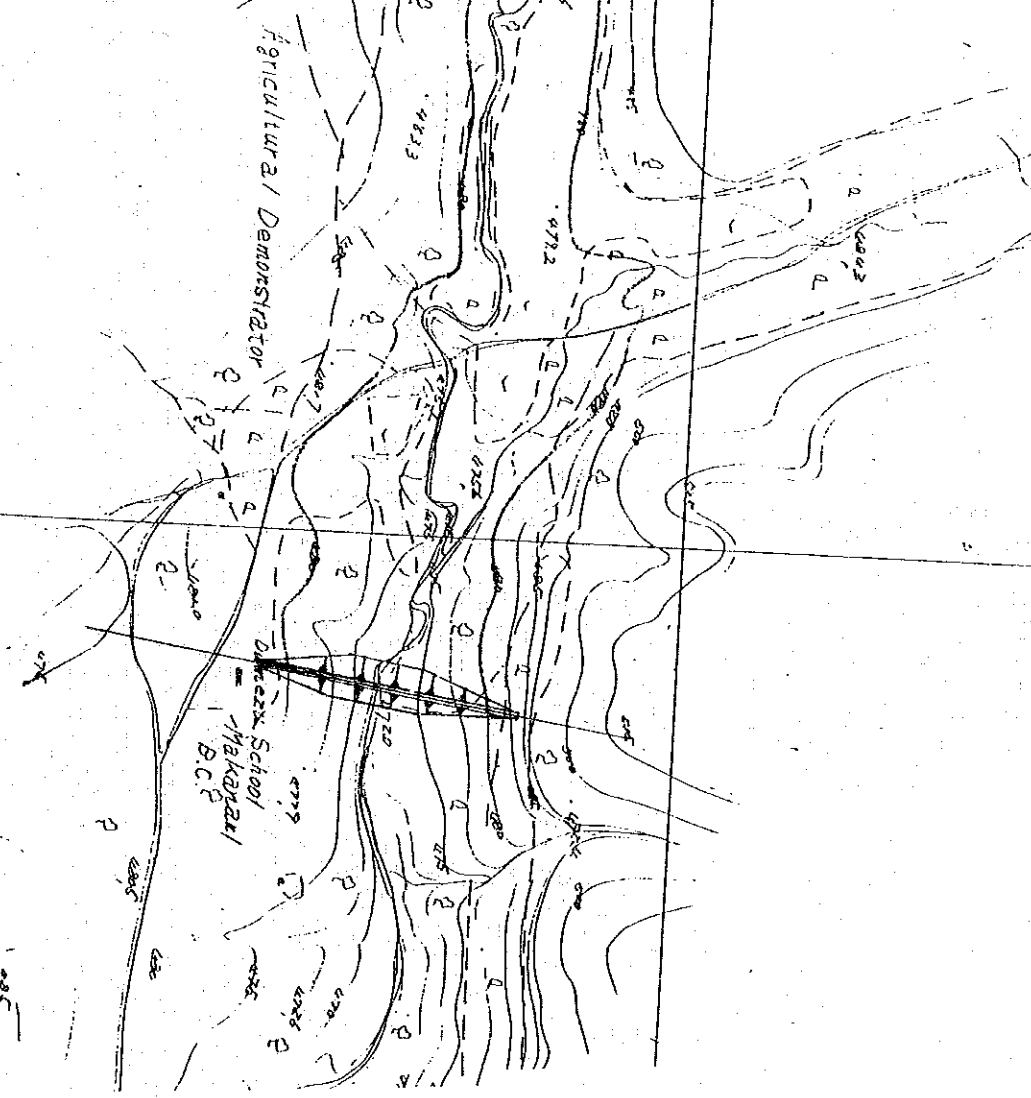


SCALE 1:10 000

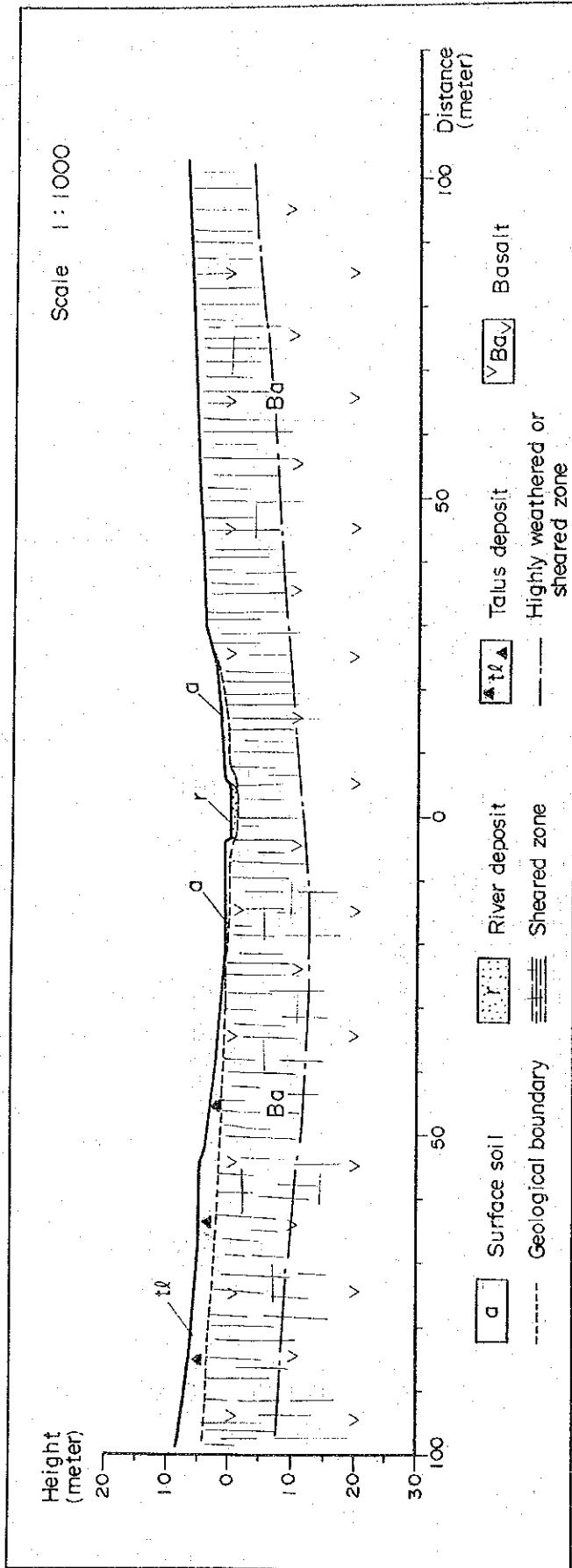
7573

7574

313



III-3-1 Dunezo



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

