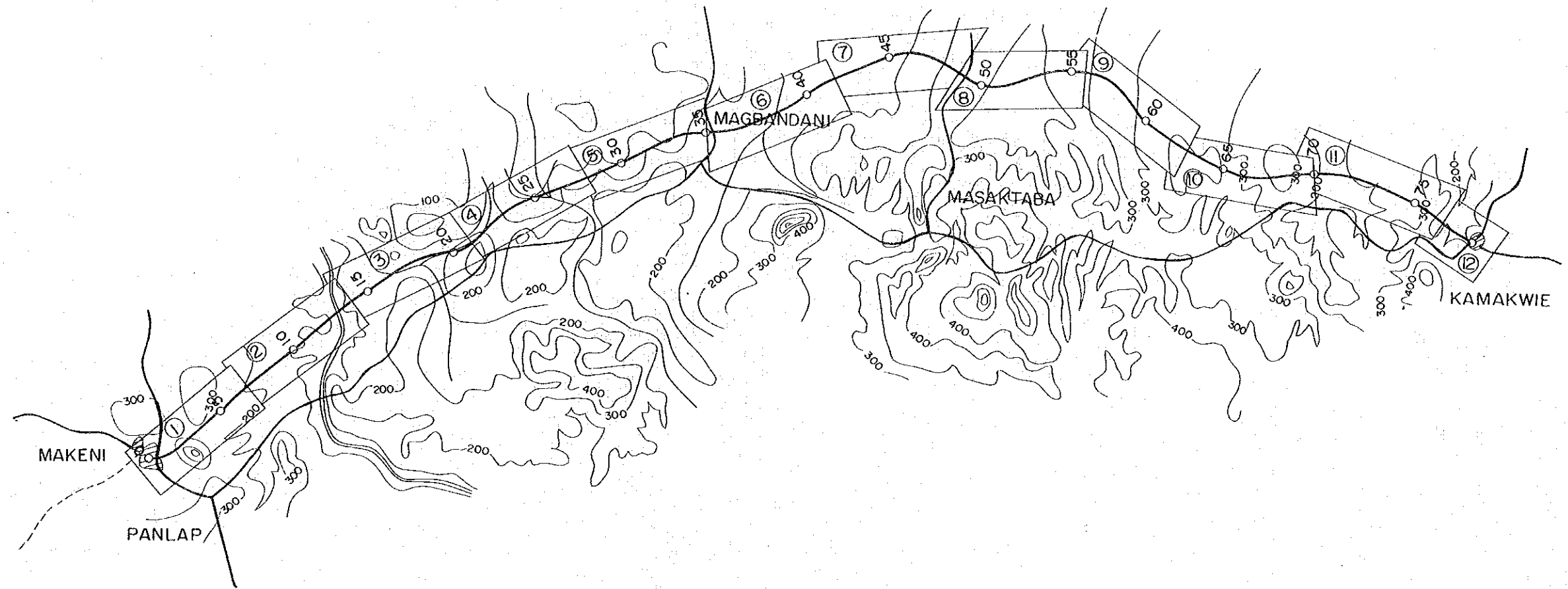


APPENDIX S-3 PLAN AND PROFILE OF ALTERNATIVE PLAN C

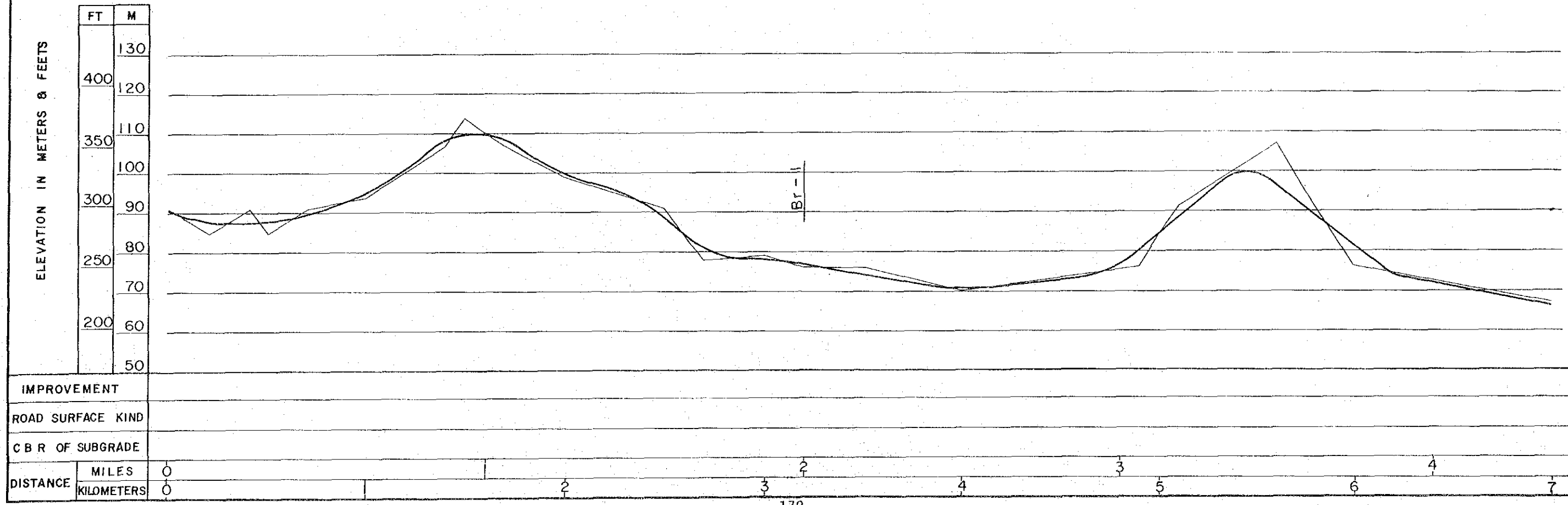
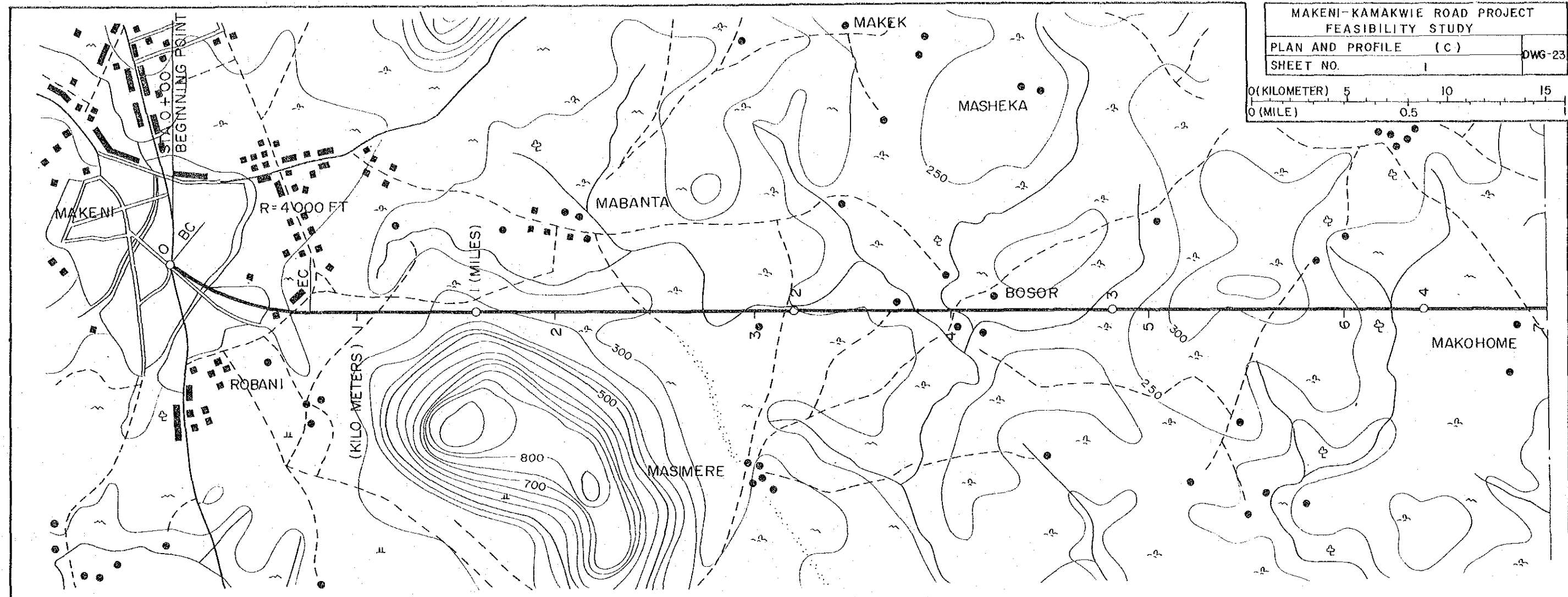
MAKENI-KAMAKWIE ROAD PROJECT FEASIBILITY STUDY		
COVER SHEET	(C)	DWG-
SHEET NO.		

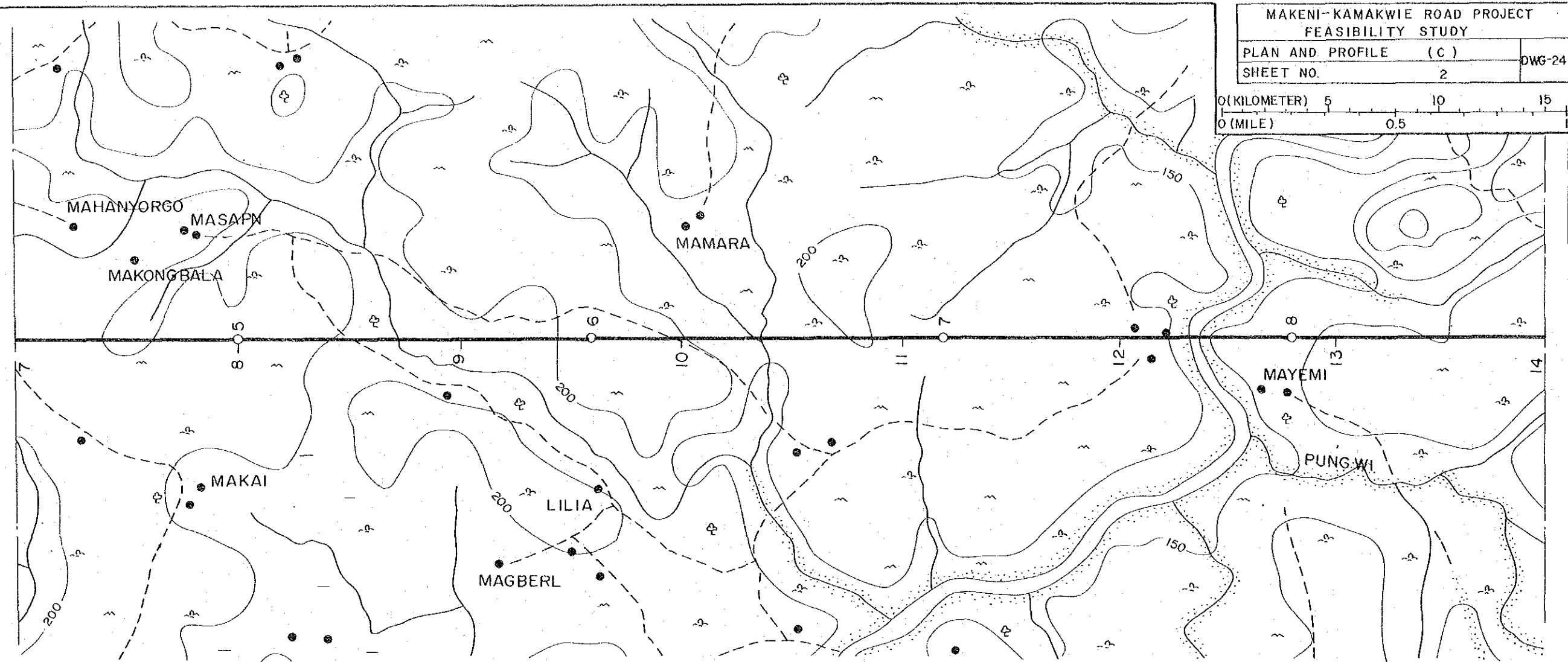
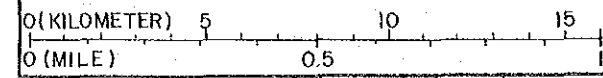


MAKENI-KAMAKWIE ROAD PROJECT
FEASIBILITY STUDY
PLAN AND PROFILE (C)
SHEET NO. 1

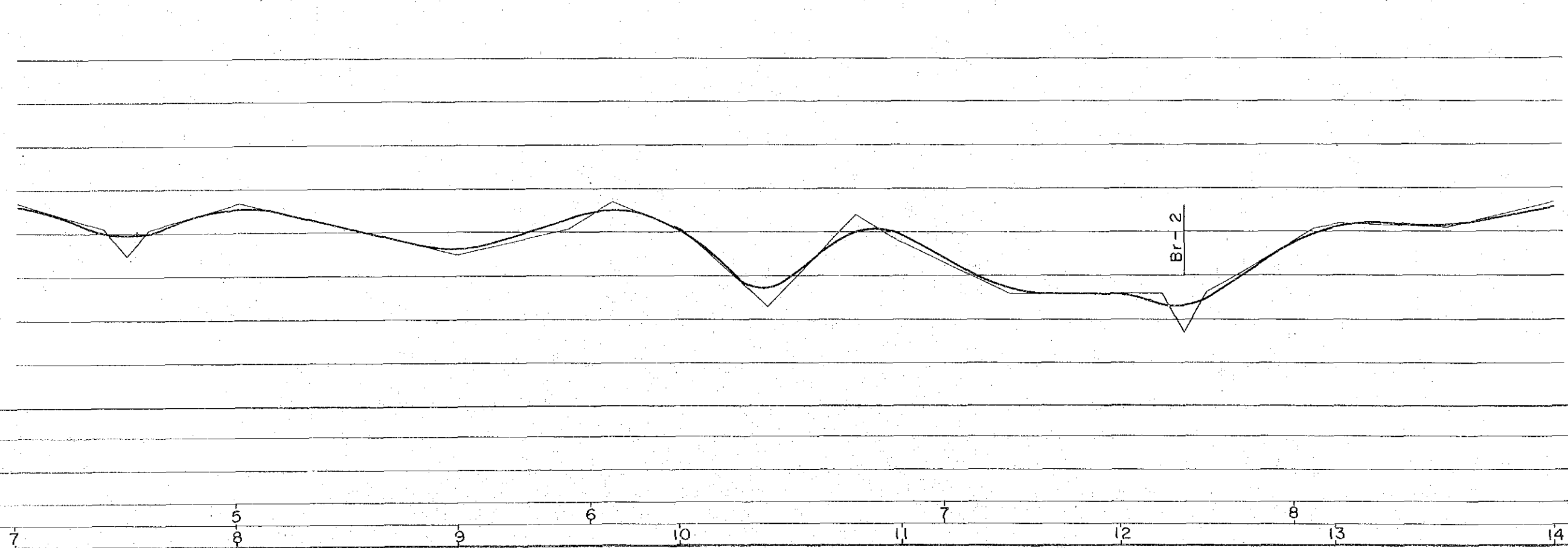
DWG-23

0 (KILOMETER) 5 10 15
0 (MILE) 0.5

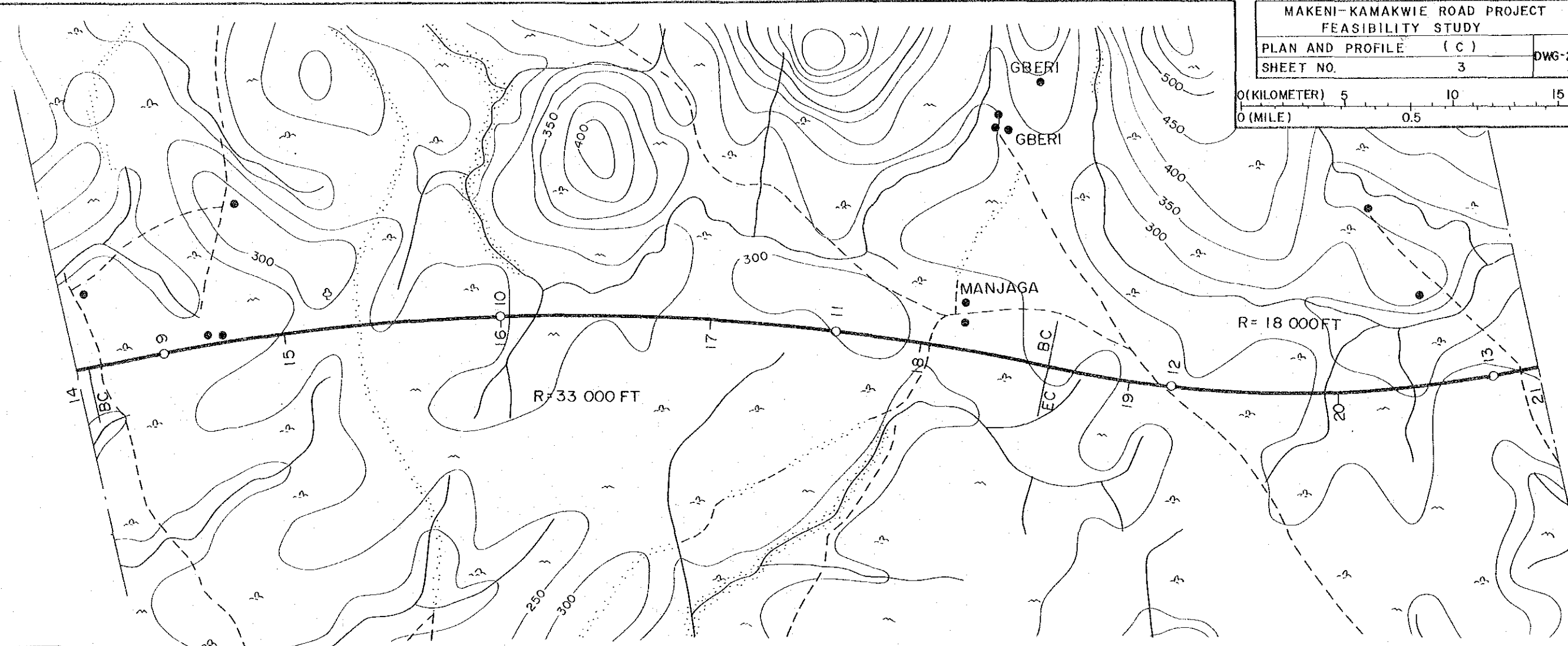
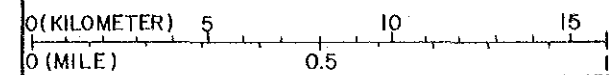