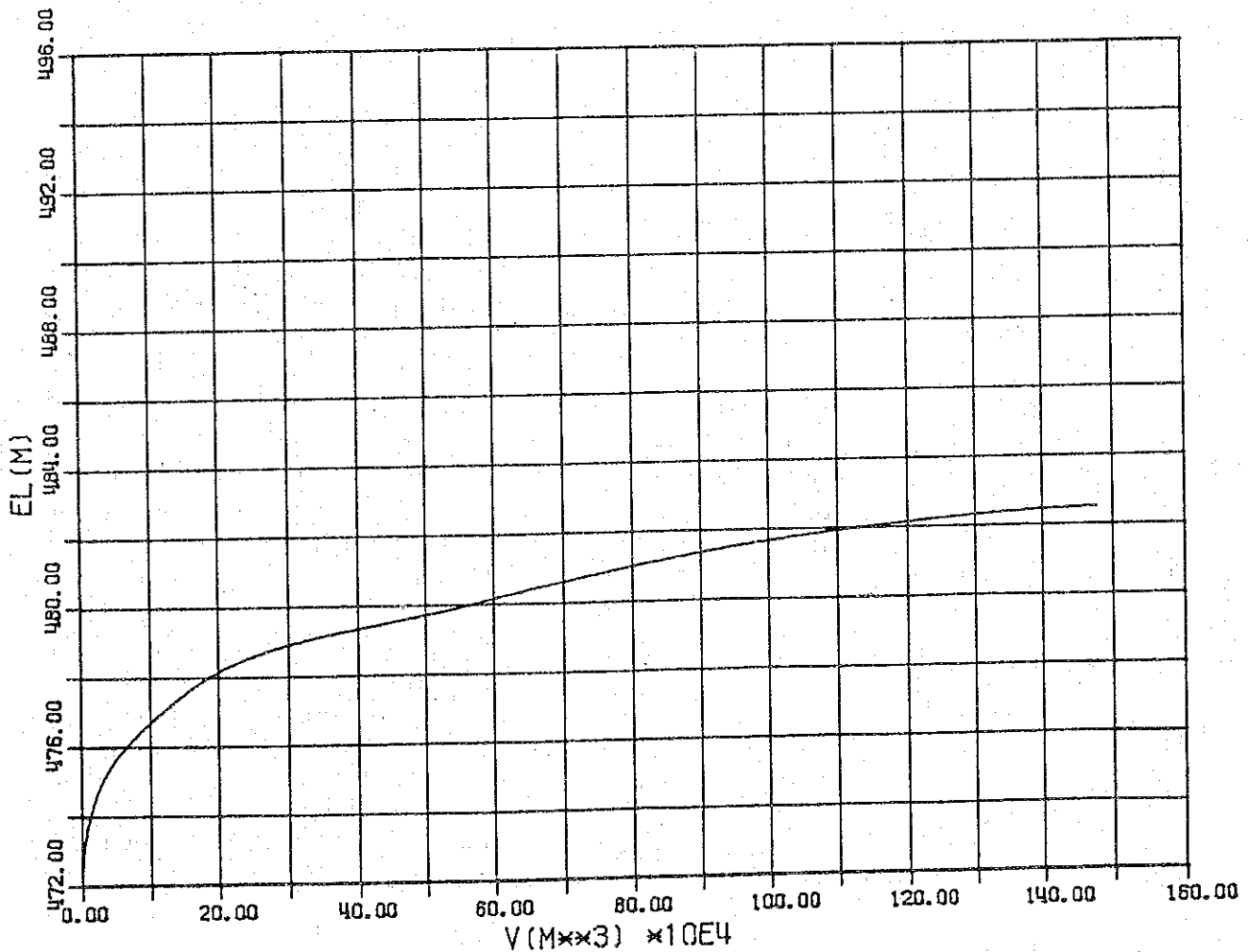
The area is undulated land, and the Mase River forms deep valley and wide flood plane. The river system in this area is affected by the geological structures.