ELEVATION IN METERS & FEET	
FT	M
300	100
250	80
200	60
150	40
100	30
	20

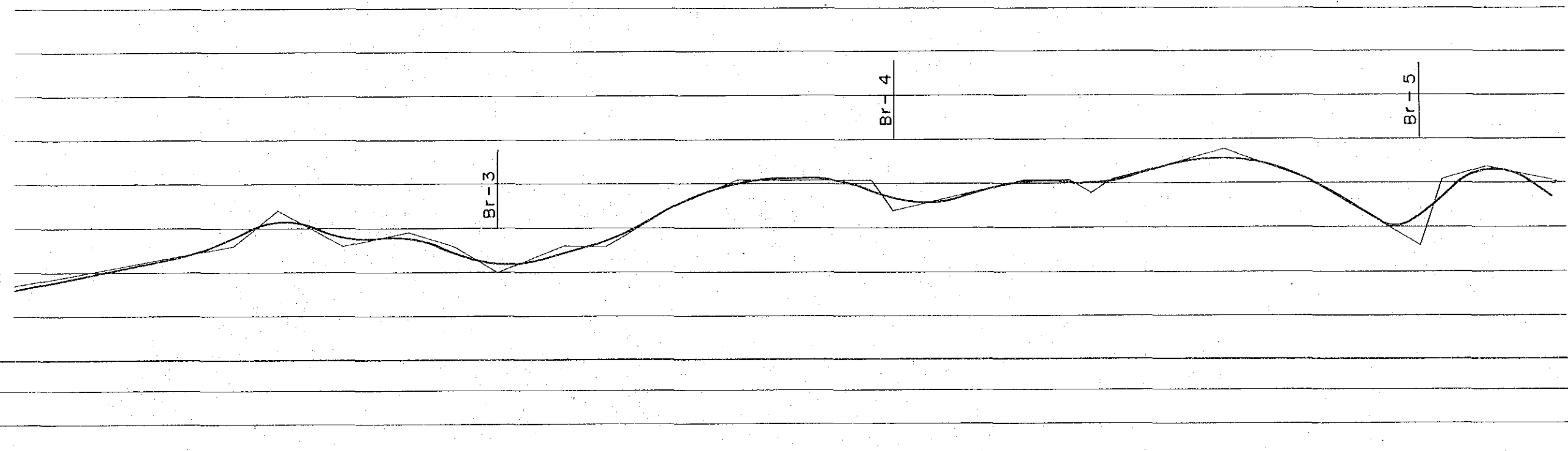


IMPROVEMENT	
ROAD SURFACE KIND	
C B R OF SUBGRADE	
DISTANCE	
MILES	5 6 7 8
KILOMETERS	7 8 9 10 11 12 13 14



ELEVATION IN METERS & FEET

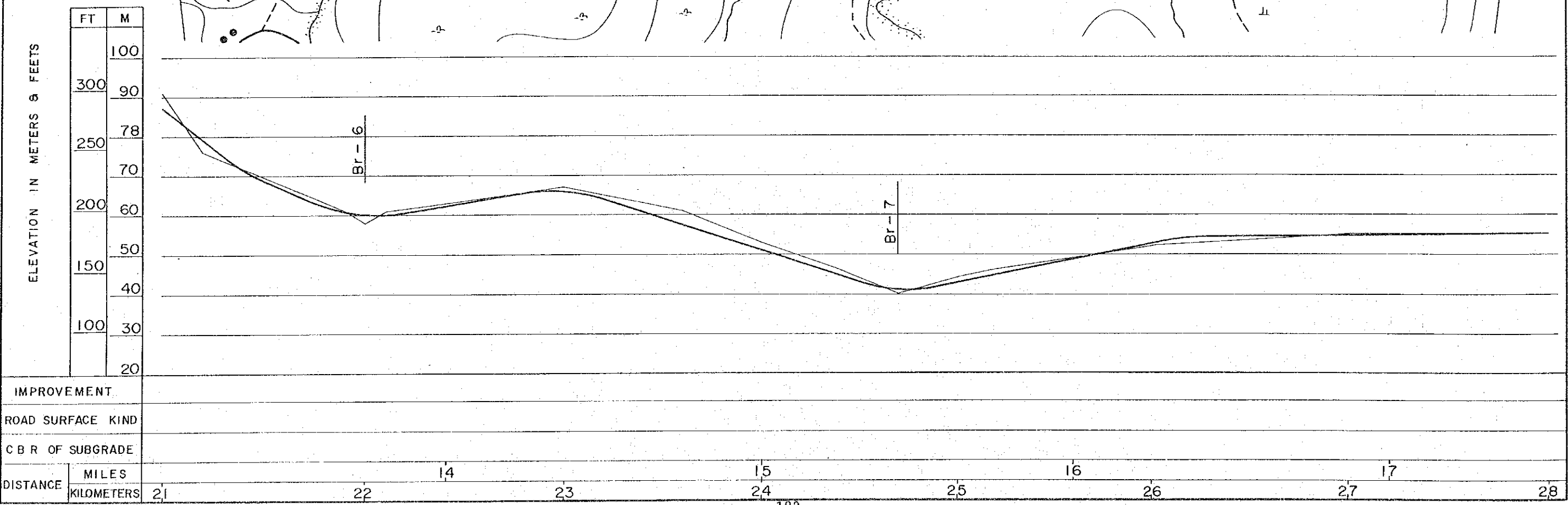
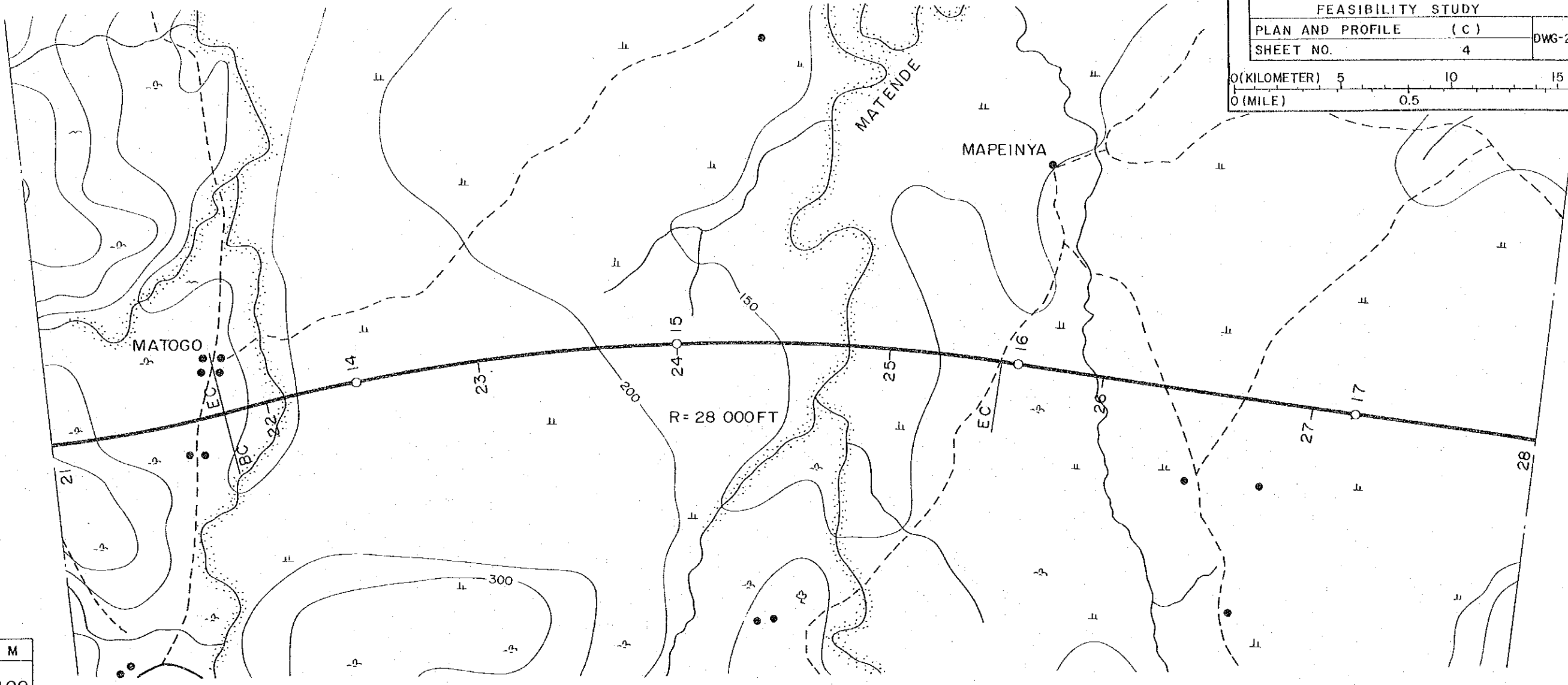
FT	M
400	120
350	110
300	90
250	80
200	60
50	

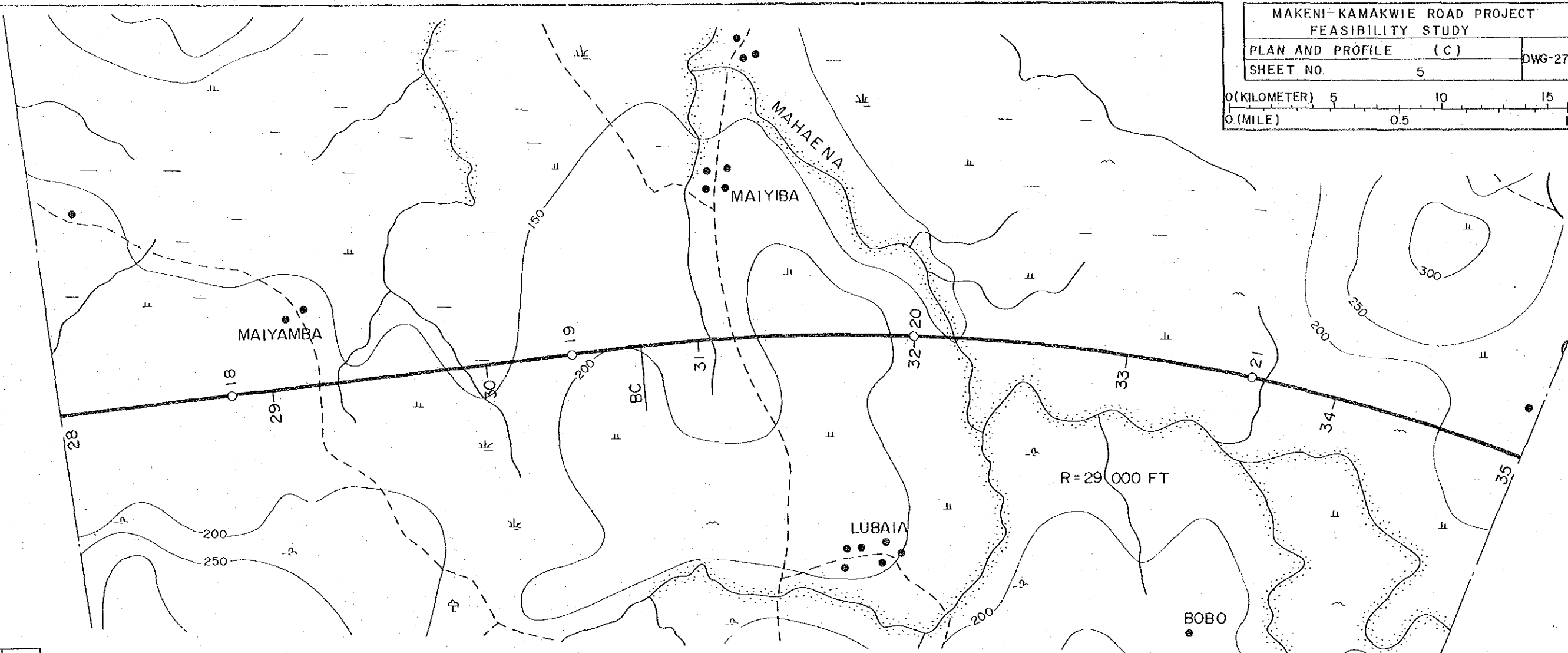
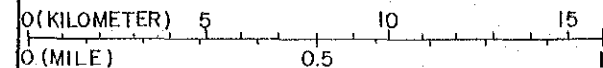


IMPROVEMENT		
ROAD SURFACE KIND		
C B R OF SUBGRADE		
DISTANCE	MILES	9 10 11 12 13
	KILOMETERS	14 15 16 17 18 19 20 21

MAKENI-KAMAKWIE ROAD PROJECT		
FEASIBILITY STUDY		
PLAN AND PROFILE	(C)	DWG-26
SHEET NO.	4	

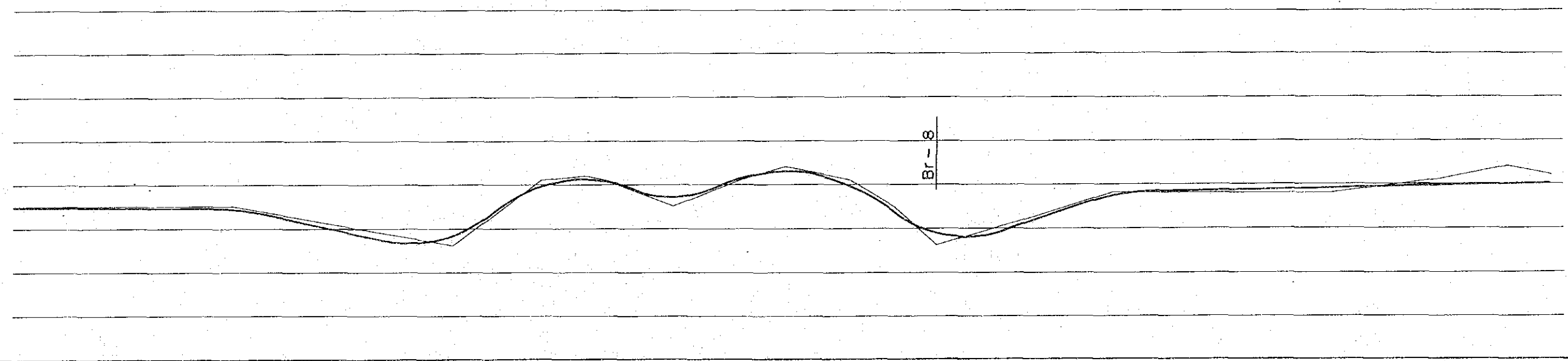
0 (KILOMETER) 5 10 15
0 (MILE) 0.5





ELEVATION IN METERS & FEET

FT	M
300	90
250	80
200	70
150	60
100	50
50	40
20	30
	20



IMPROVEMENT	
ROAD SURFACE KIND	
C B R OF SUBGRADE	
DISTANCE	
MILES	28 29 30 31 32 33 34 35
KILOMETERS	28 29 30 31 32 33 34 35

MAKENI-KAMAKWIE ROAD PROJECT
FEASIBILITY STUDY

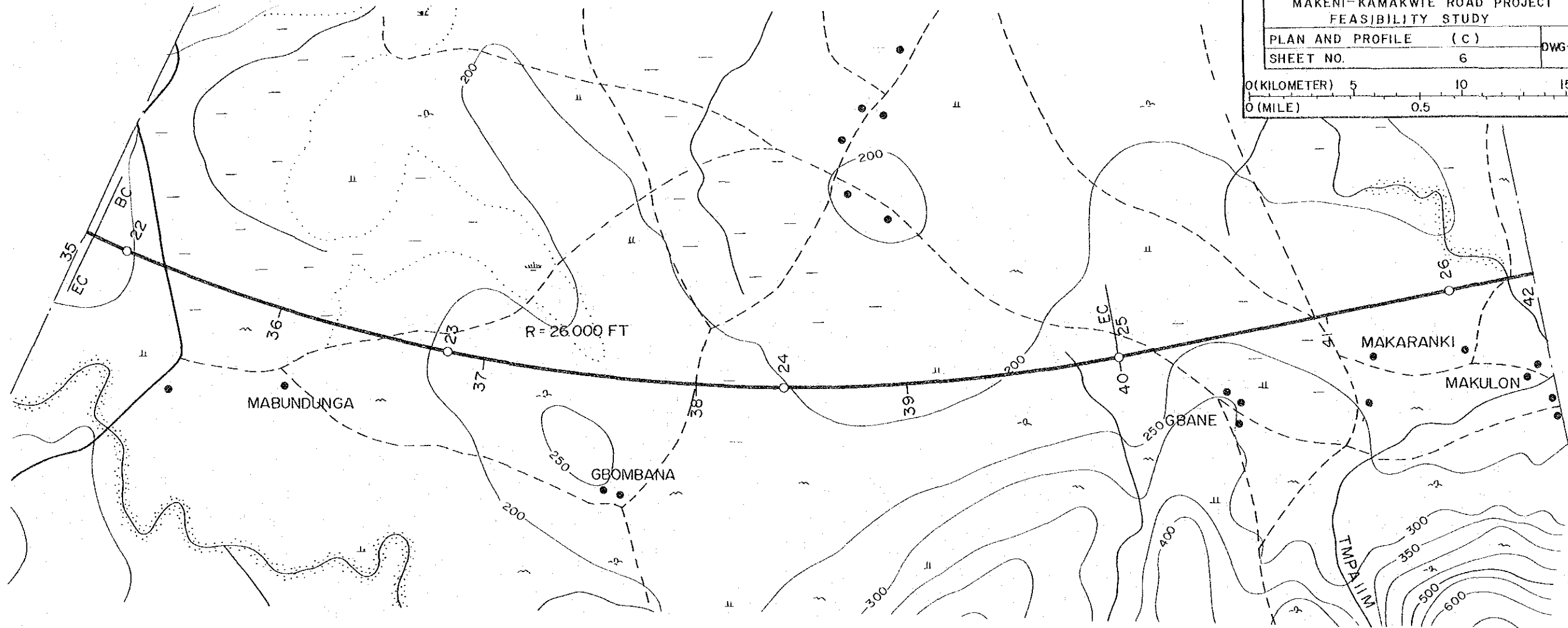
PLAN AND PROFILE (C)

SHEET NO. 6

DWG-28

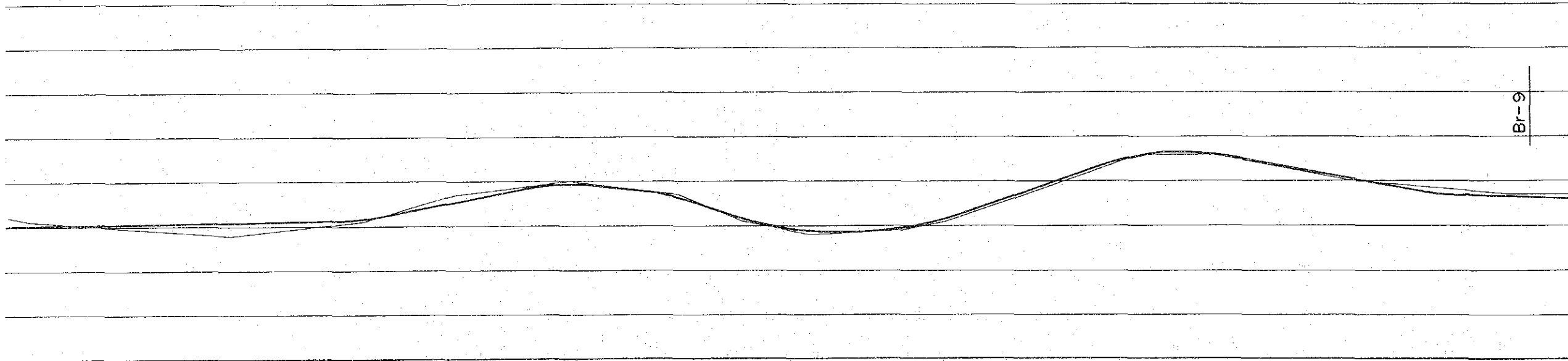
0 (KILOMETER) 5 10 15

0 (MILE) 0.5



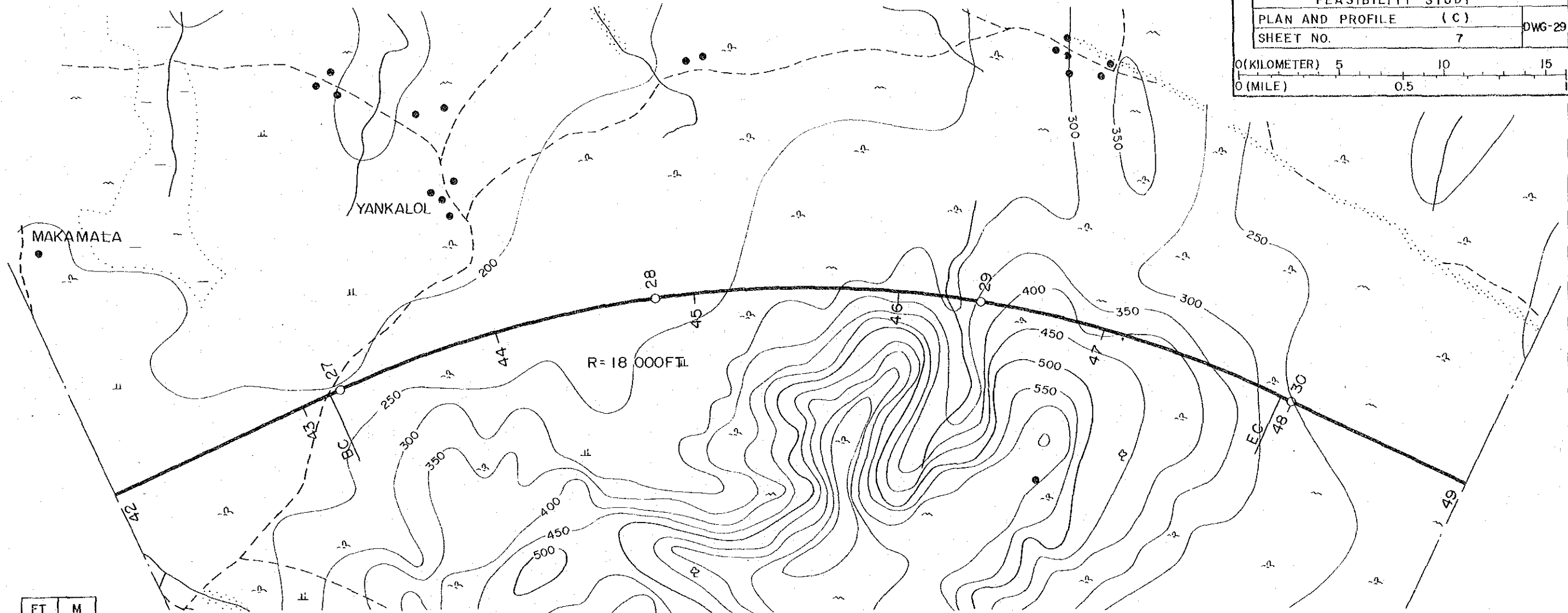
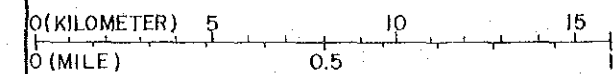
ELEVATION IN METERS & FEET

FT	M
350	110
	100
300	90
	80
250	70
200	60
	50
150	40
100	30



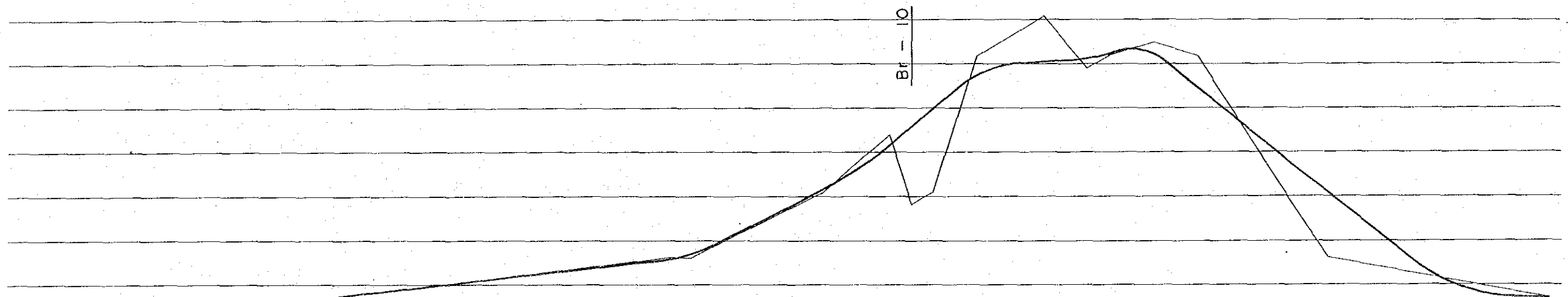
IMPROVEMENT
ROAD SURFACE KIND
C B R OF SUBGRADE

DISTANCE	MILES	22	23	24	25	26		
	KILOMETERS	35	36	37	38	39	40	41



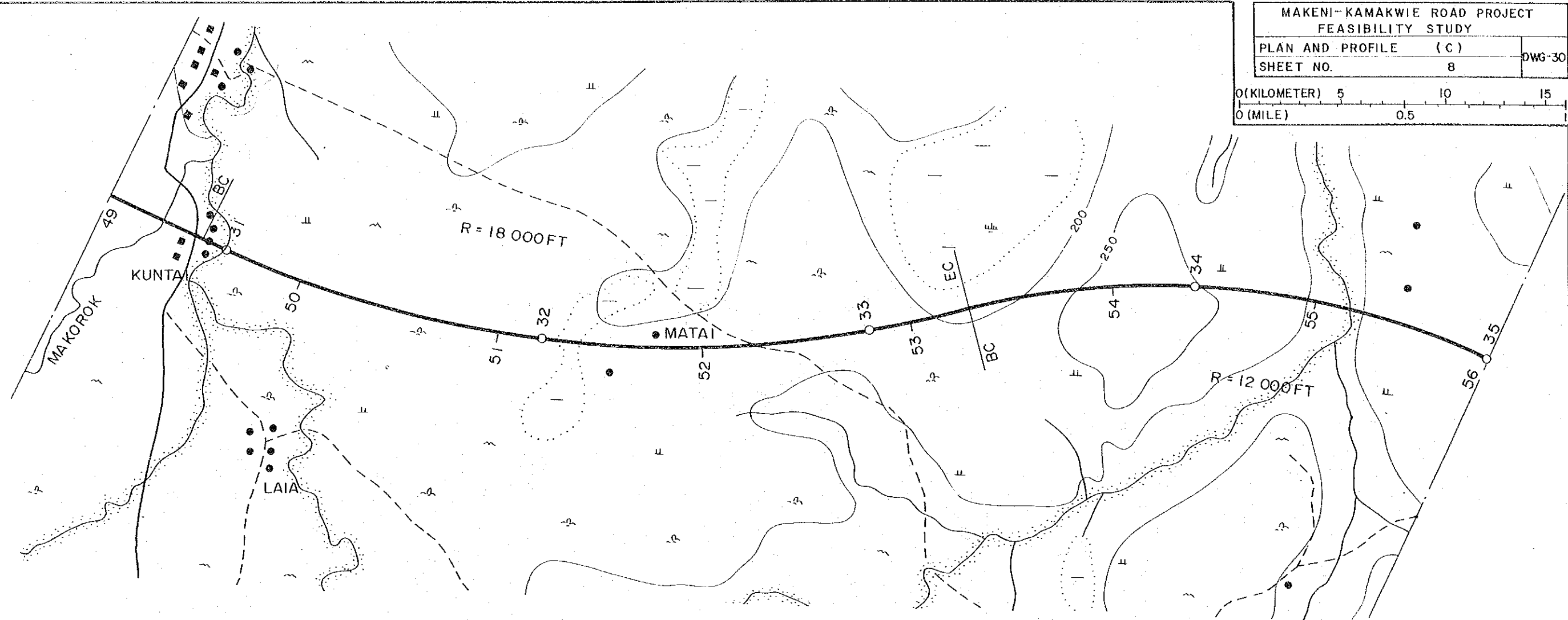
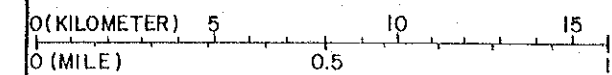
ELEVATION IN METERS & FEET

FT	M
450	140
	130
400	120
	110
350	100
	90
300	80
	70
250	60
200	



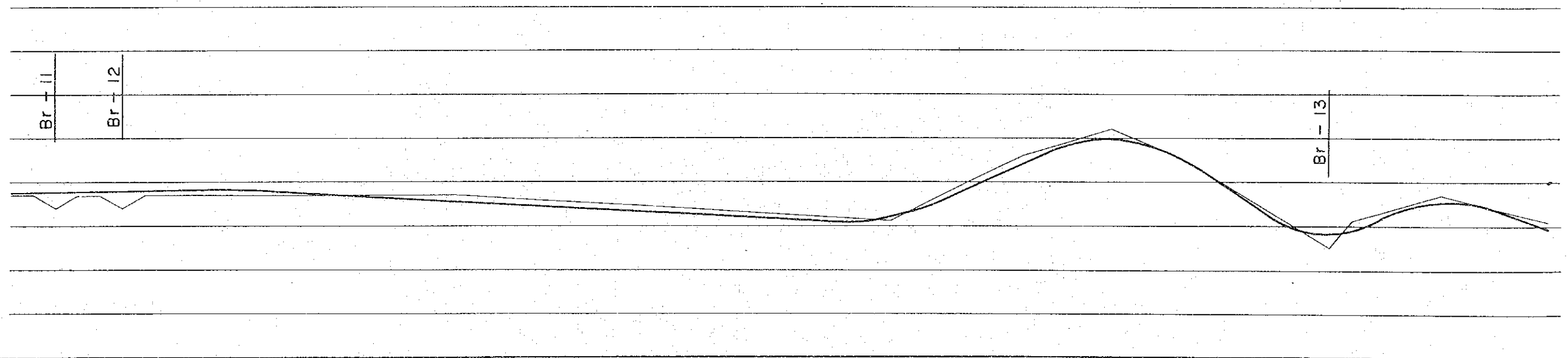
IMPROVEMENT	
ROAD SURFACE KIND	
C B R OF SUBGRADE	
DISTANCE	
MILES	
KILOMETERS	

27	28	29	30	48	49
42	43	44	45	46	47

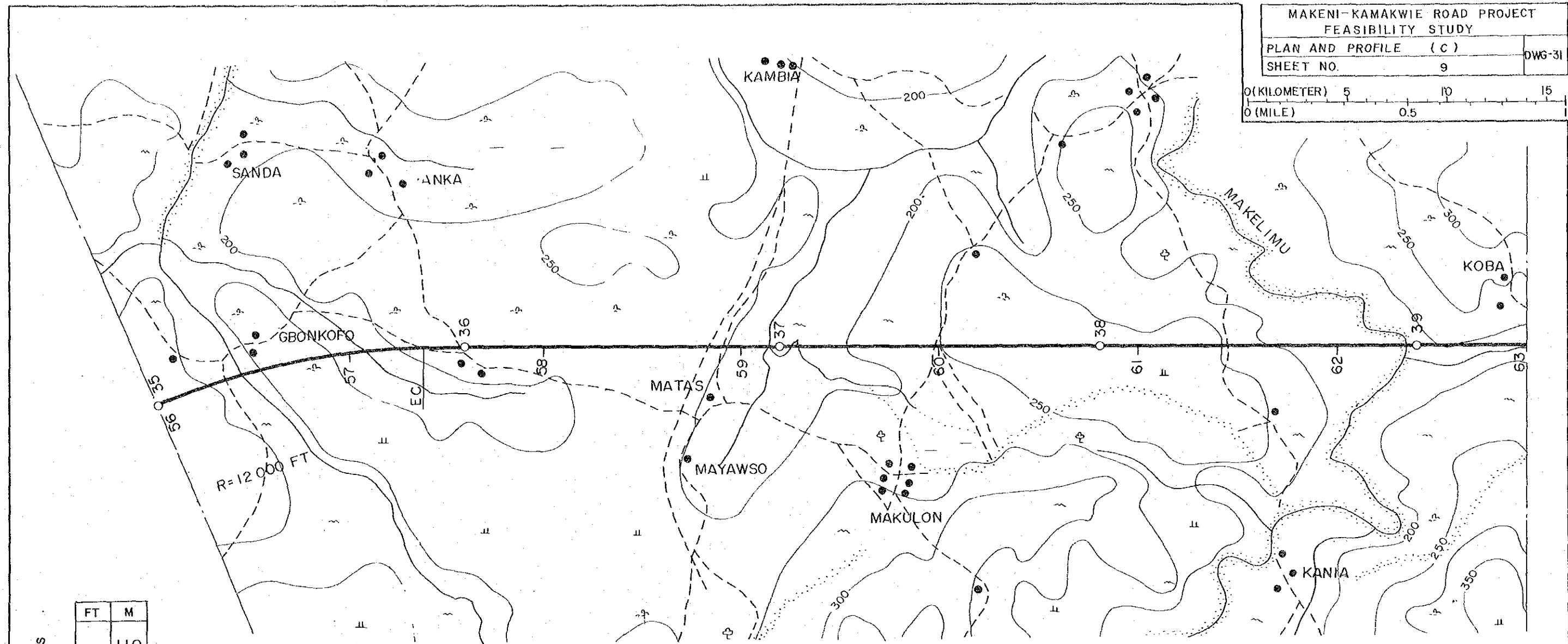
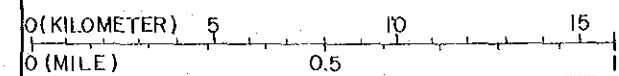


ELEVATION IN METERS & FEET

FT	M
350	110
300	90
250	80
200	60
150	50
100	30

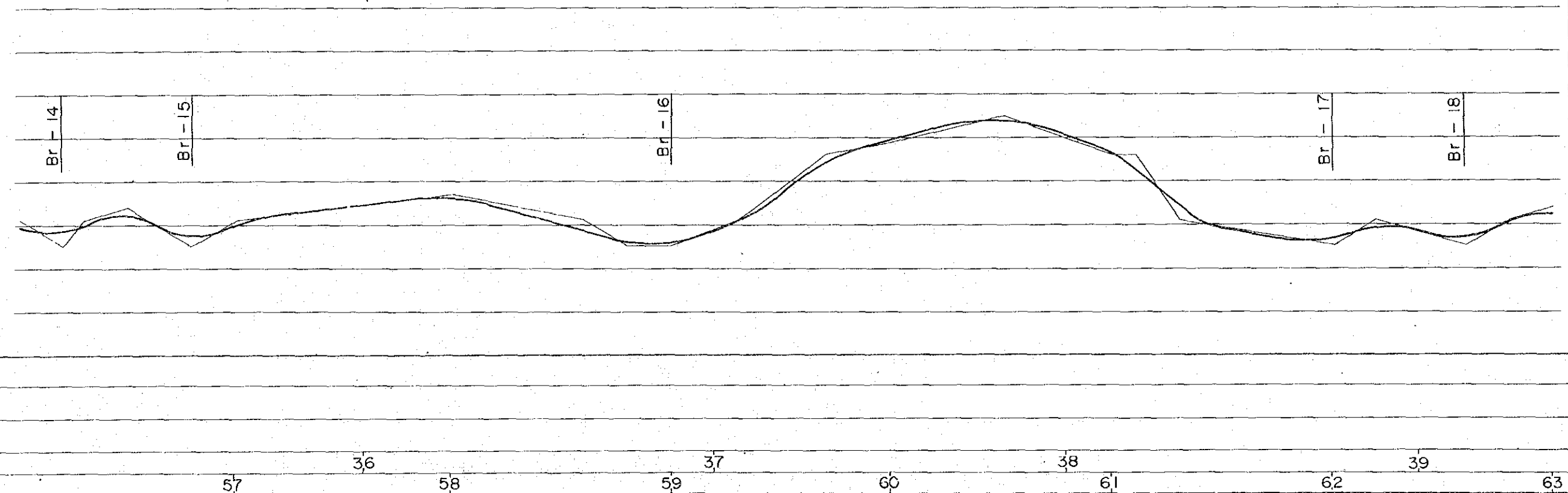


IMPROVEMENT	
ROAD SURFACE KIND	
C B R OF SUBGRADE	
DISTANCE	
MILES	31 32 33 34 35
KILOMETERS	49 50 51 52 53 54 55 56

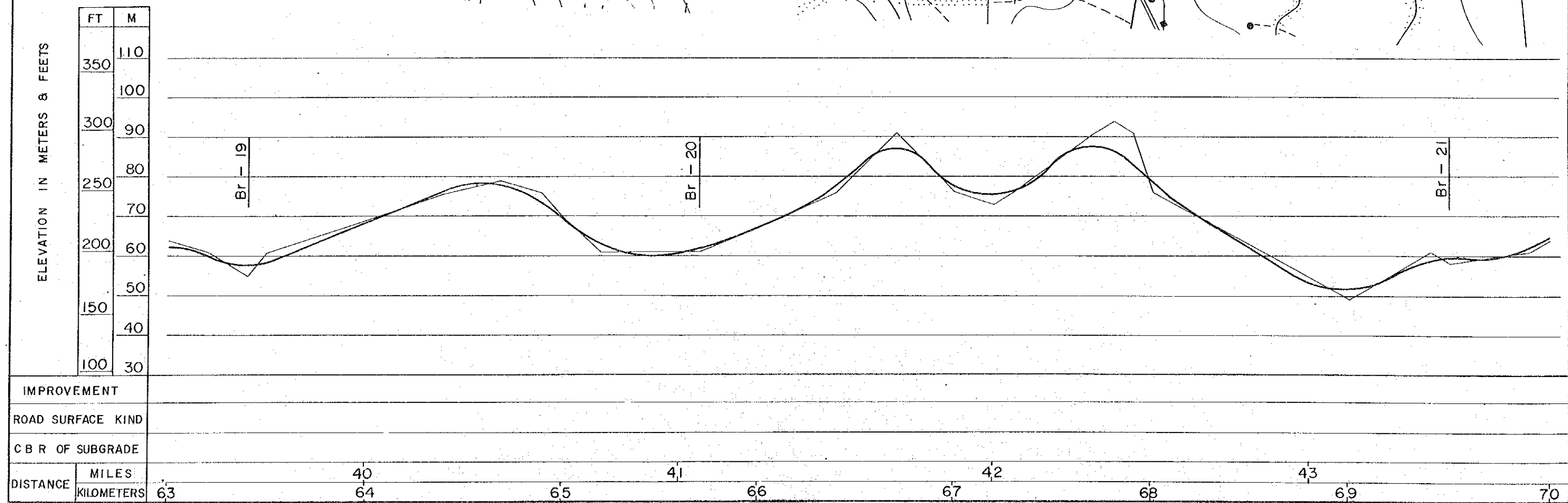
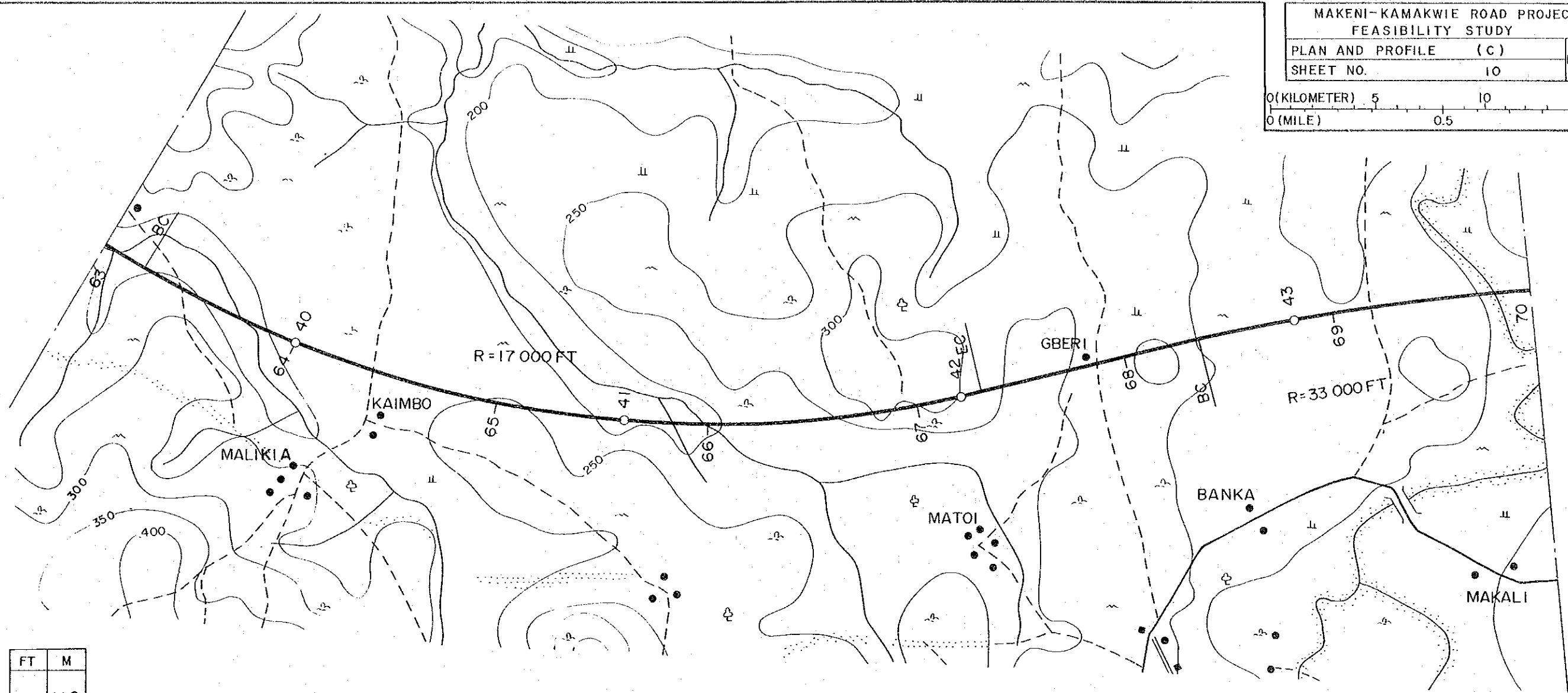
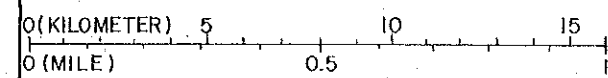


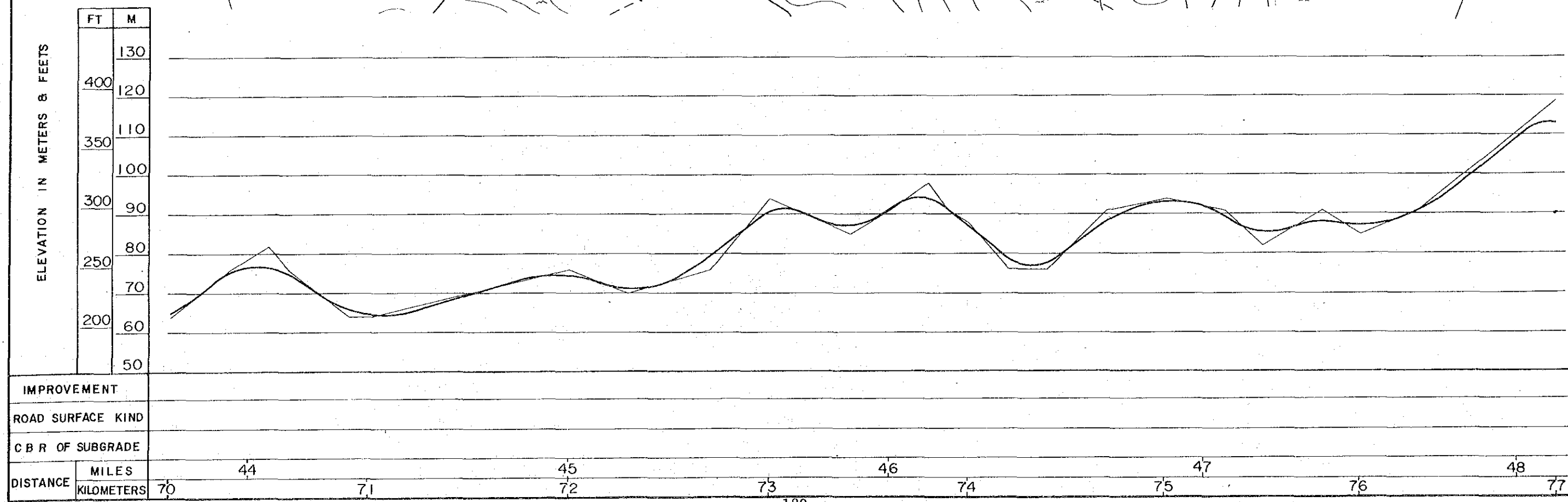
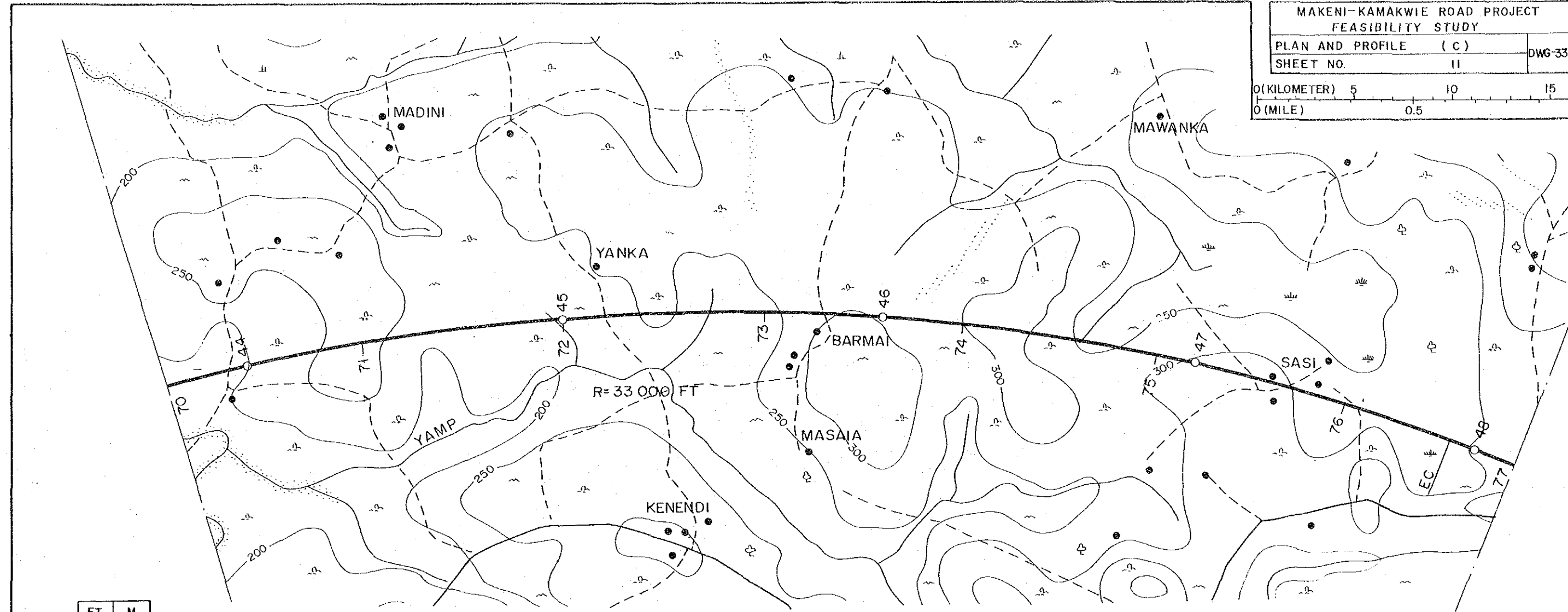
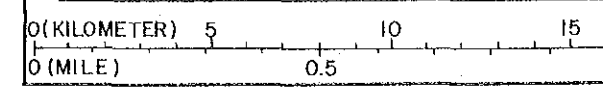
ELEVATION IN METERS & FEET