The bedrock consists of basalt. The airphoto-reading indicates that many large scale lineaments including the damsite are distributed, therefore the bedrock seems to be soft and well jointed. The bedrock seems to be less suitable for the dam foundation.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-3-1	2131C3	UL	132	736

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
472.0	0.0	0	0	0	0.00	
472.5	0.5	2900	1450	725	0.72	
475.0	2.5	20800	11850	29625	30.35	
477.5	2.5	73800	47300	118250	148.60	
480.0	2.5	261000	167400	418500	567.10	
482.5	2.5	465800	363400	908500	1475.60	



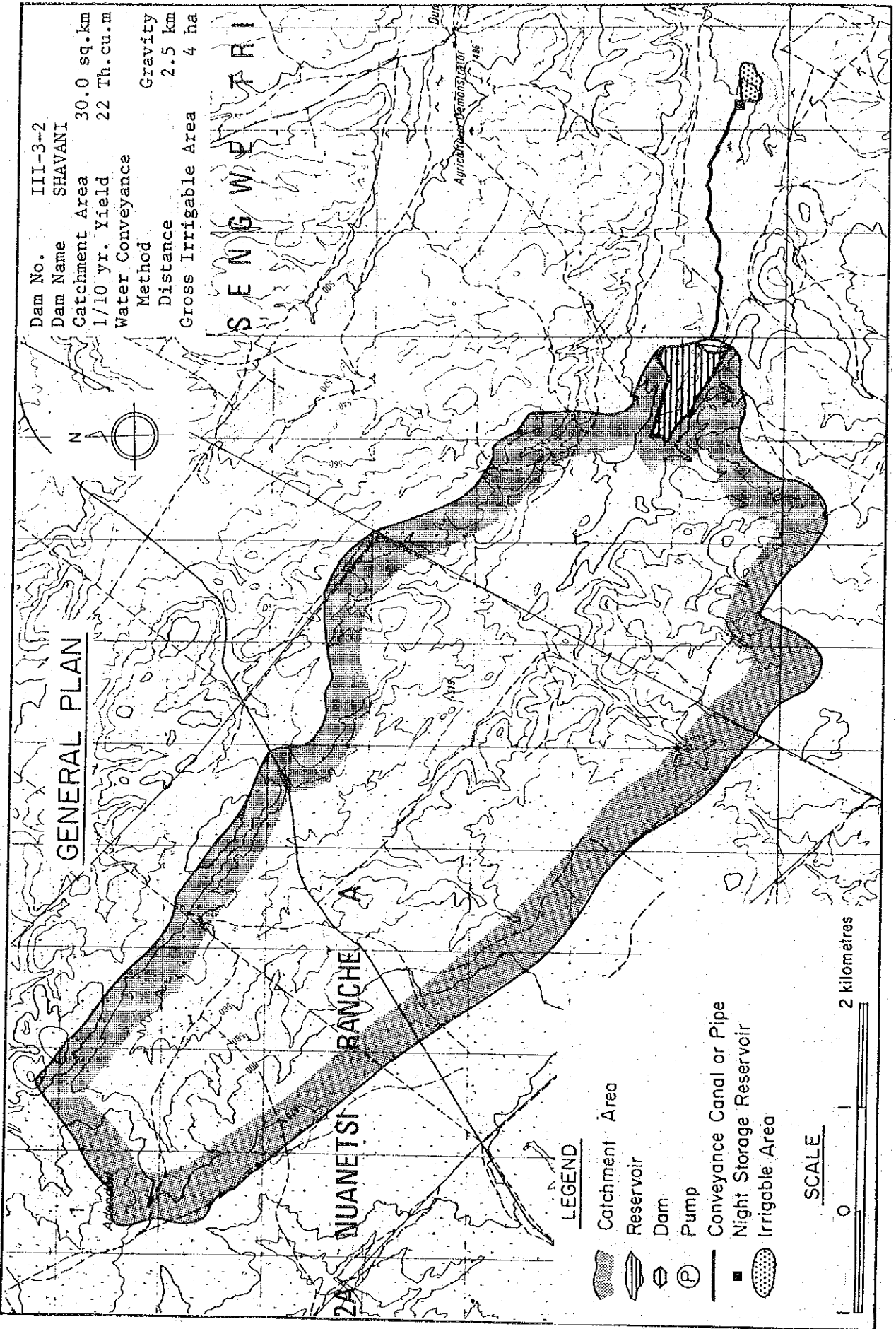
No. III-3-2

Name of Dam Chavani

Location	District	Gaza Komanani		Communal Land	Sengwe
	Map Ref.	2131C3		Coordinates	UL099707
Geology	Basalt, it seems to be soft and well jointed from the airphoto-reading.				
Hydrology	River	(T) Mase		Hydrological Zone	B-N1
	Catchment Area	30.0	sq.km	M.A. Rainfall	470 mm
	M.A. Runoff	15	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	0.200	MCM	1/10 Yr. Yield	0.022 MCM
	Dead Capacity	0.030	MCM	D.W.S.	476 m
	Total Capacity	0.230	MCM	N.W.S.	482 m
Dam	Height	10	m	Length	580 m
	Embankment Volume	84 000	cu.m	Spillway	136 m
Agriculture	Natural Region	V		Soil	L-CL
	Potential Irrigable Area	100 ha			
	Proposed Cropping Pattern	C			
Irrigation	Net Irrigable Area	1.1 ha	Dist. 2.5 km by Gravity		
	Topography	Area	Gently slope		
		Conveyance	Slightly sloping, one river crossing		
Rural Water Supply	Population	395	person	8 cu.m/day	
	Livestock	910	unit	41 cu.m/day	
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 1 279 000	Z\$ 441 000		Z\$1 720 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 4 714 /year	Z\$55 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	N	Y	Y	Y
Remarks					