FT	M
350	110
300	90
250	80
200	60
150	40
100	30



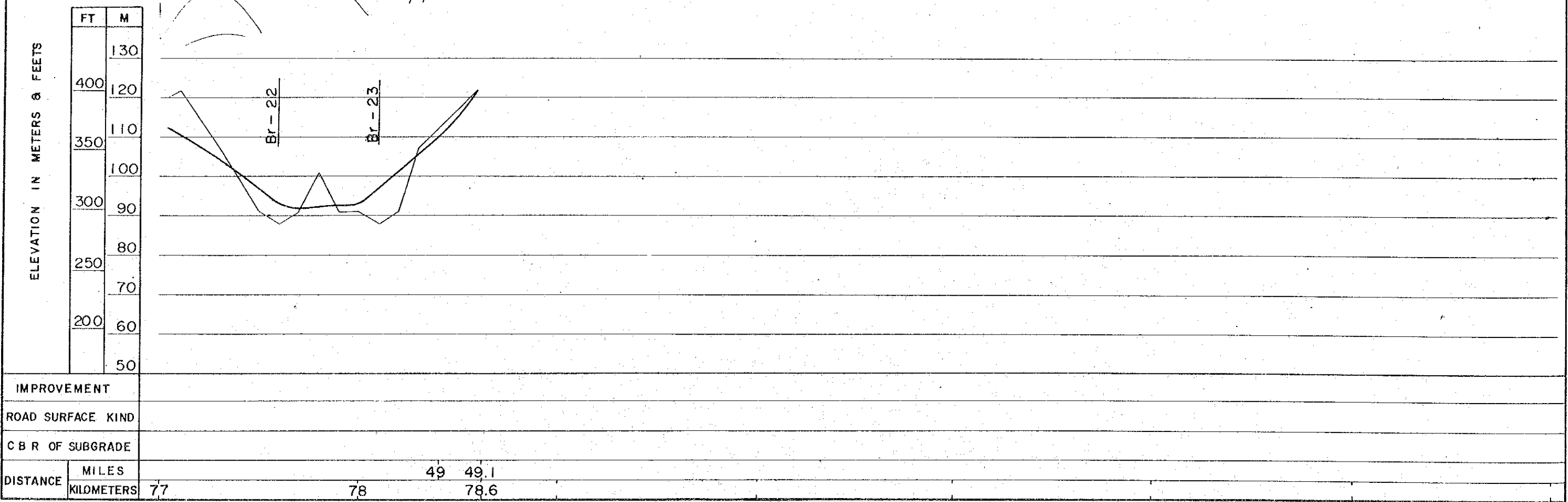
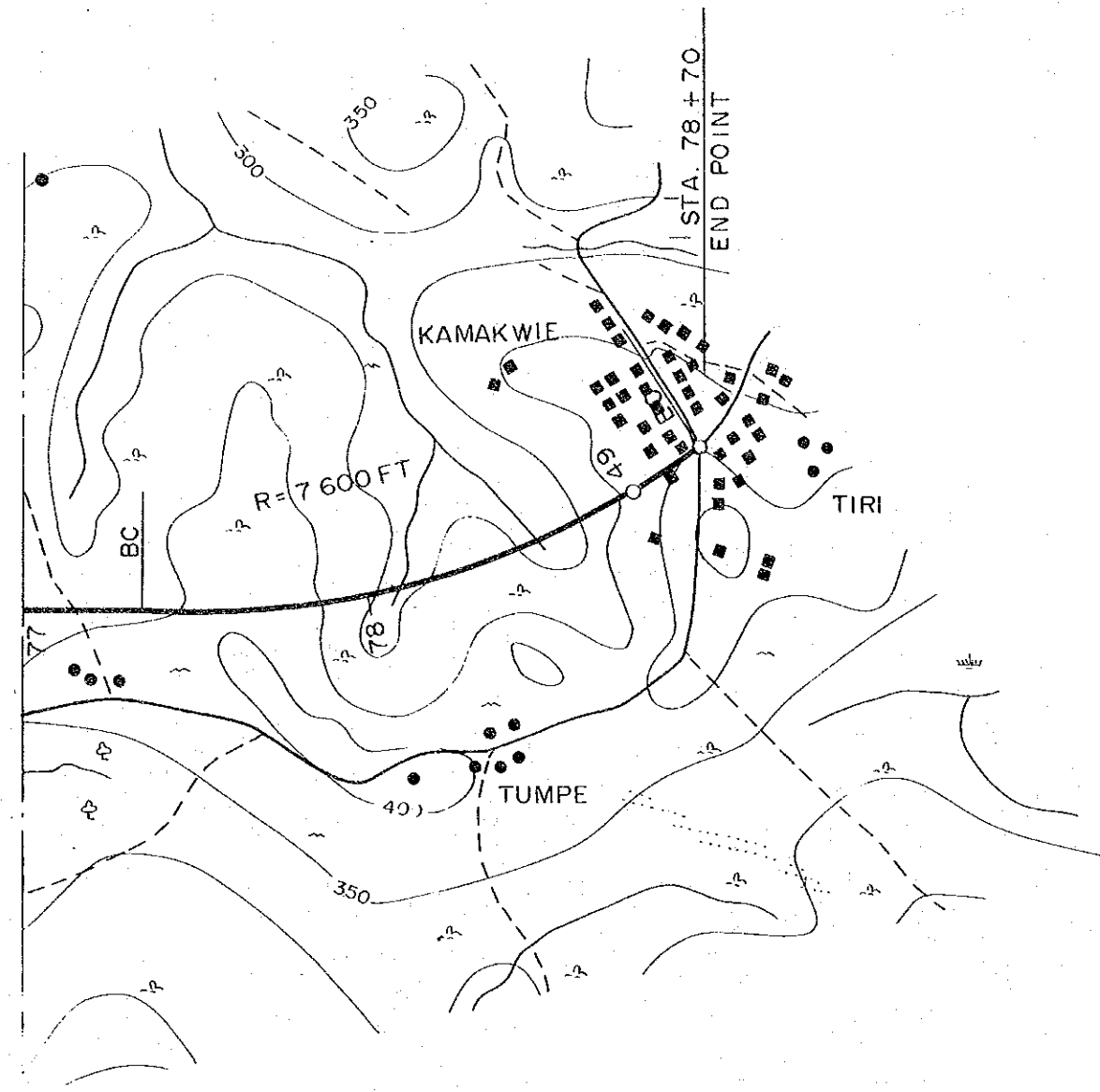
IMPROVEMENT	
ROAD SURFACE KIND	
C B R OF SUBGRADE	
DISTANCE	
MILES	
KILOMETERS	





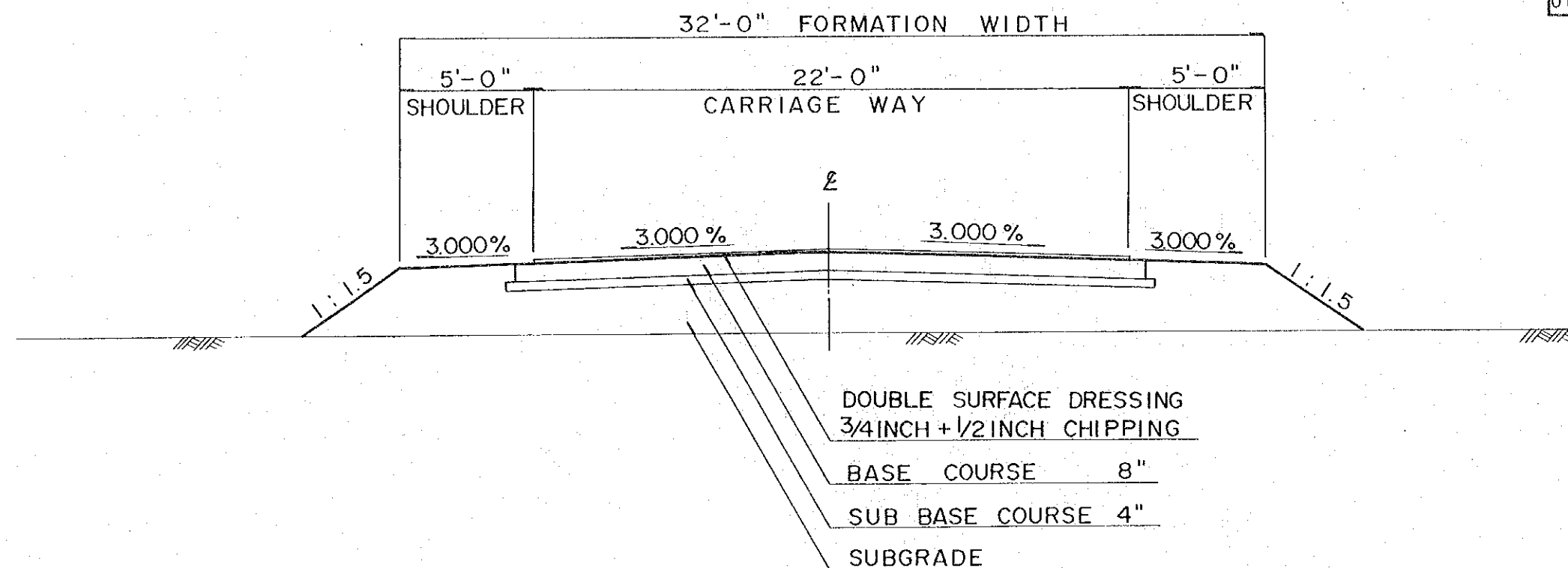
MAKENI-KAMAKWIE ROAD PROJECT FEASIBILITY STUDY		
PLAN AND PROFILE	(C)	DWG-34
SHEET NO.	12	

0 (KILOMETER) 5 10 15
0 (MILE) 0.5

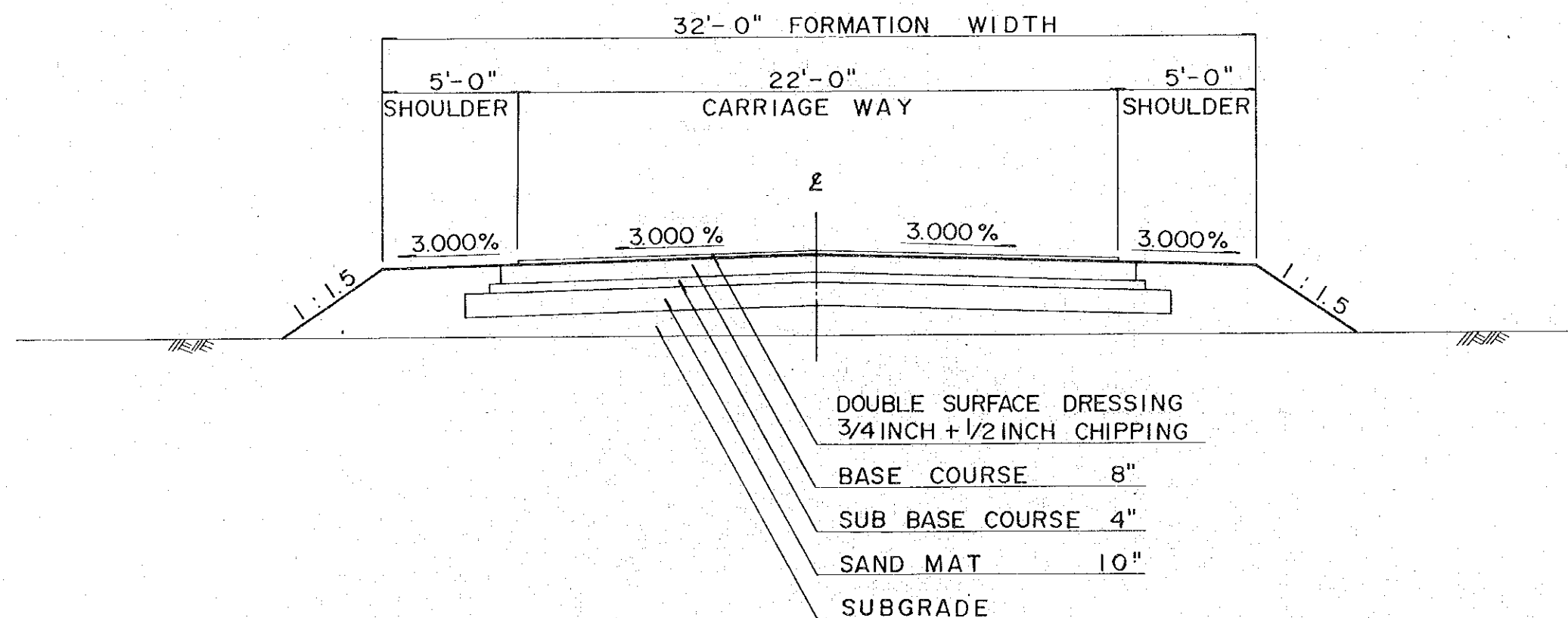


APPENDIX S-4 TYPICAL CROSS SECTIONS

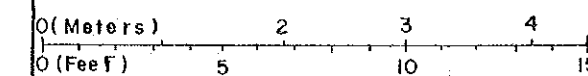
TYPE A

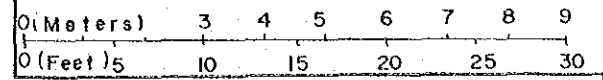


TYPE B

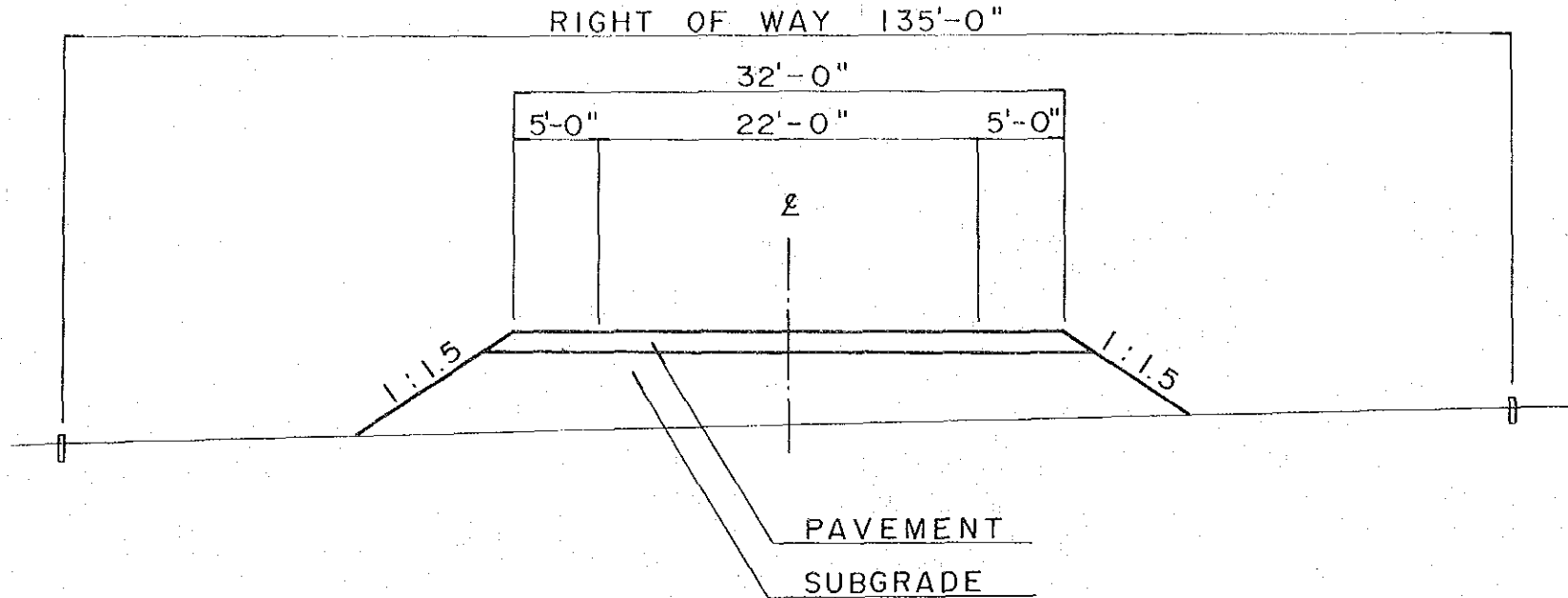


MAKENI-KAMAKWIE ROAD PROJECT	
FEASIBILITY STUDY	
TYPICAL CROSS SECTION	DWG-35
TYPICAL PAVEMENT STRUCTURE	

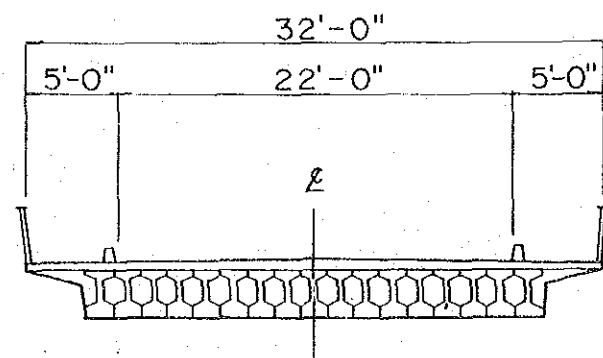




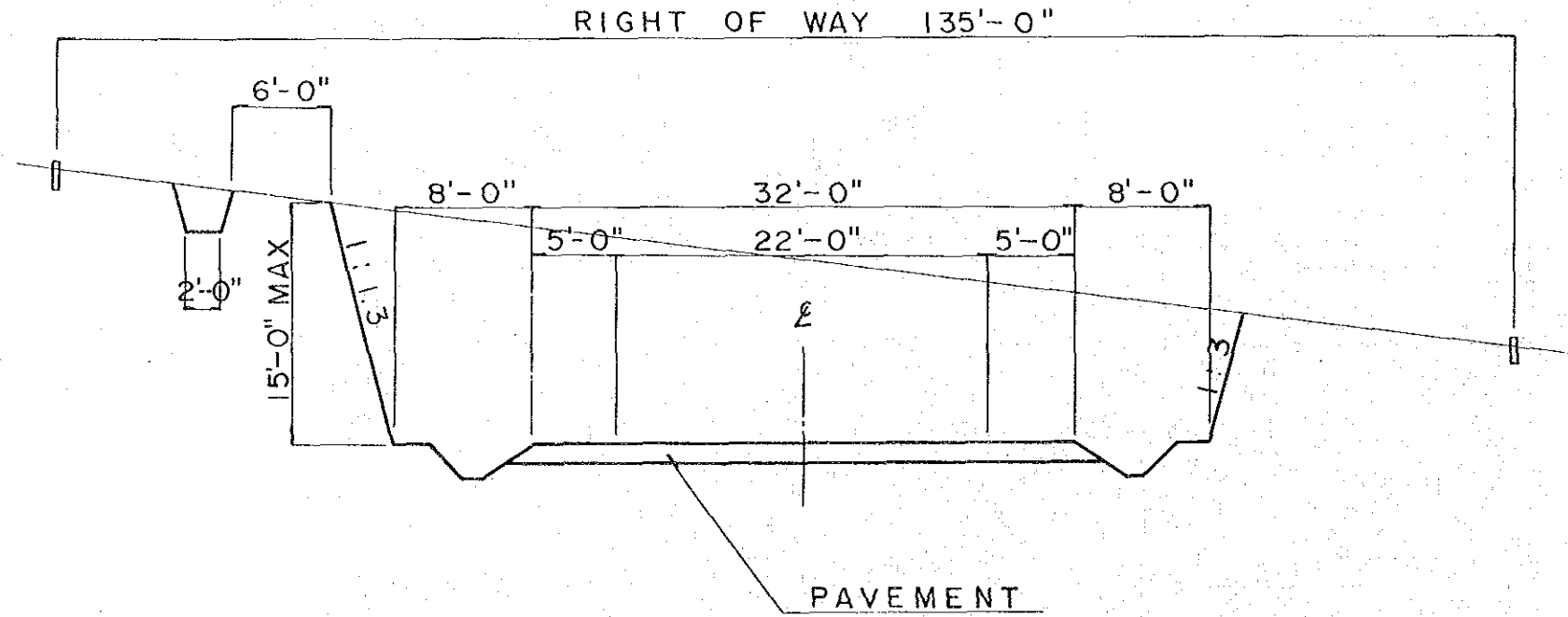
FILL SECTION

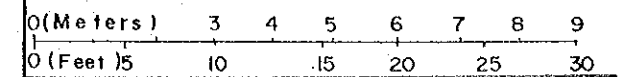


BRIDGE SECTION



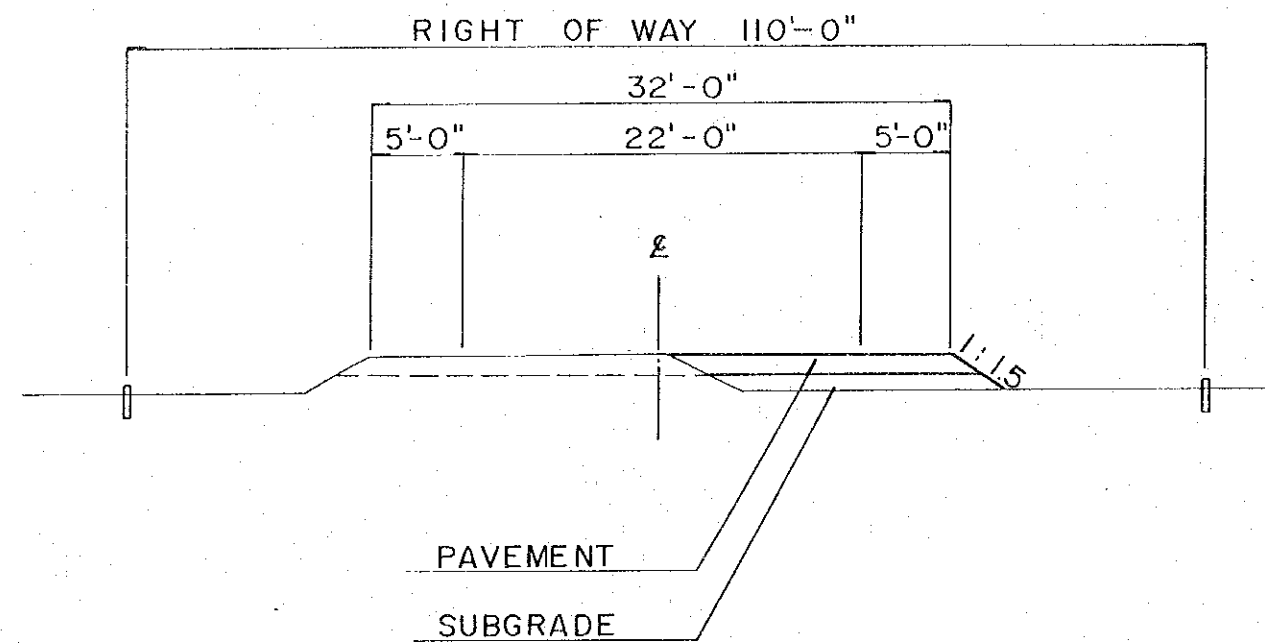
CUT SECTION



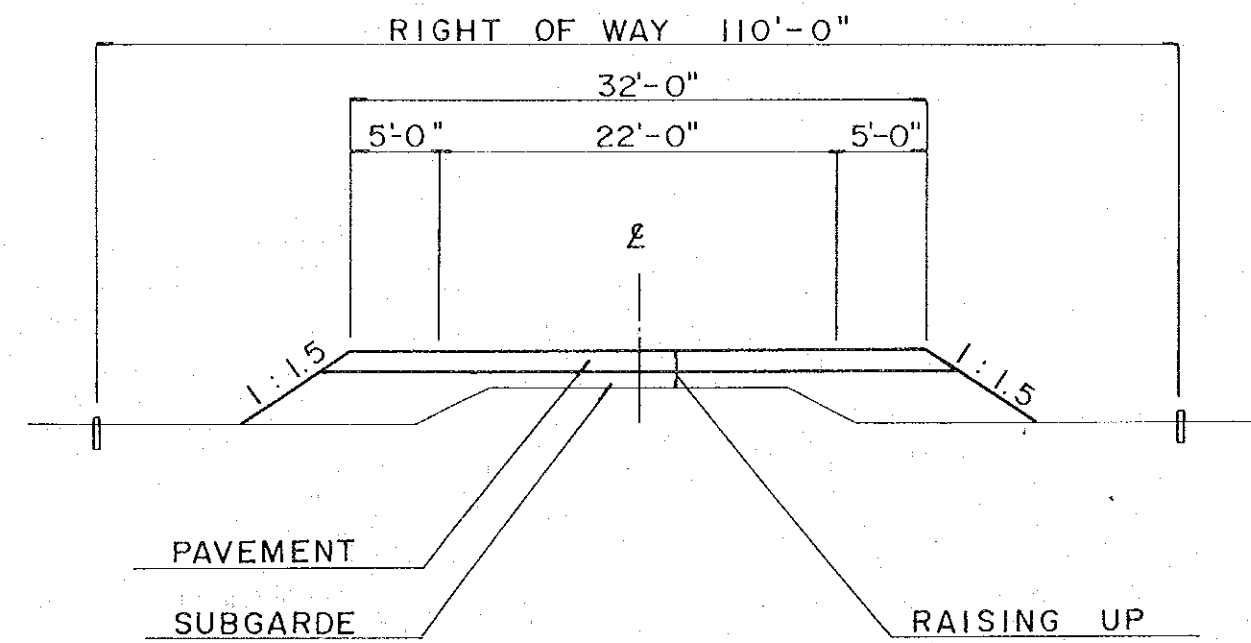


FILL SECTION

WIDENING

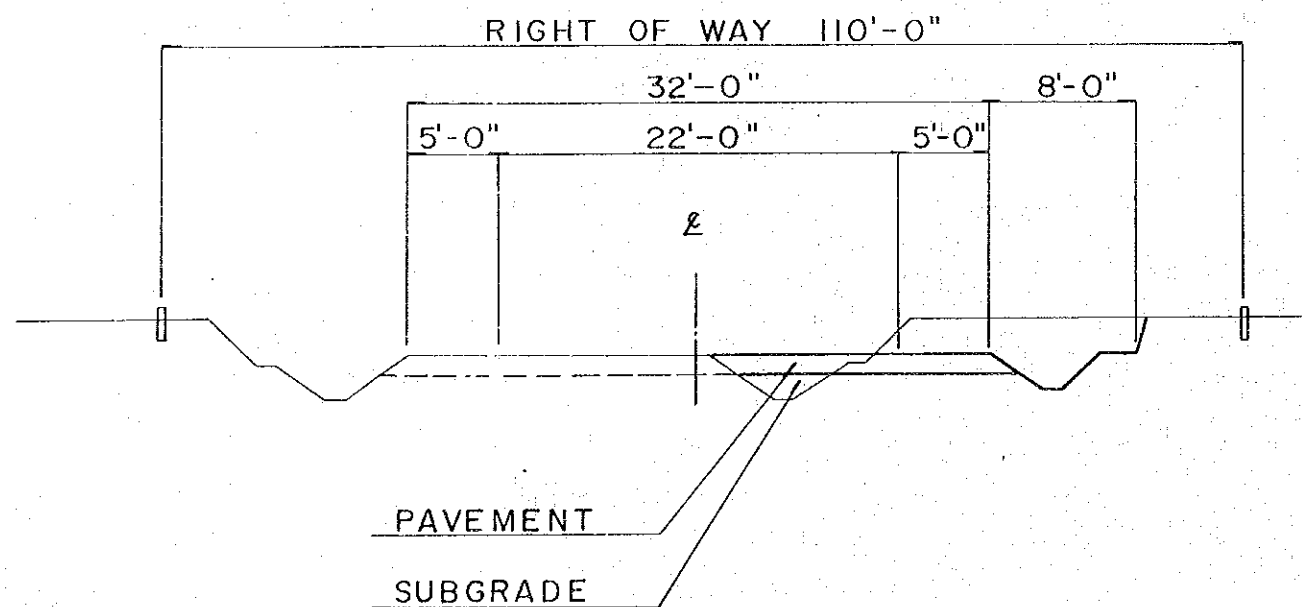


RAISING UP AND WIDENING

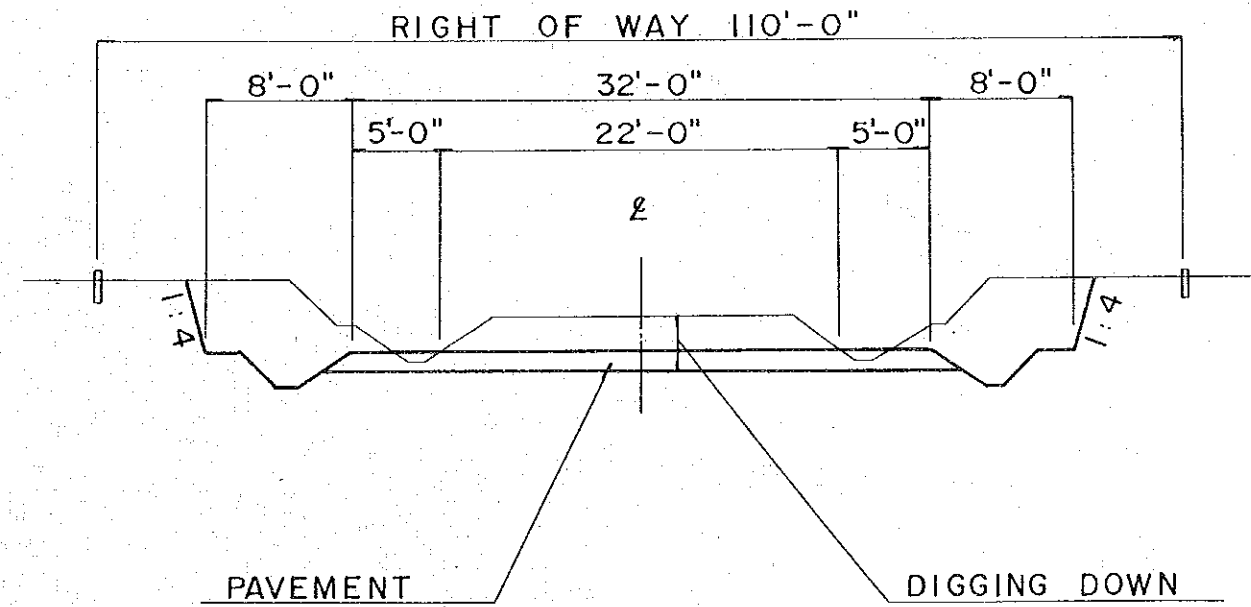


OUT SECTION

WIDENING

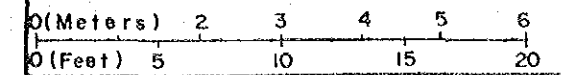


DIGGING DOWN AND WIDENING

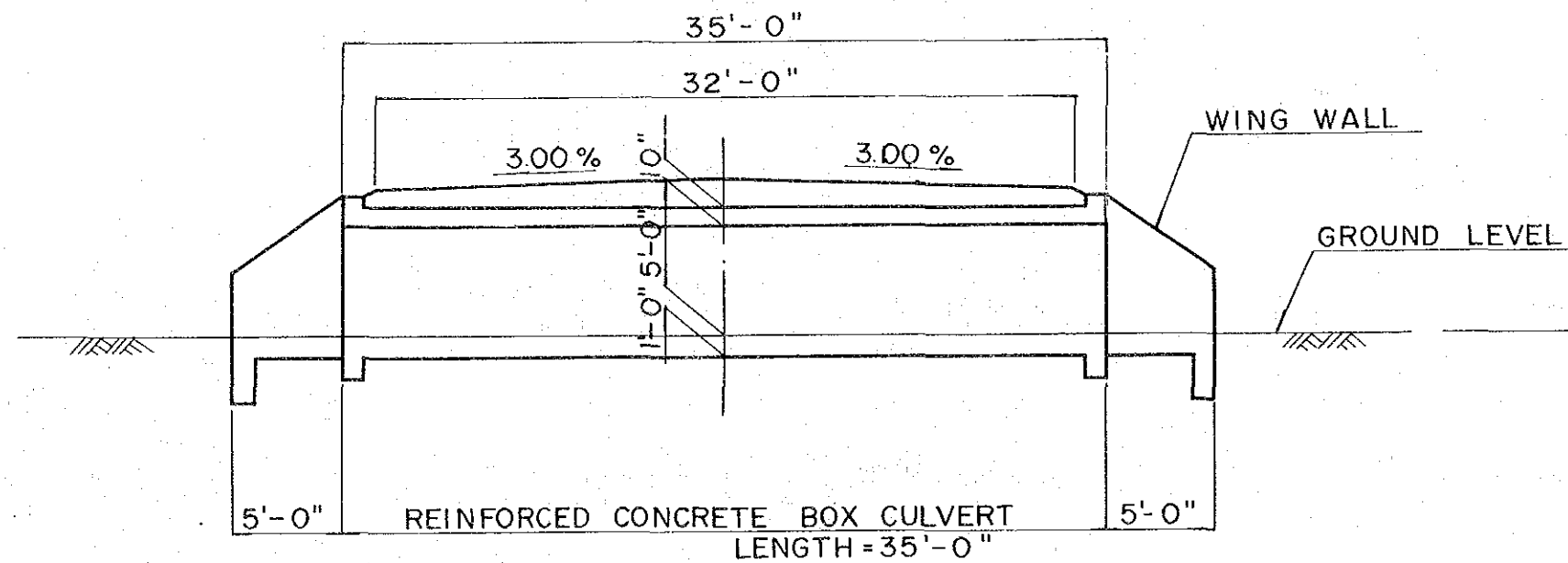


APPENDIX S-5 STANDARD BOX AND PIPE CULVERTS

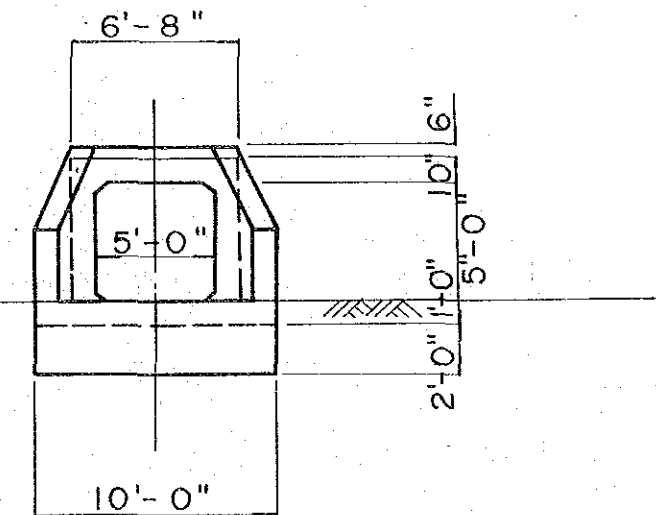
MAKENI-KAMAKWIE ROAD PROJECT	
FEASIBILITY STUDY	
BOX CULVERT 5FT x 5FT	DWG-38
SHEET NO. 1	