Present Condition on the Ward








Ward Name	I		Area	89 000 ha
Demography	Population Density		7.9	persons/sq.km
	Family Size		8.8	Persons/household
Agriculture	Arable Area		9 000 ha	Grazing Area 80 000 ha
	Maize	1.3	ha/household	7 bags/ha
	Sorghum	3.8	ha/household	11 bags/ha
	Livestock	3.7	LSUs/household	3.4 LSUs/sq.km
Rural Water Supply	Borehole	0.01	units/sq.km	875 persons/unit
	Well	-	units/sq.km	- persons/unit



Dam No. III-3-2
 Dam Name SHAVANI
 Catchment Area 30.0 sq.km
 1/10 yr. Yield 22 Th.cu.m
 Water Conveyance
 Method Gravity
 Distance 2.5 km
 Gross Irrigable Area 4 ha

GENERAL PLAN

LEGEND

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

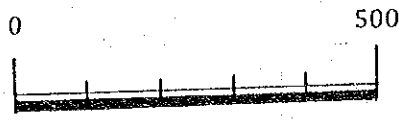
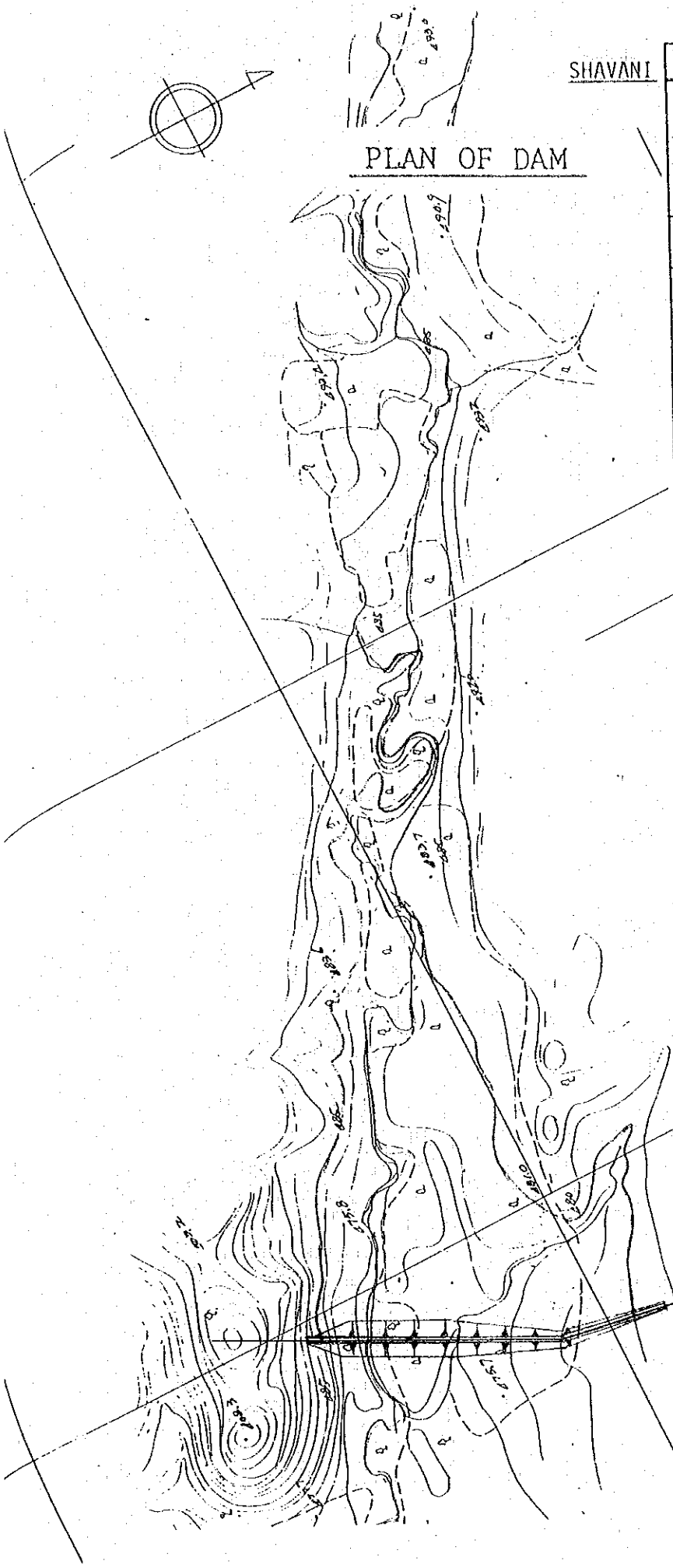
SCALE