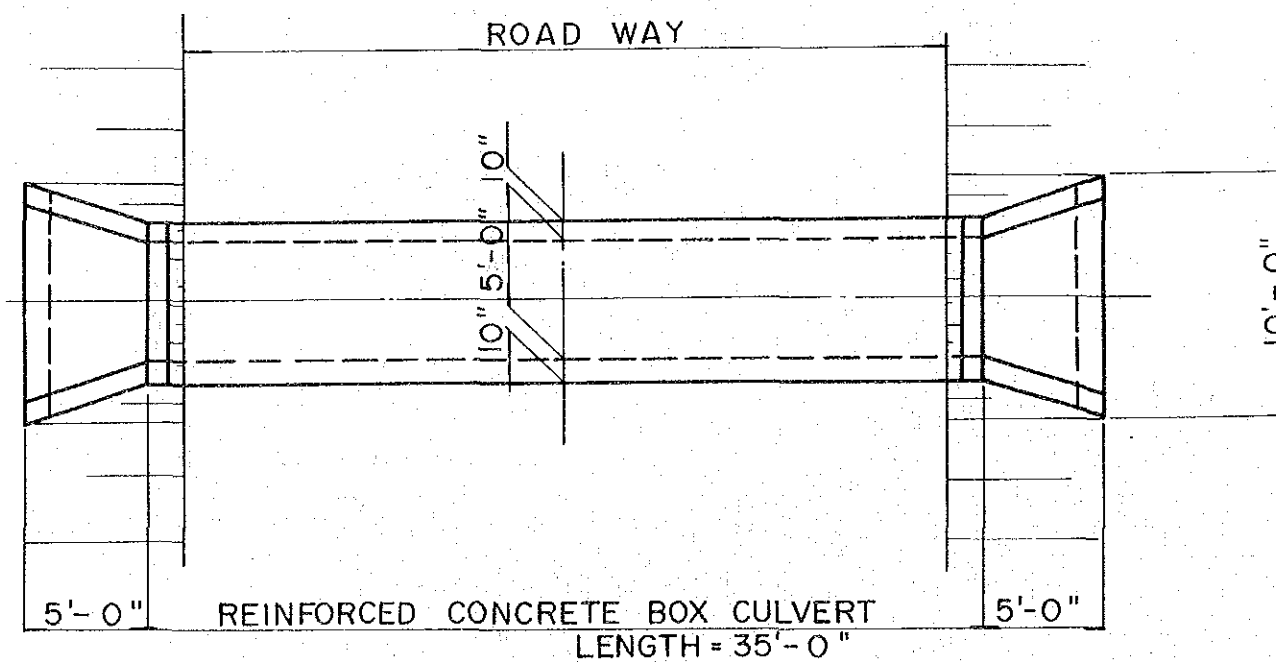
PROFILE



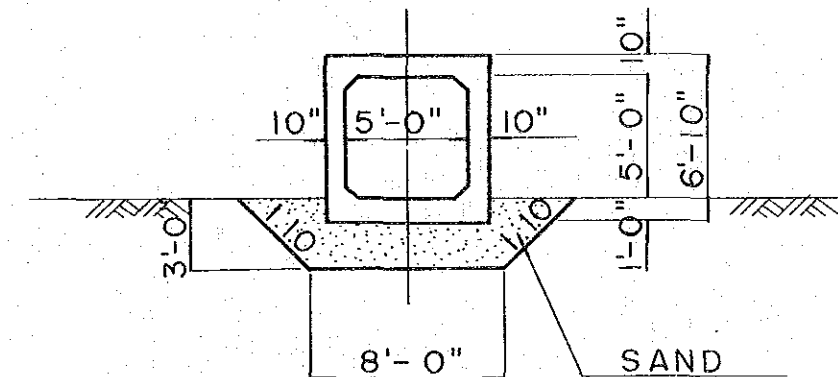
FRON VIEW



PLAN

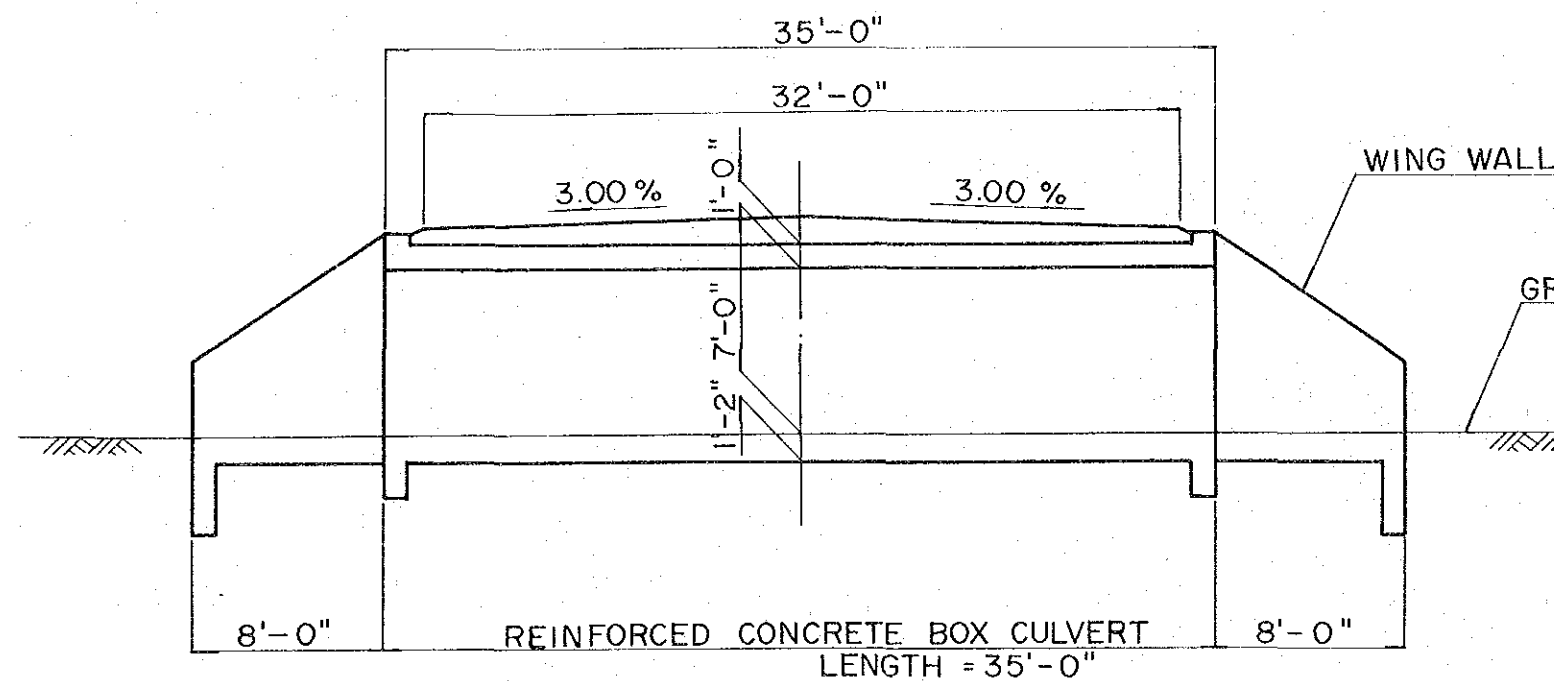


CROSS SECTION

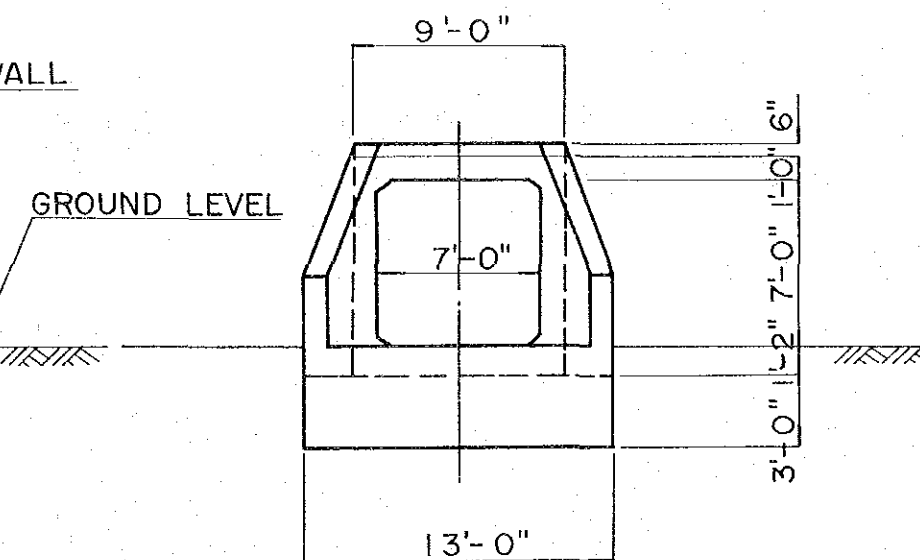


0 (Meters)	2	3	4	5	6
0 (Feet)	5	10	15	20	

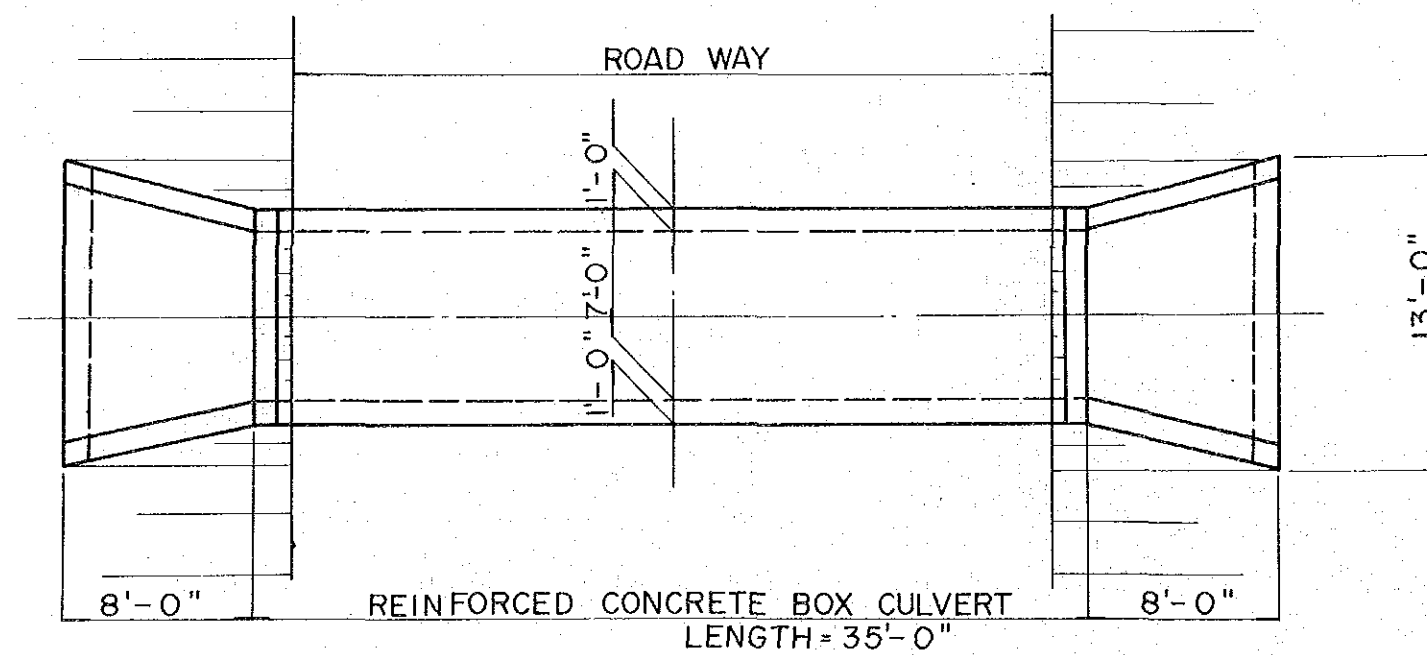
PROFILE



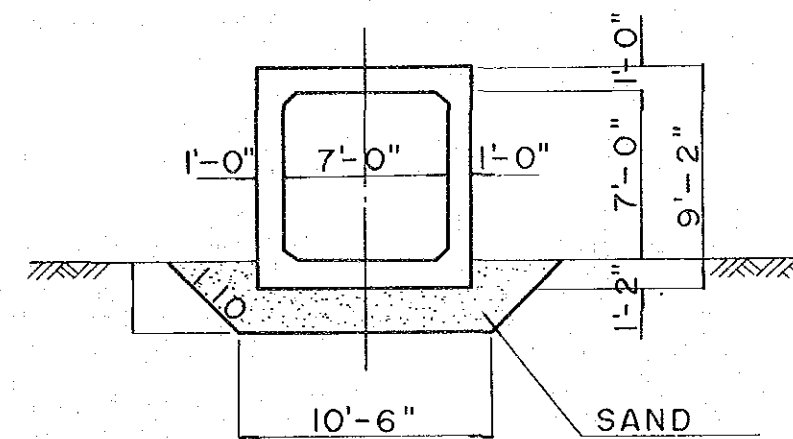
FRONT VIEW



PLAN



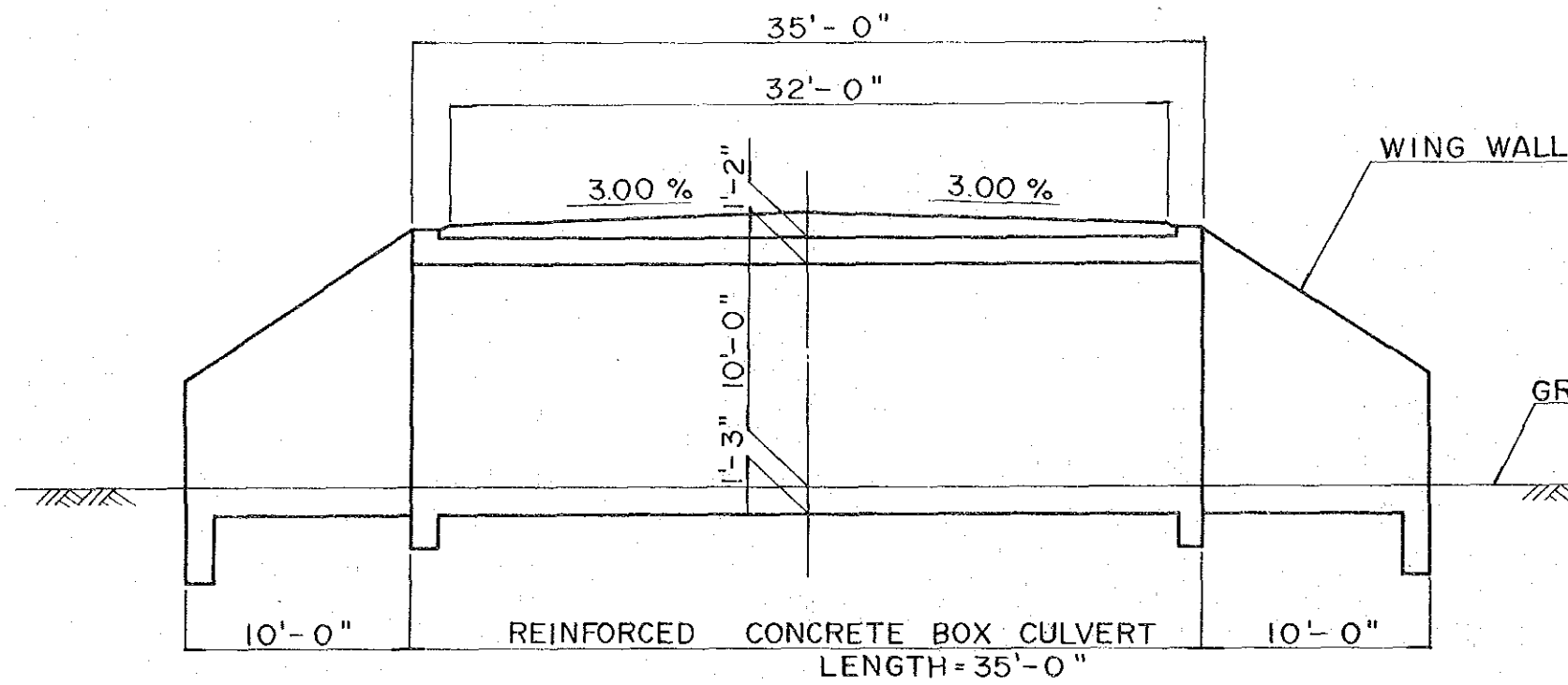
CROSS SECTION



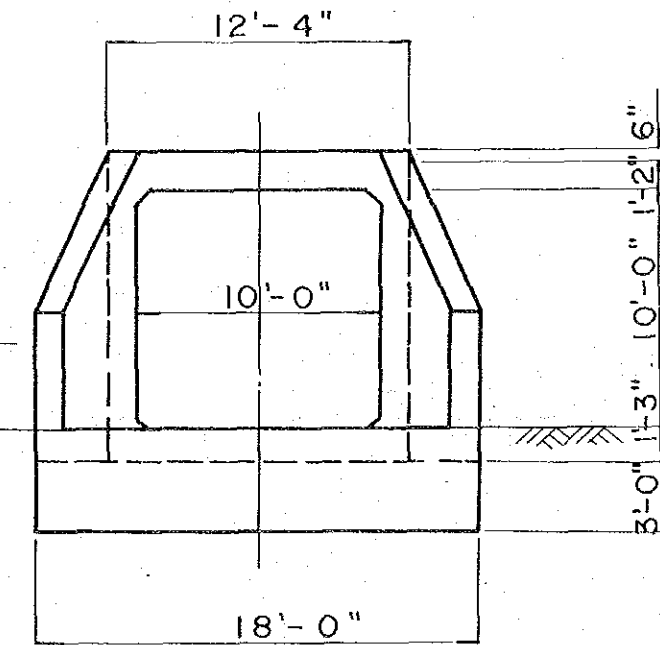
MAKENI-KAMAKWIE ROAD PROJECT	
FEASIBILITY STUDY	
BOX CULVERT 10FT x 10FT	DWG-40
SHEET NO. 3	

0 (Meters)	2	3	4	5	6
0 (Feet)	5	10	15	20	

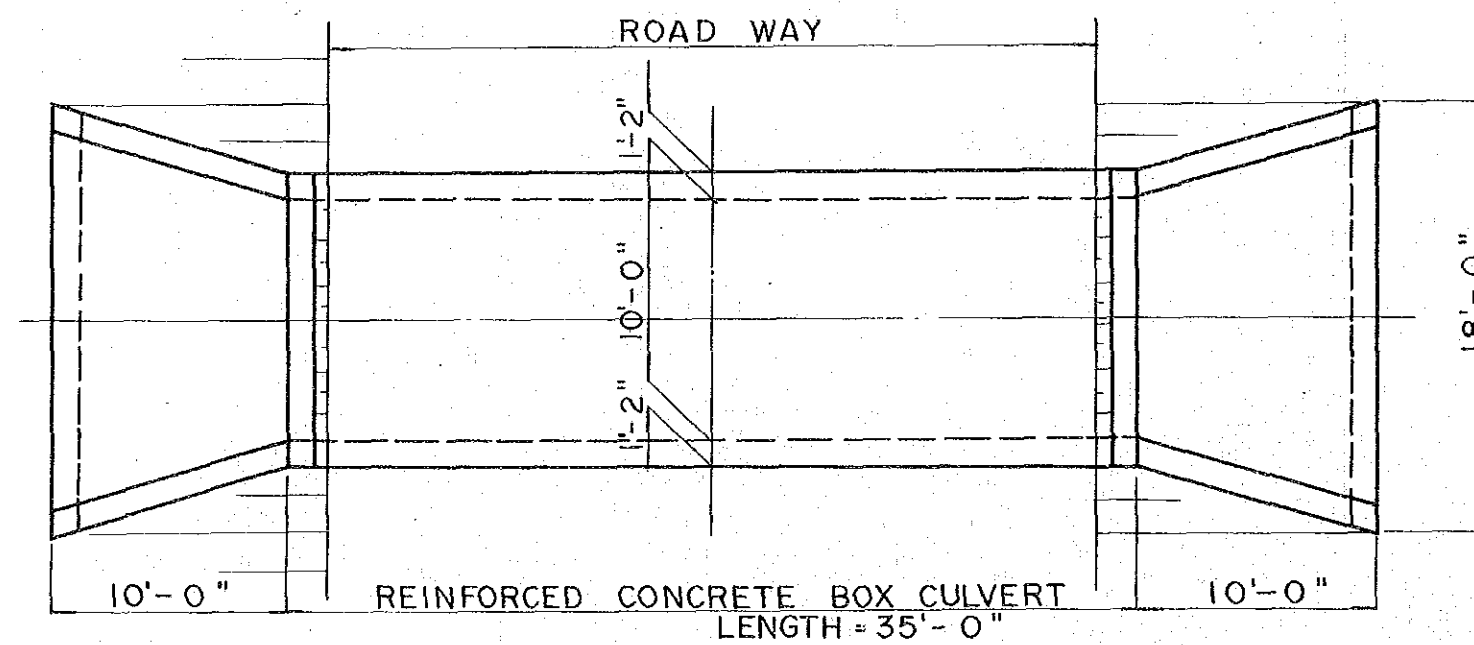
PROFILE



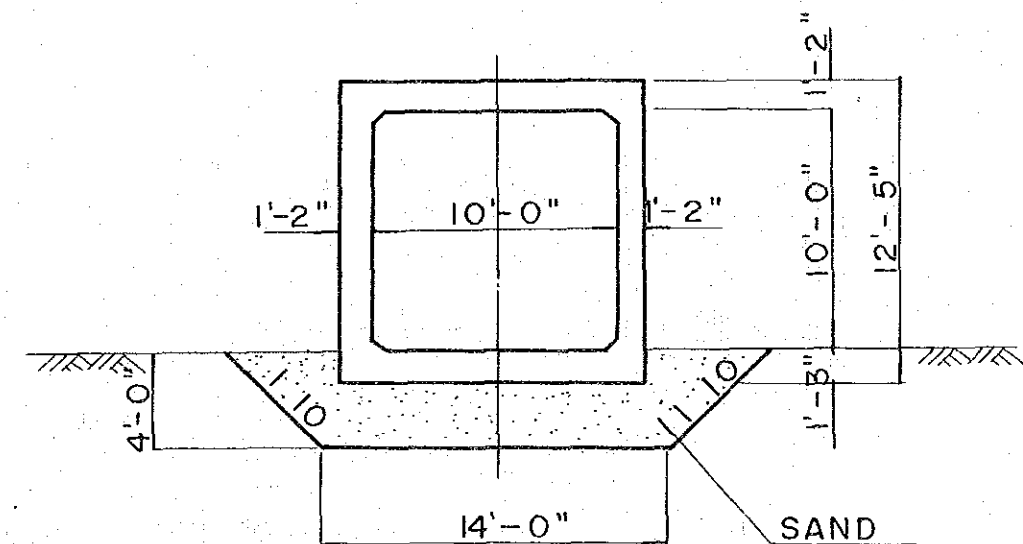
FRONT VIEW

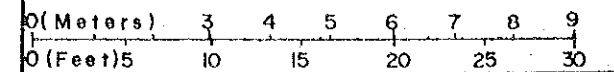


PLAN

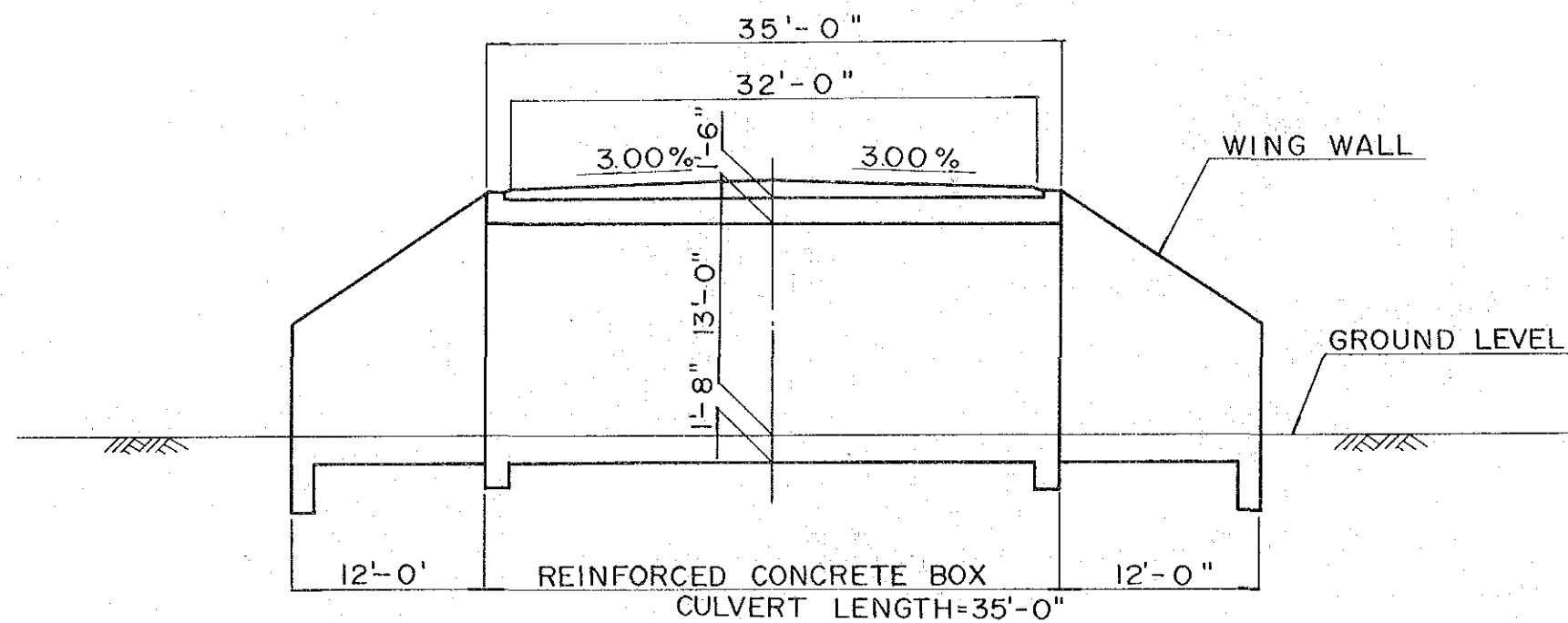


CROSS SECTION

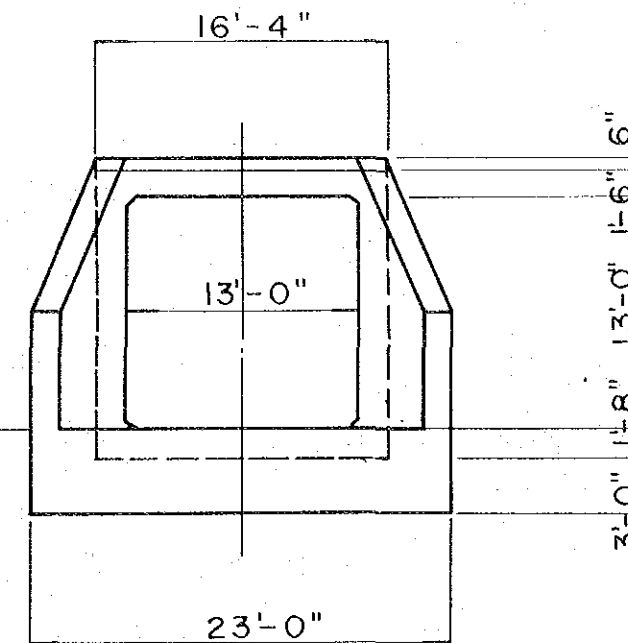




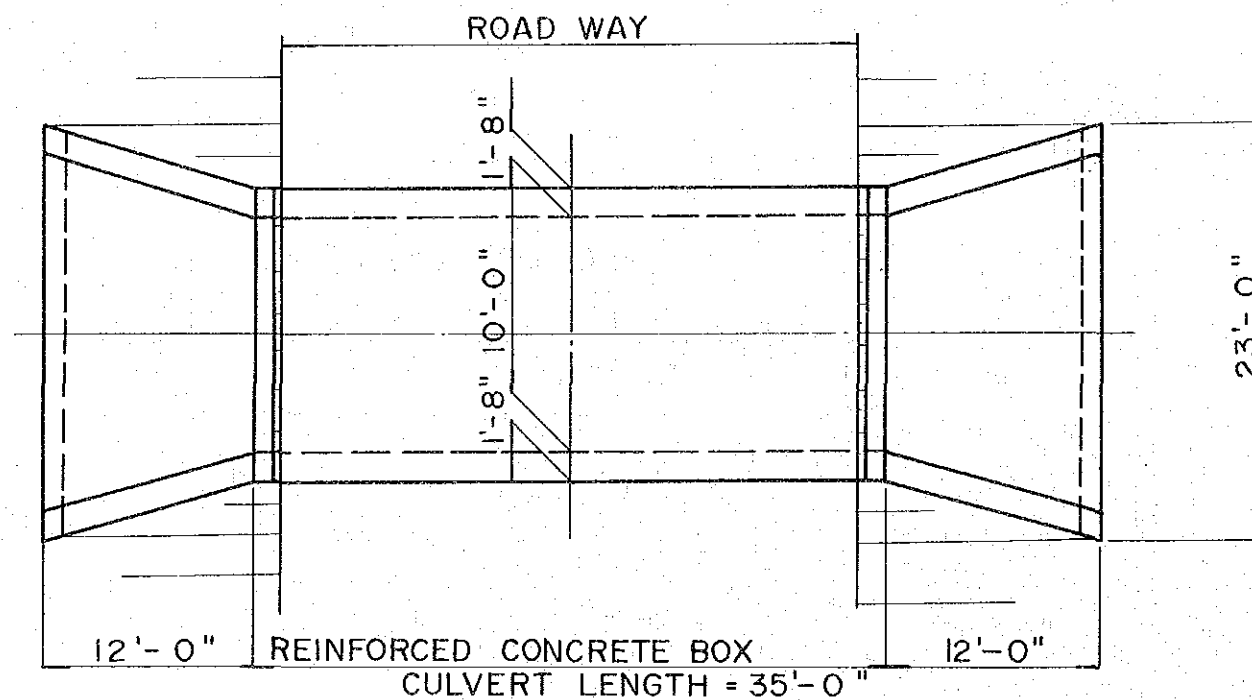
PROFILE



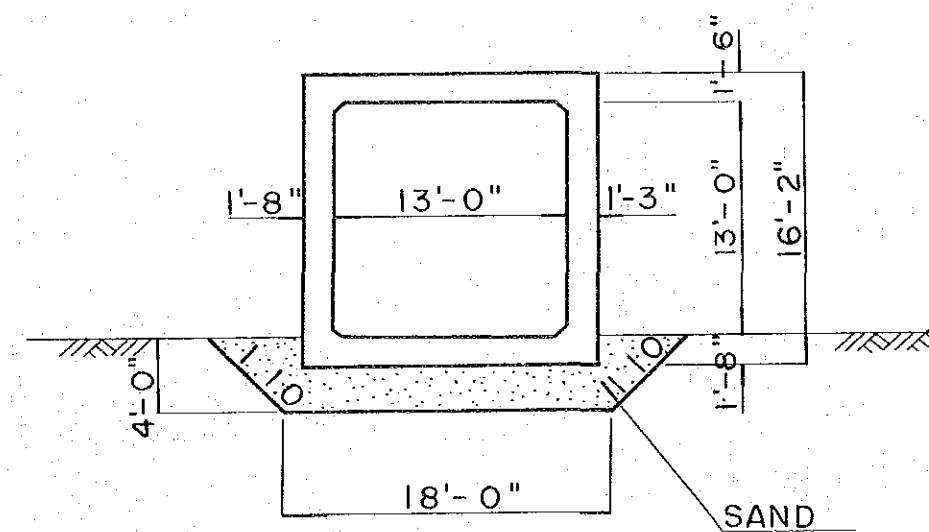
FRONT VIEW

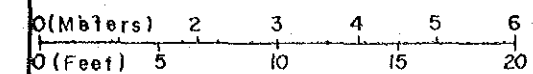


PLAN

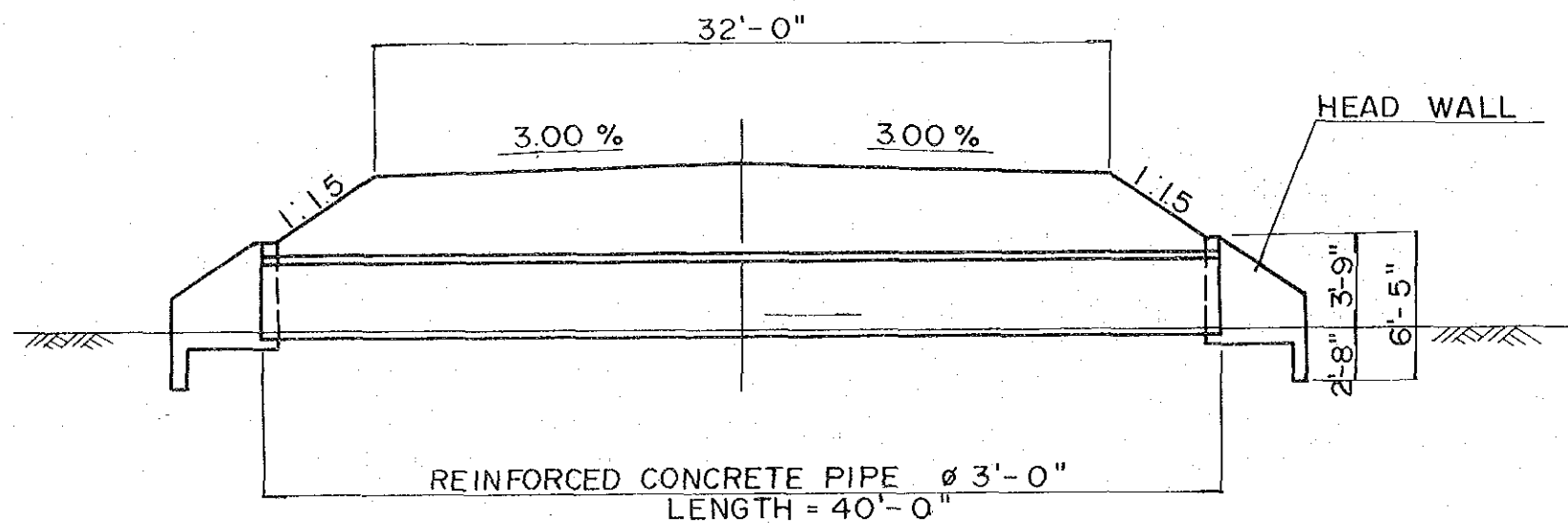


CROSS SECTION

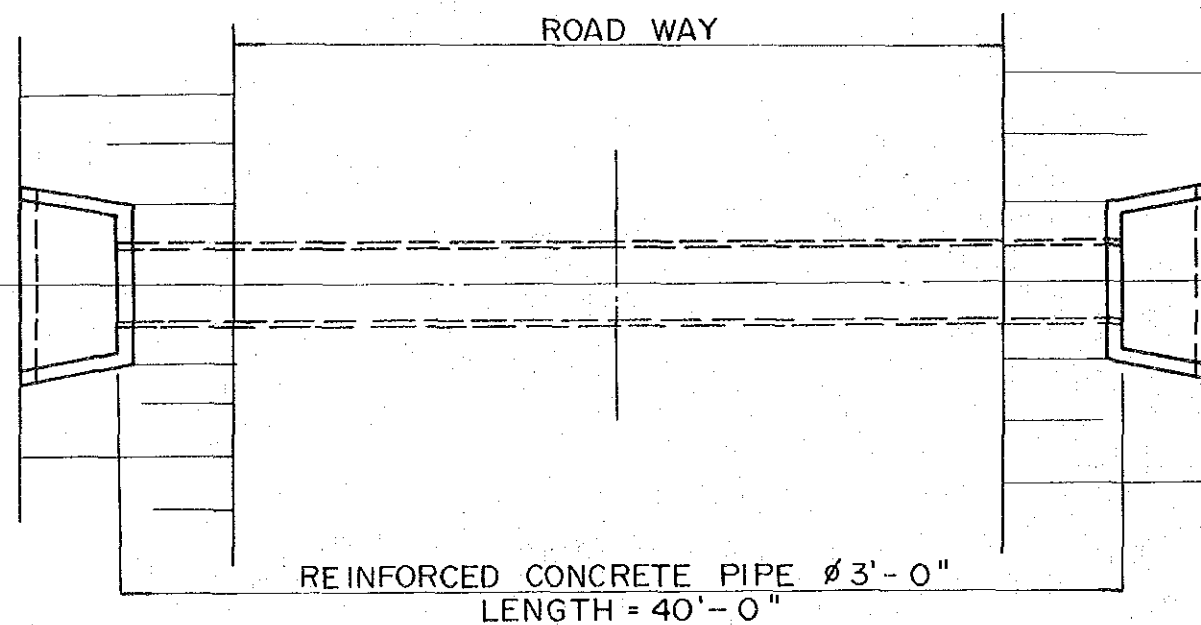




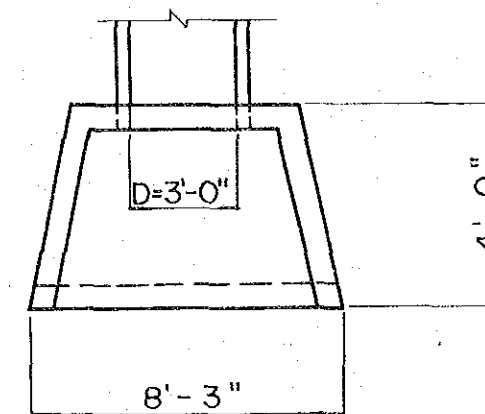
PROFILE



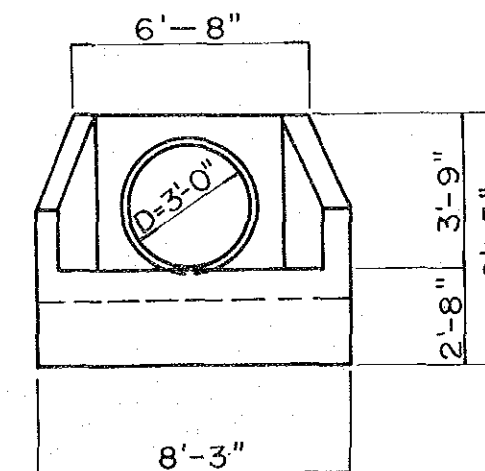
PLAN



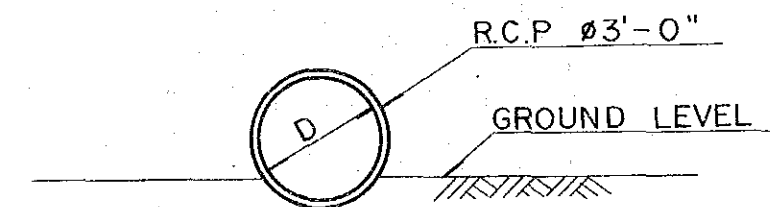
HEAD WALL

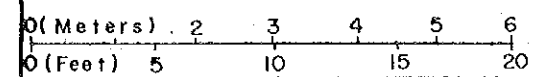


FRONT VIEW

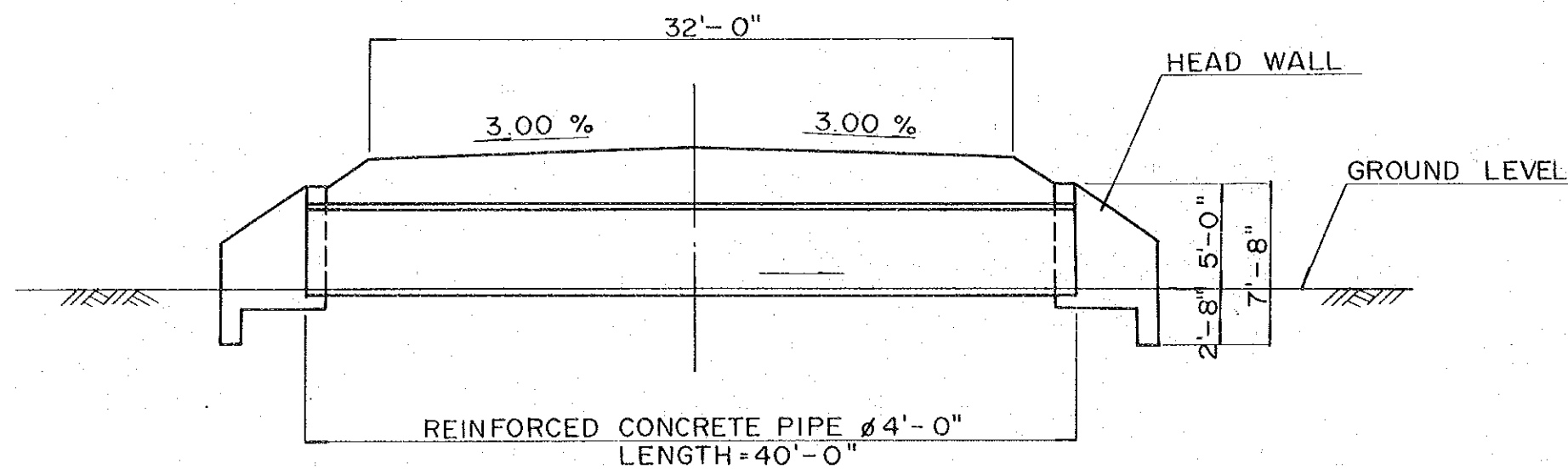


CROSS SECTION

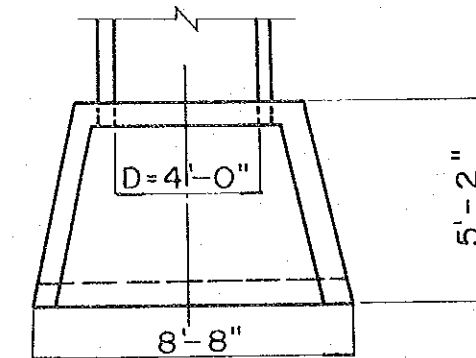




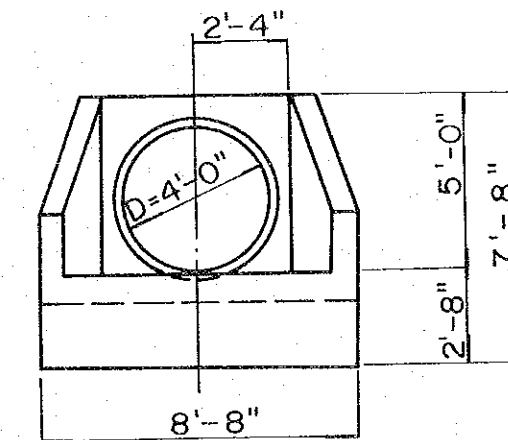
PROFILE



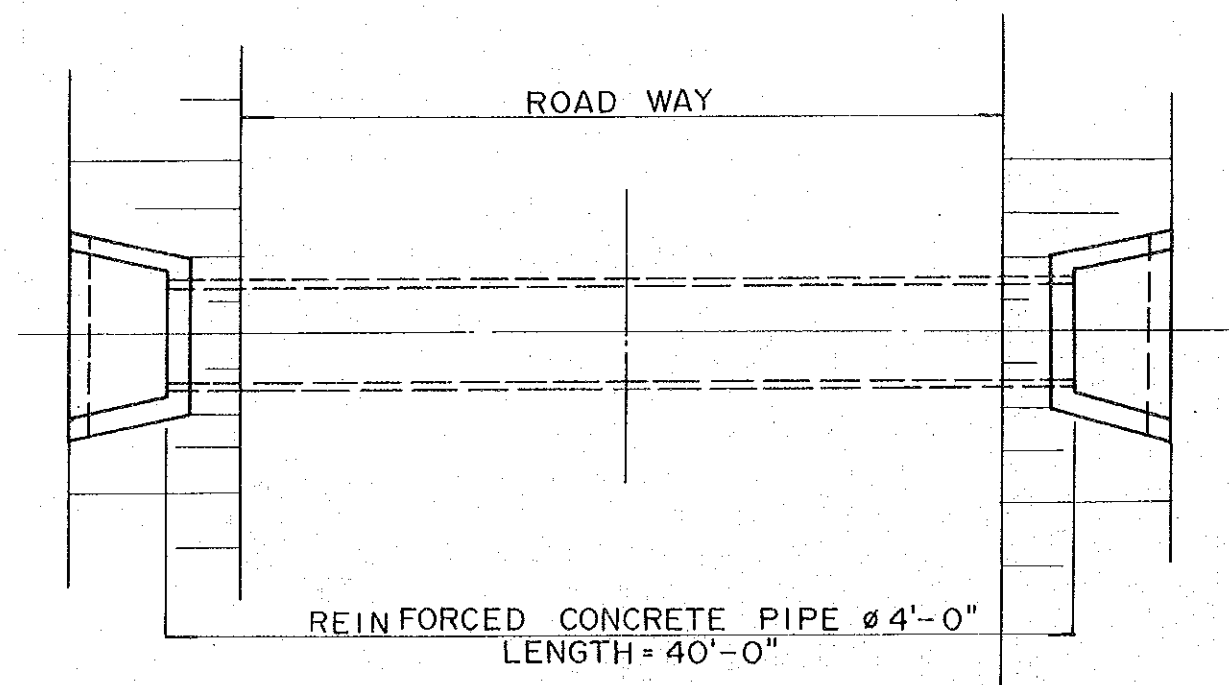
HEAD WALL



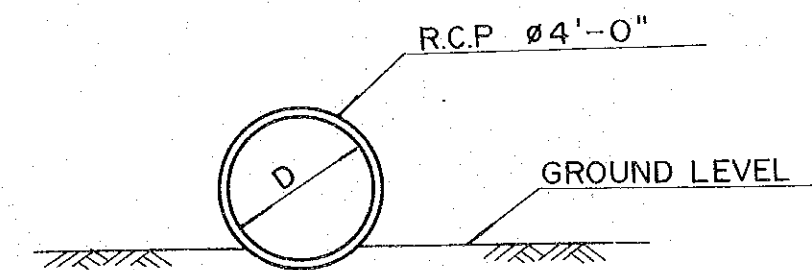
FRONT VIEW



PLAN



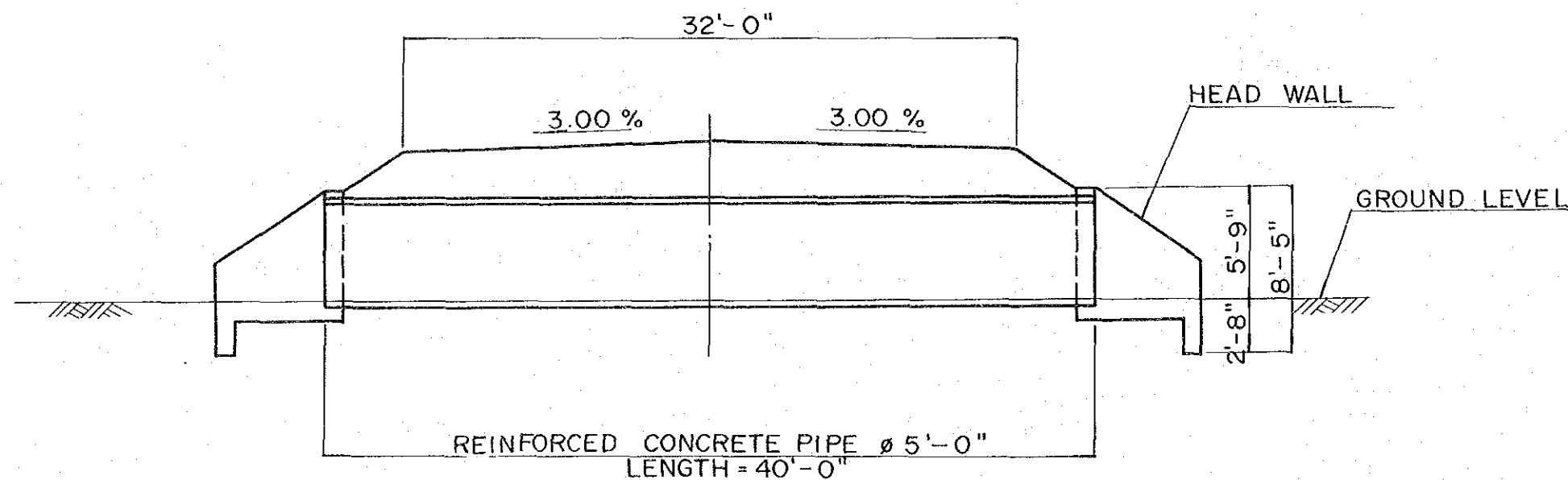
CROSS SECTION



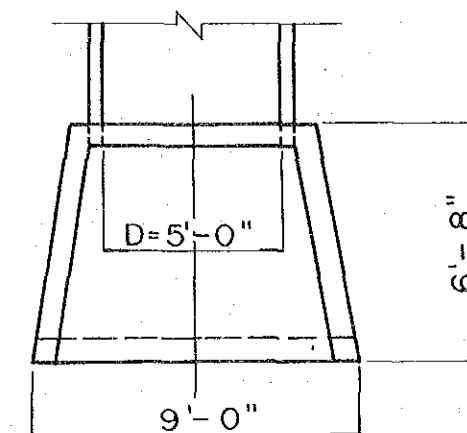
MAKENI-KAMAKWIE ROAD PROJECT	
FEASIBILITY STUDY	
PIPE CULVERT Ø 5FT	DWG-45
SHEET NO. 8	

0 (Meters)	2	3	4	5	6
0 (Feet)	5	10	15	20	

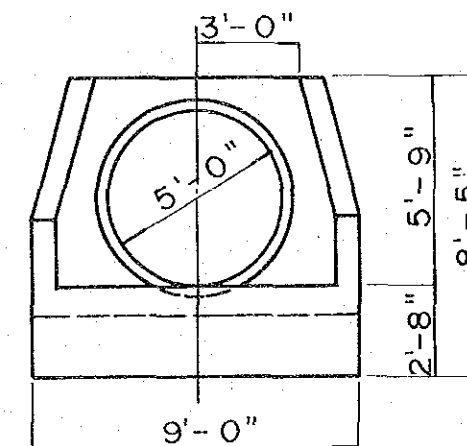
PROFILE



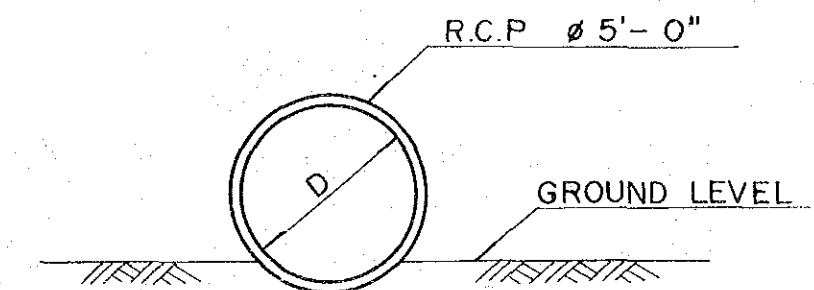
HEAD WALL



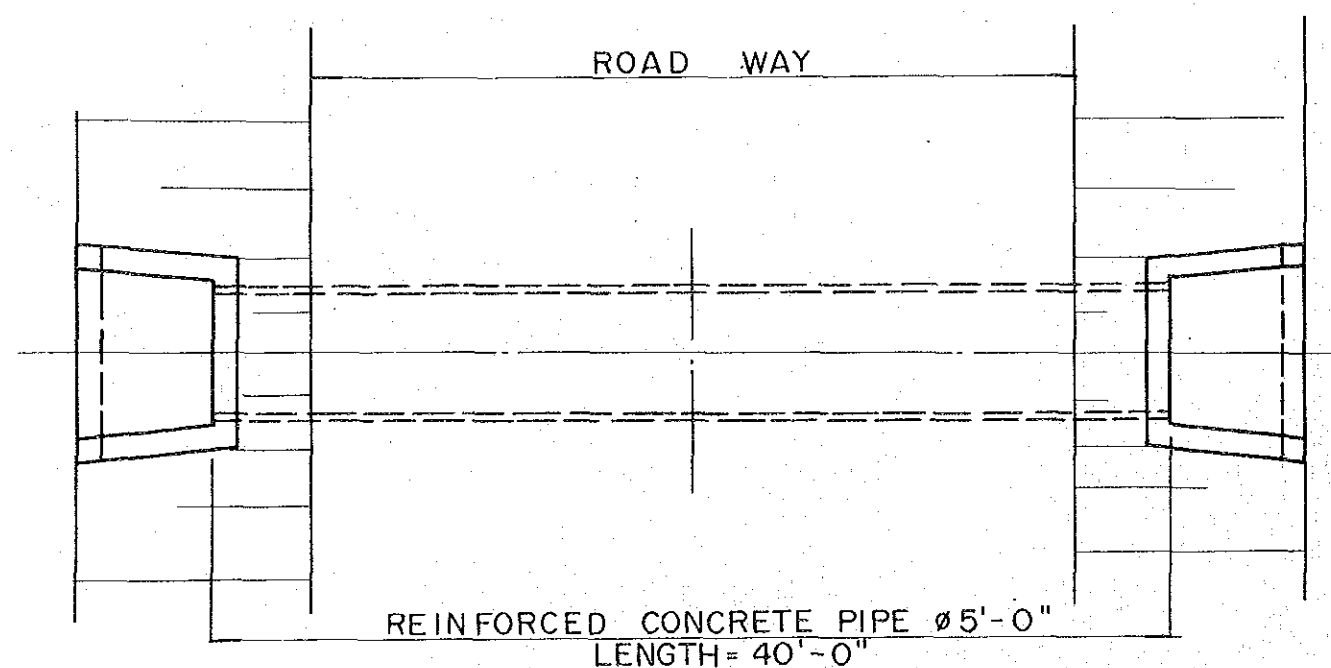
FRONT VIEW



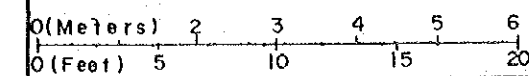
CROSS SECTION



PLAN

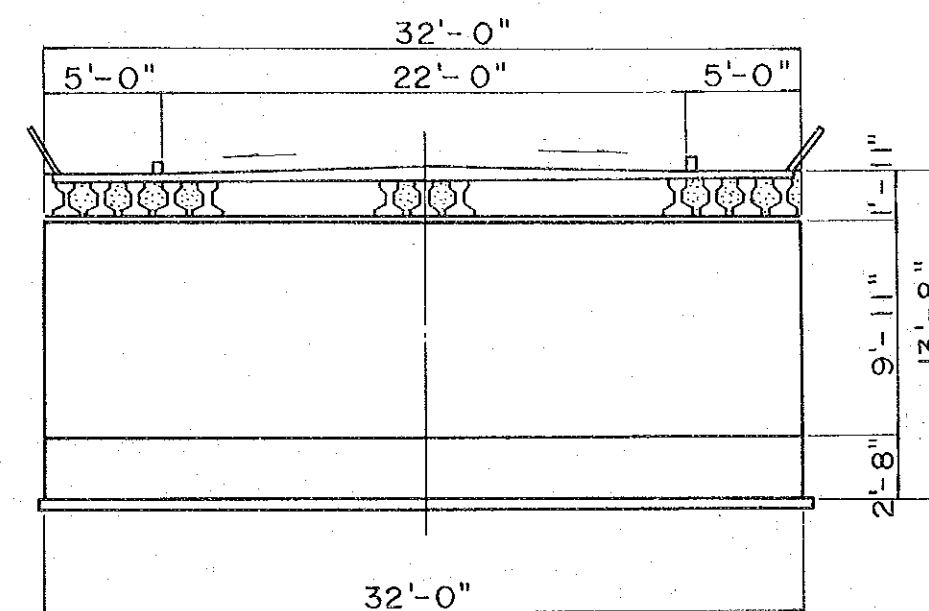
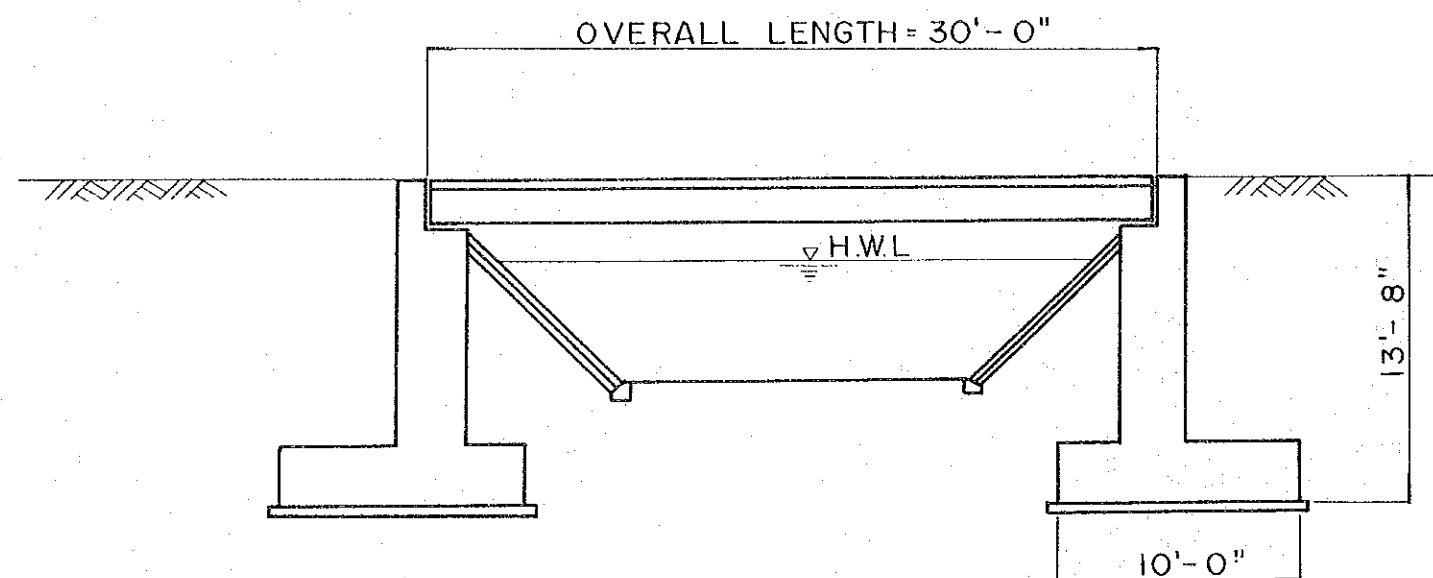