SHAVANI

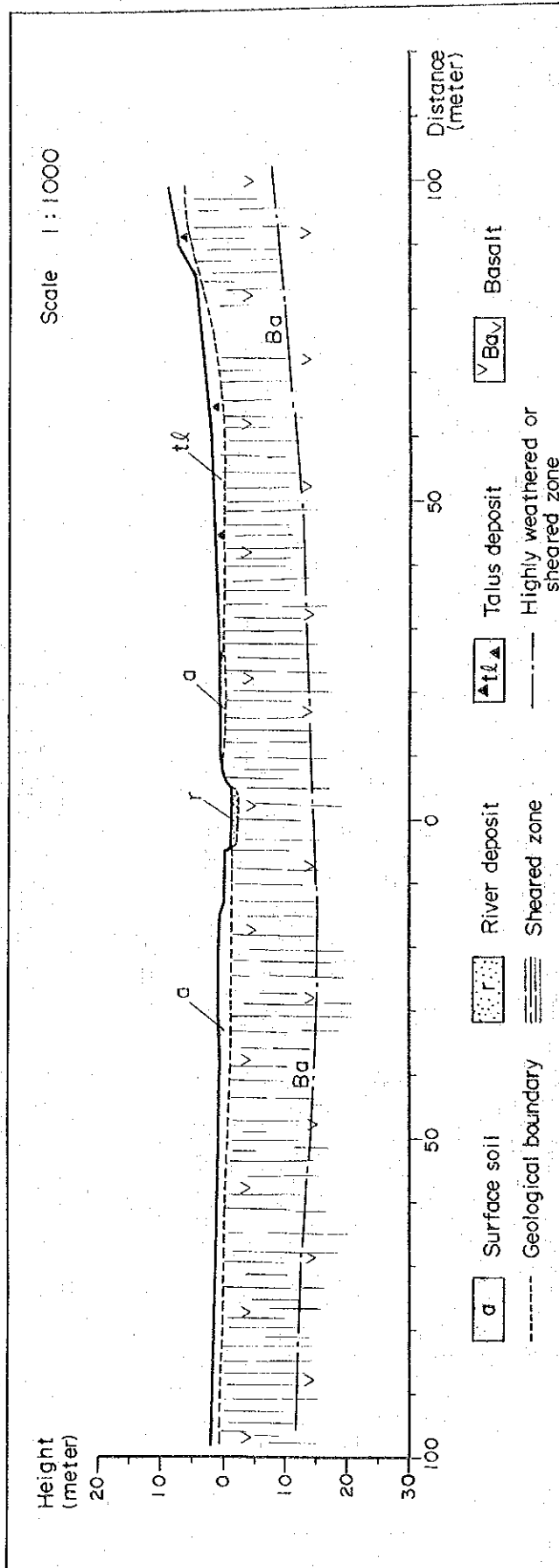
Dam No.	III- 3 - 2
District	Gaza Komanani
Communal L.	Sengwe
River	(T)Mase
Map Ref.	2131 C3
Coordinate	UL 099707
Catchment A.	30.0 sq.km
Design Flood	245 cum/sec
N.W.S.	EL.482.0 m
D.W.S.	EL.476.0 m
Capacity of Res.	0.90 M.C.M.
Dam Top	EL.484.0 m
Dam Height	10.0 m
Dam Length	580 m
Dam Vol.	84,000 cum

PLAN OF DAM



SCALE 1:10 000

III-3-2 Shavani



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

The area is undulated land, and the river system is greatly affected by the geological structures and flows straight.

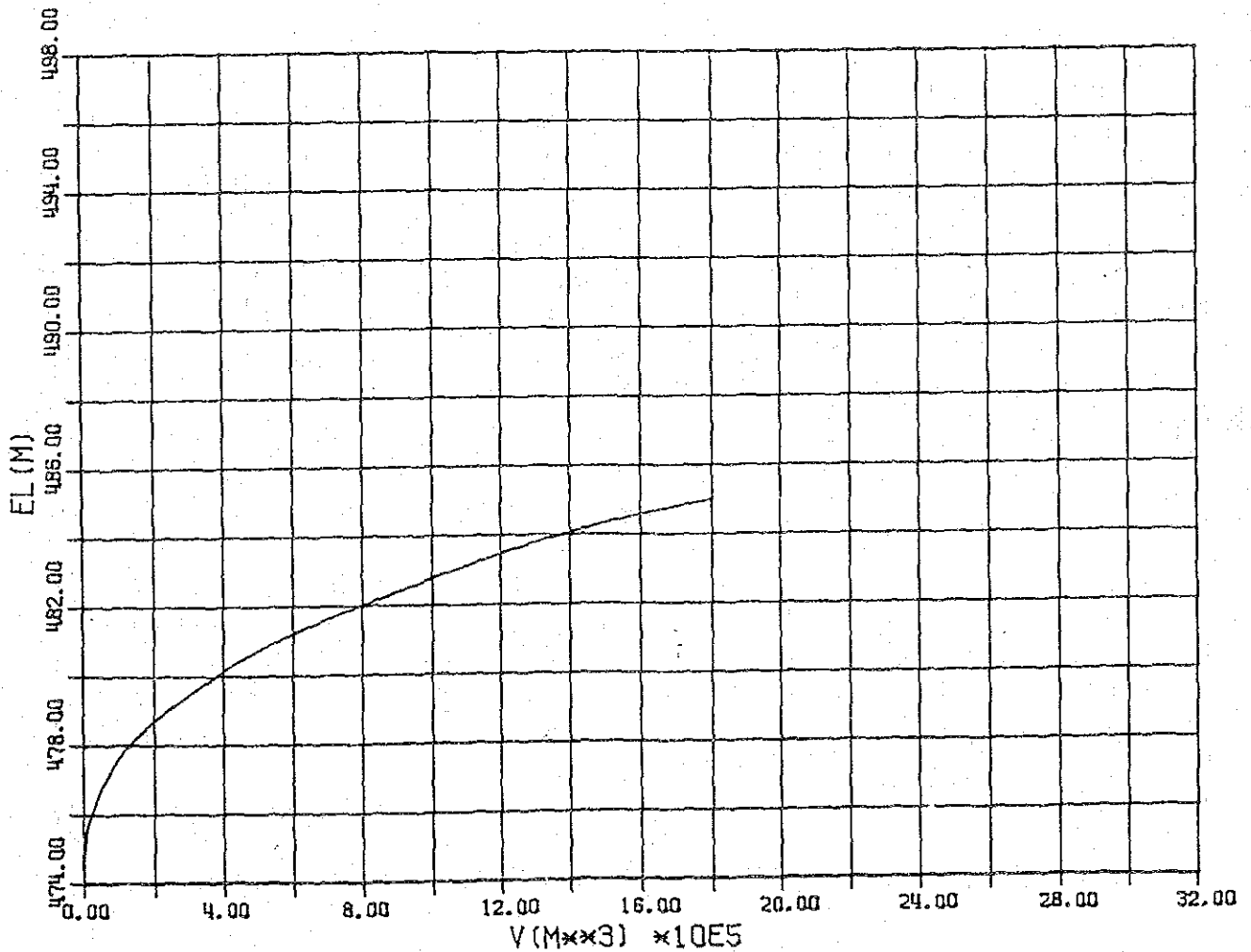
The bedrock consists of basalt. The airphoto-reading indicates that the Mase River flows along a very wide lineament and is controlled by the structure. Therefore it seems that the bedrock is well jointed and leakage is large.

The bedrock is less suitable for the dam foundation.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-3-2	2131C3	UL	99	707

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
474.0	0.0	0	0	0	0.00	
475.0	1.0	5300	2650	2650	2.65	
477.5	2.5	66200	35750	89375	92.02	
480.0	2.5	163100	114650	286625	378.65	
482.5	2.5	275800	219450	548625	927.27	
485.0	2.5	421900	348850	872125	1799.40	



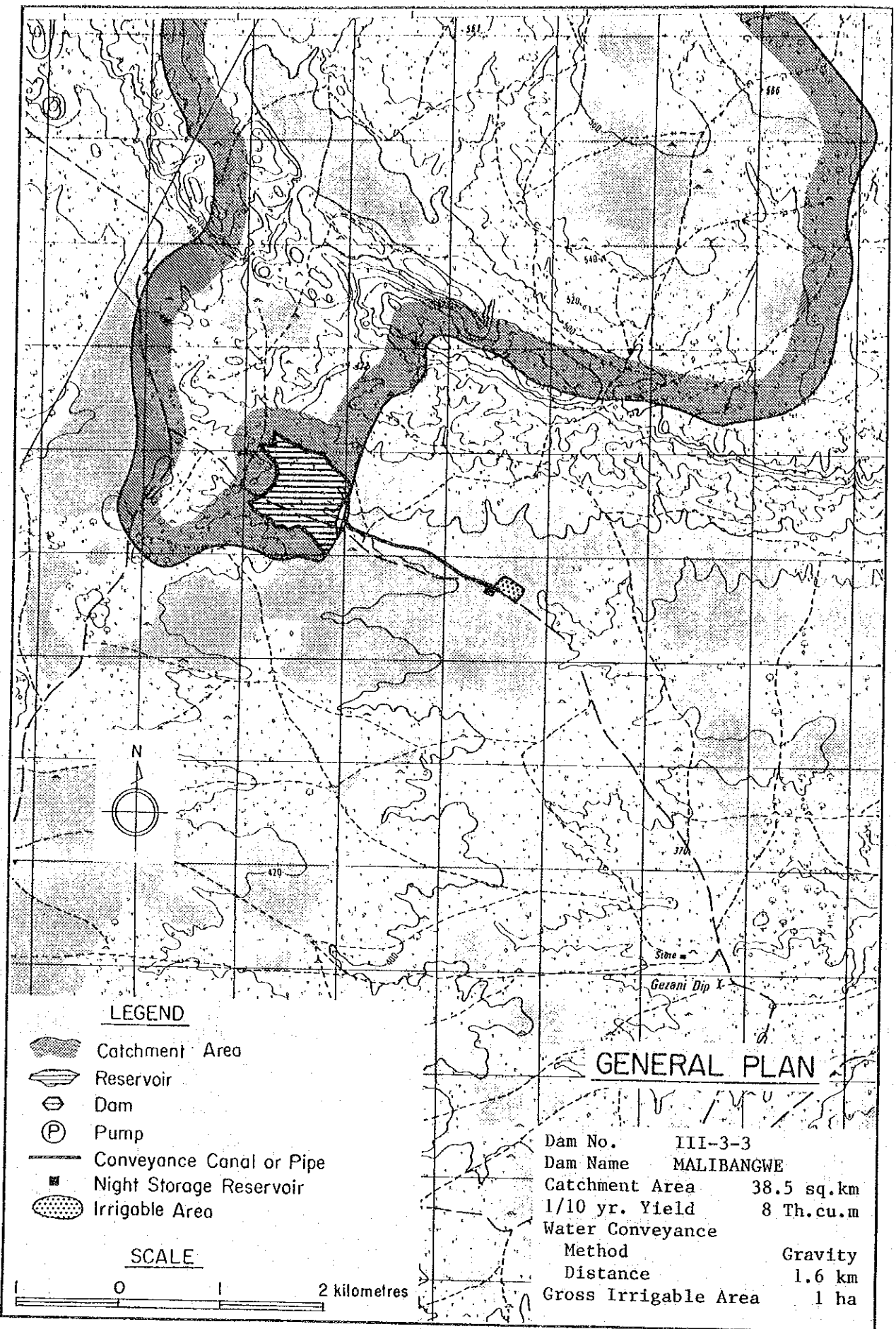
No. III-3-3

Name of Dam Malibangwe








Location	District	Gaza Komanani		Communal Land	Sengwe
	Map Ref.	2231A1		Coordinates	UL050614
Geology	Basalt, very flat terrain, outcrops very few, highly weathering and very soft.				
Hydrology	River	Malibangwe		Hydrological Zone	B-N1
	Catchment Area	38.5	sq.km	M.A. Rainfall	430 mm
	M.A. Runoff	11	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	0.380	MCM	1/10 Yr. Yield	0.008 MCM
	Dead Capacity	0.020	MCM	D.W.S.	401 m
	Total Capacity	0.400	MCM	N.W.S.	406 m
Dam	Height	10	m	Length	480 m
	Embankment Volume	50 000	cu.m	Spillway	160 m
Agriculture	Natural Region	V		Soil	CL-C
	Potential Irrigable Area				100 ha
	Proposed Cropping Pattern	C			
Irrigation	Net Irrigable Area	0.4 ha	Dist. 1.6 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	340	person	7	cu.m/day
	Livestock	900	unit	41	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 1 309 000	Z\$ 290 000		Z\$ 1 599 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 2 870 /year	Z\$ 33 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

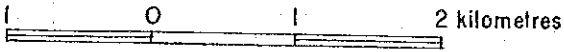
Ward Name	4		Area	88 179 ha
Demography	Population Density		6.8	persons/sq.km
	Family Size		8.6	Persons/household
Agriculture	Arable Area		9 000 ha	Grazing Area 79 179 ha
	Maize	1.4	ha/household	7 bags/ha
	Sorghum	5.4	ha/household	11 bags/ha
	Livestock	4.4	LSUs/household	3.5 LSUs/sq.km
Rural Water Supply	Borehole		0.01	units/sq.km
	Well		-	units/sq.km
			857	persons/unit
			-	persons/unit



LEGEND

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

SCALE



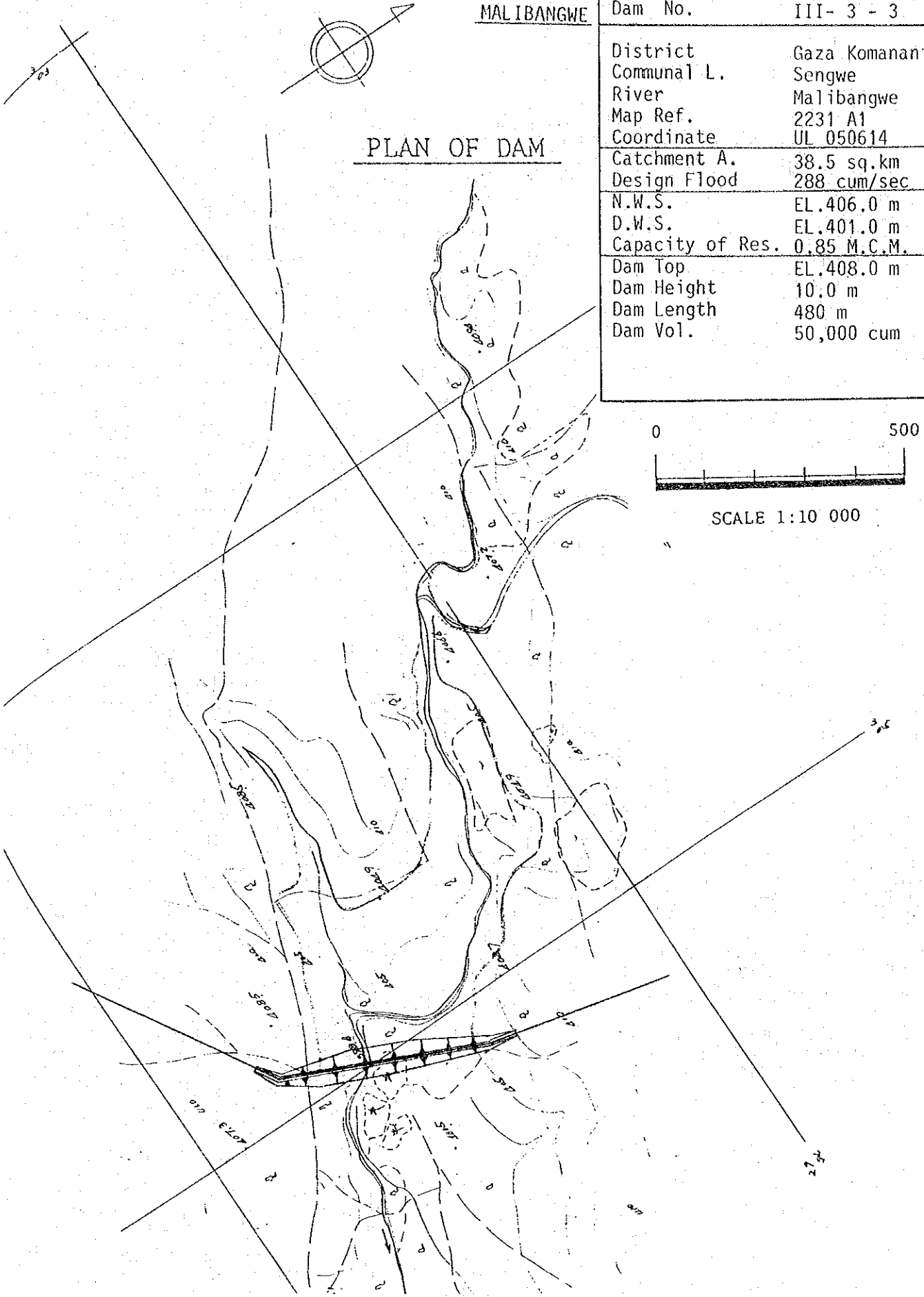
GENERAL PLAN

Dam No.	III-3-3
Dam Name	MALIBANGWE
Catchment Area	38.5 sq.km
1/10 yr. Yield	8 Th.cu.m
Water Conveyance	
Method	Gravity
Distance	1.6 km
Gross Irrigable Area	1 ha

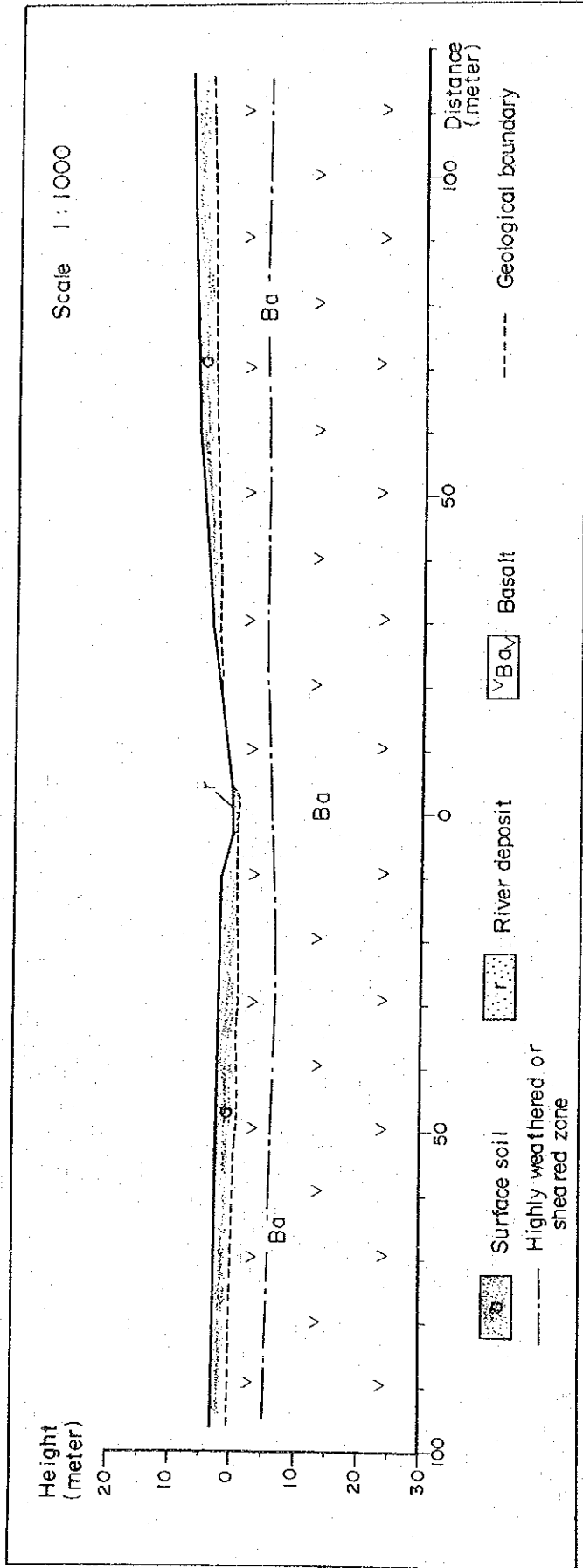
MALIBANGWE

Dam No.	III- 3 - 3
District	Gaza Komanani
Communal L.	Sengwe
River	Malibangwe
Map Ref.	2231 A1
Coordinate	UL 050614
Catchment A.	38.5 sq.km
Design Flood	288 cum/sec
N.W.S.	EL.406.0 m
D.W.S.	EL.401.0 m
Capacity of Res.	0.85 M.C.M.
Dam Top	EL.408.0 m
Dam Height	10.0 m
Dam Length	480 m
Dam Vol.	50,000 cum

PLAN OF DAM



III - 3 - 3 Malibangwe



The area is very flat land which outcrops are very few, and the Malibangwe River forms a broad and very shallow valley.

The bedrock consists of basalt. According to very few outcrops, basalt is very soft by highly weathering and it is well jointed. The thickness of highly weathering layer seems to be more than 10 meters. Leakage through the bedrock is very large and bearing strength in foundation strata is small.

The estimated thickness of unconsolidated deposits is maximum 1 meter at the riverbed and maximum 3 meters at both banks.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-3-3	2231A1	UL	050	614

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
398.4	0.0	0	0	0	0.00	
400.0	1.6	2000	1000	1600	1.60	
402.5	2.5	78000	40000	100000	101.60	
405.0	2.5	204000	141000	352500	454.10	
407.5	2.5	414000	309000	772500	1226.60	
410.0	2.5	646000	530000	1325000	2551.60	