MAKENI-KAMAKWIE ROAD PROJECT FEASIBILITY STUDY	
STANDARD BRIDGE SPAN 30FT	DWG-46
SHEET NO. 1	



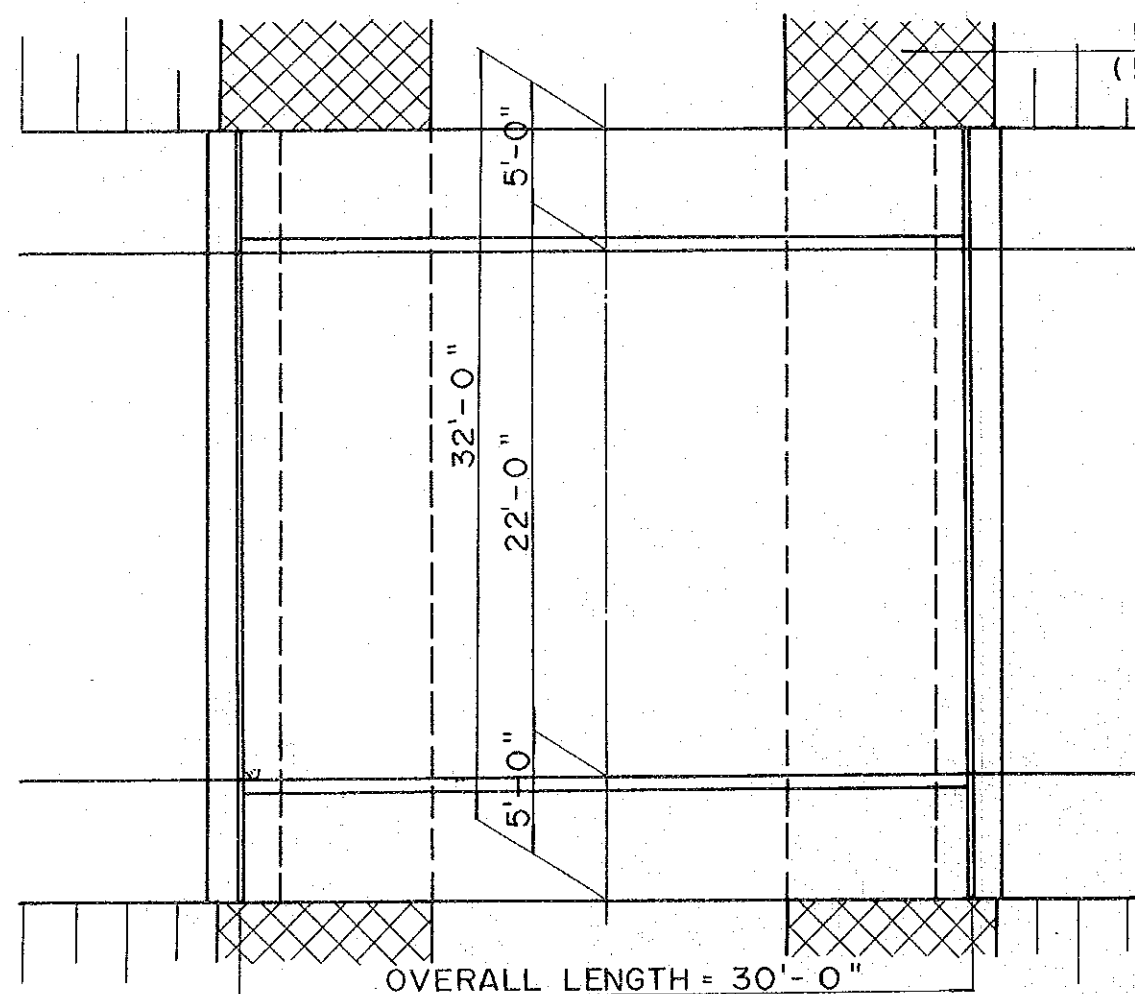
SIDE VIEW

ABUTMENT

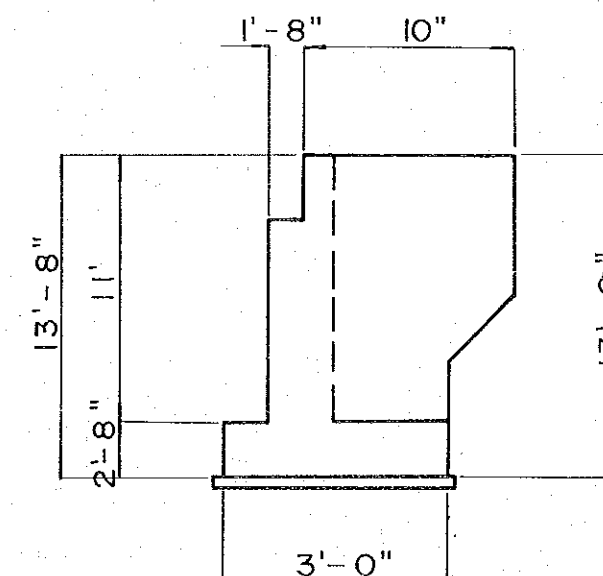


PLAN

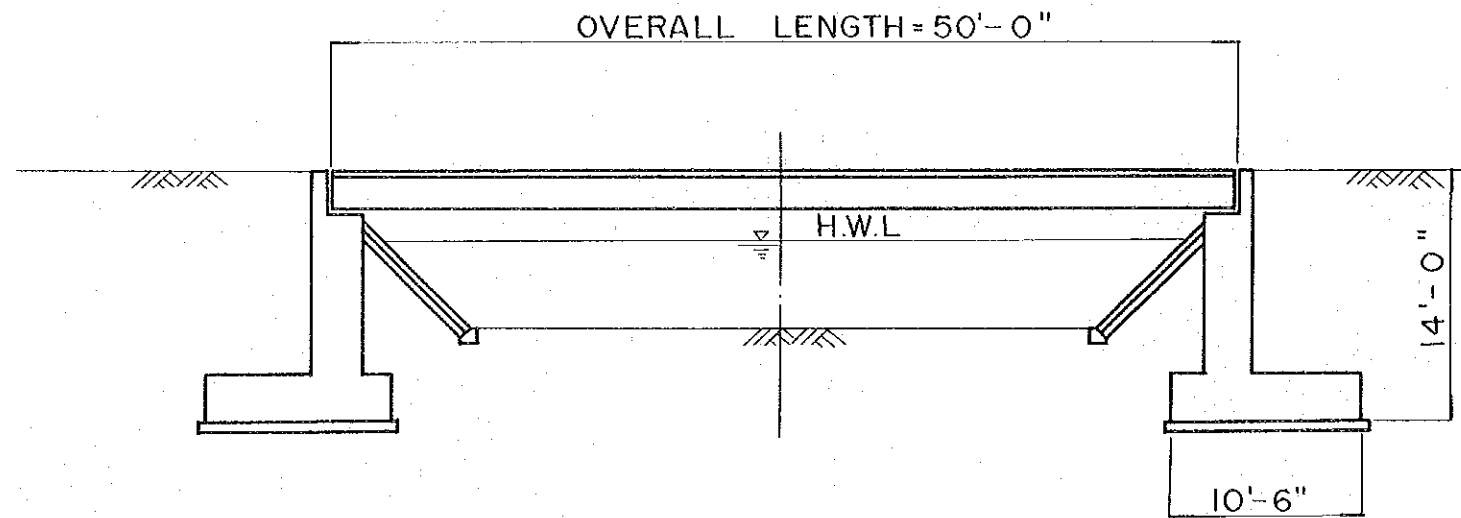
PROTECTOR
(RIPRAP PITCHING)



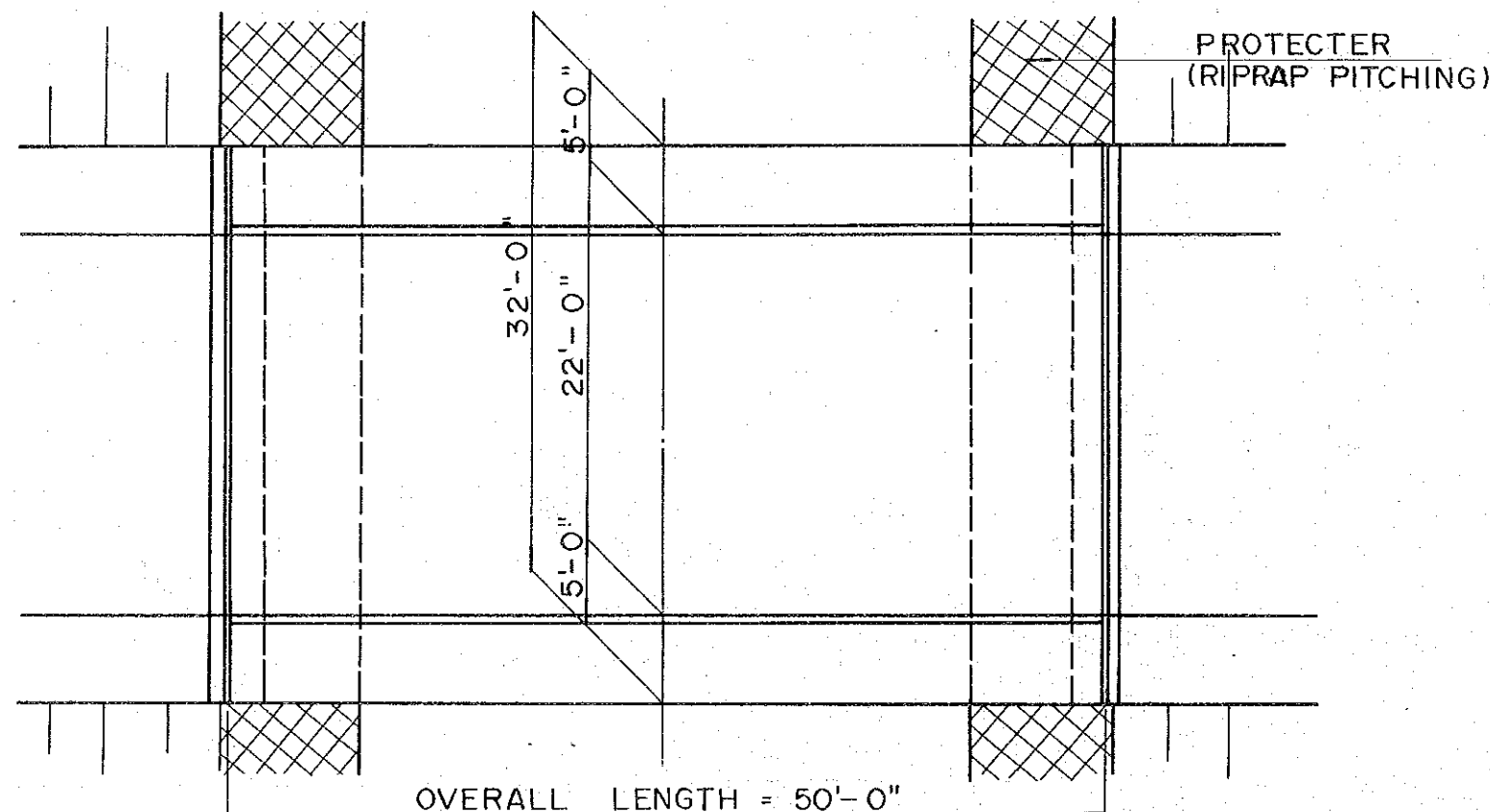
CROSS SECTION



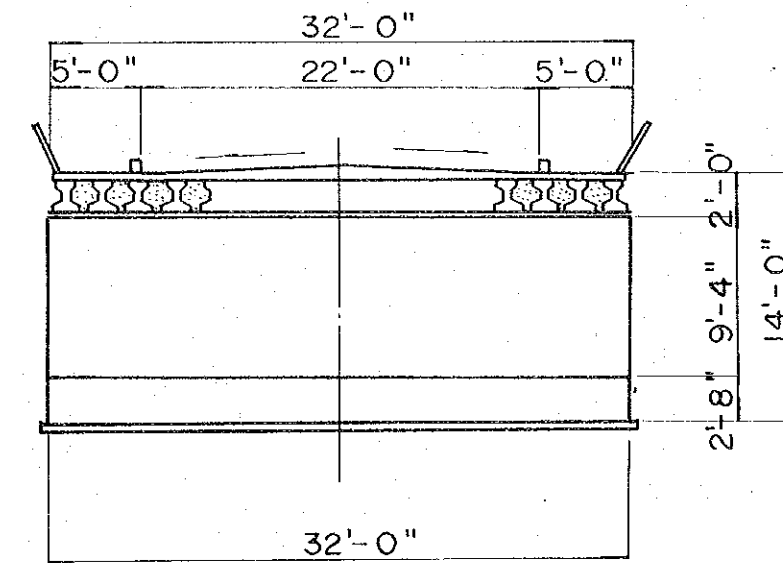
SIDE VIEW



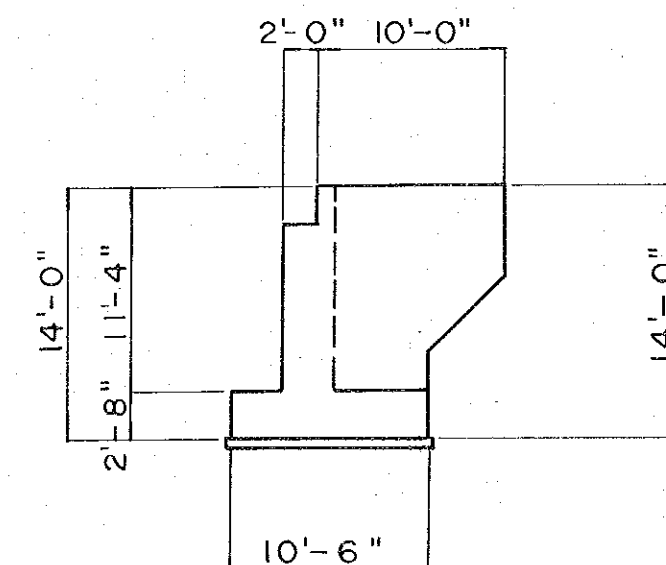
PLAN



ABUTMENT

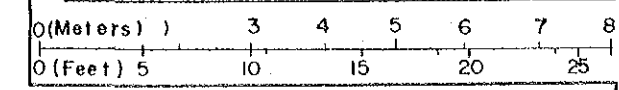


CROSS SECTION

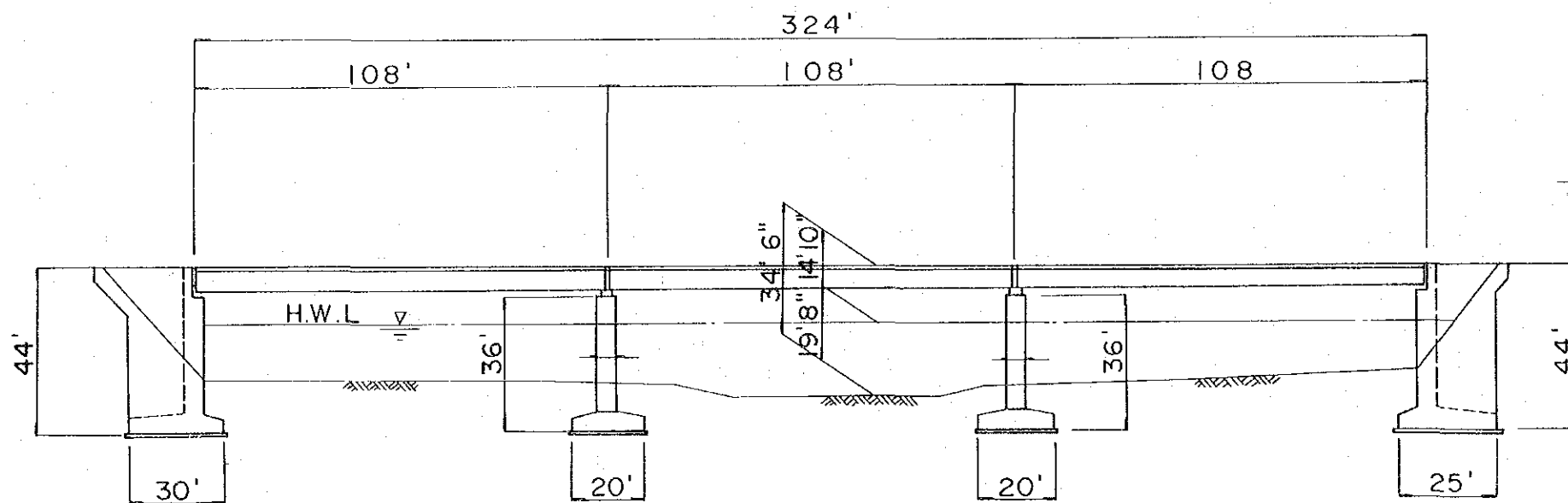


APPENDIX S-7 ALTERNATIVE PLAN AND GENERAL VIEW OF MOBOLE BRIDGE

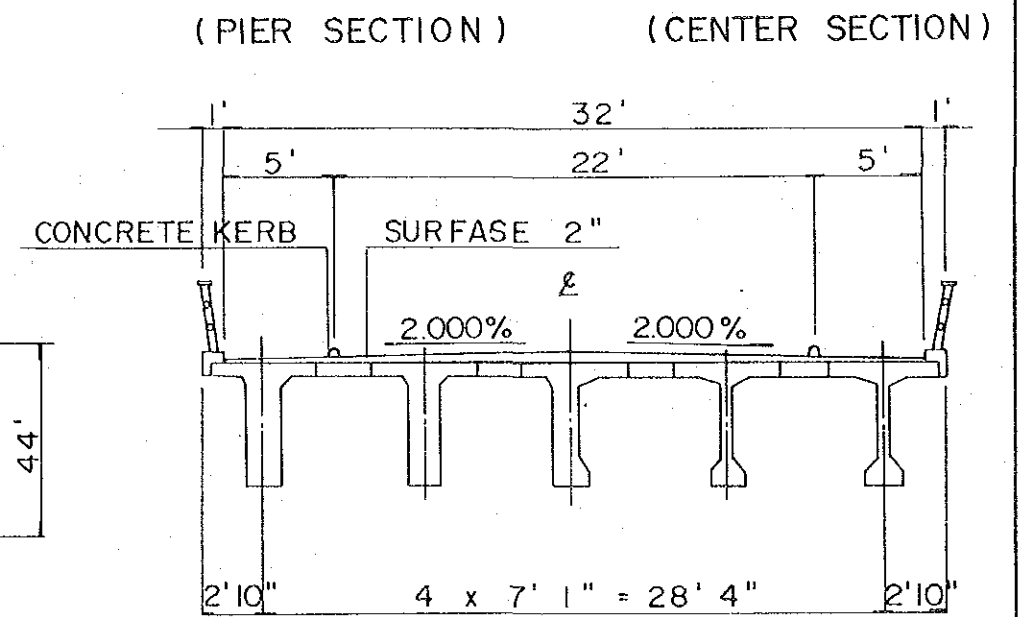
Type of Bridge	Cross Section of Bridge	Structure	Work Item	Bill of Quantities	Direct Construction Cost
Post-tension concrete girder bridge		Superstructure	-	1,152 Sq.Yd	Le. 403,680
		Substructure			
		Abutment	Reinforced concrete	420 Cu.Yd	68,040
			Excavation	1,260 Cu.Yd	2,280
			Temporary work	-	26,880
		Pier	Reinforced concrete	470 Cu.Yd	76,080
			Excavation	990 Cu.Yd	1,800
			Temporary work	-	30,120
		Total			608,880
Composed steel girder bridge		Superstructure	-	1,152 Sq.Yd	Le. 489,360
		Sub-structure			
		Abutment	Reinforced concrete	371 Cu.Yd	59,800
			Excavation	1,061 Cu.Yd	1,920
			Temporary work	-	22,200
		Pier	Reinforced concrete	424 Cu.Yd	68,350
			Excavation	875 Cu.Yd	1,580
			Temporary work	-	24,840
		Total	-	-	668,050



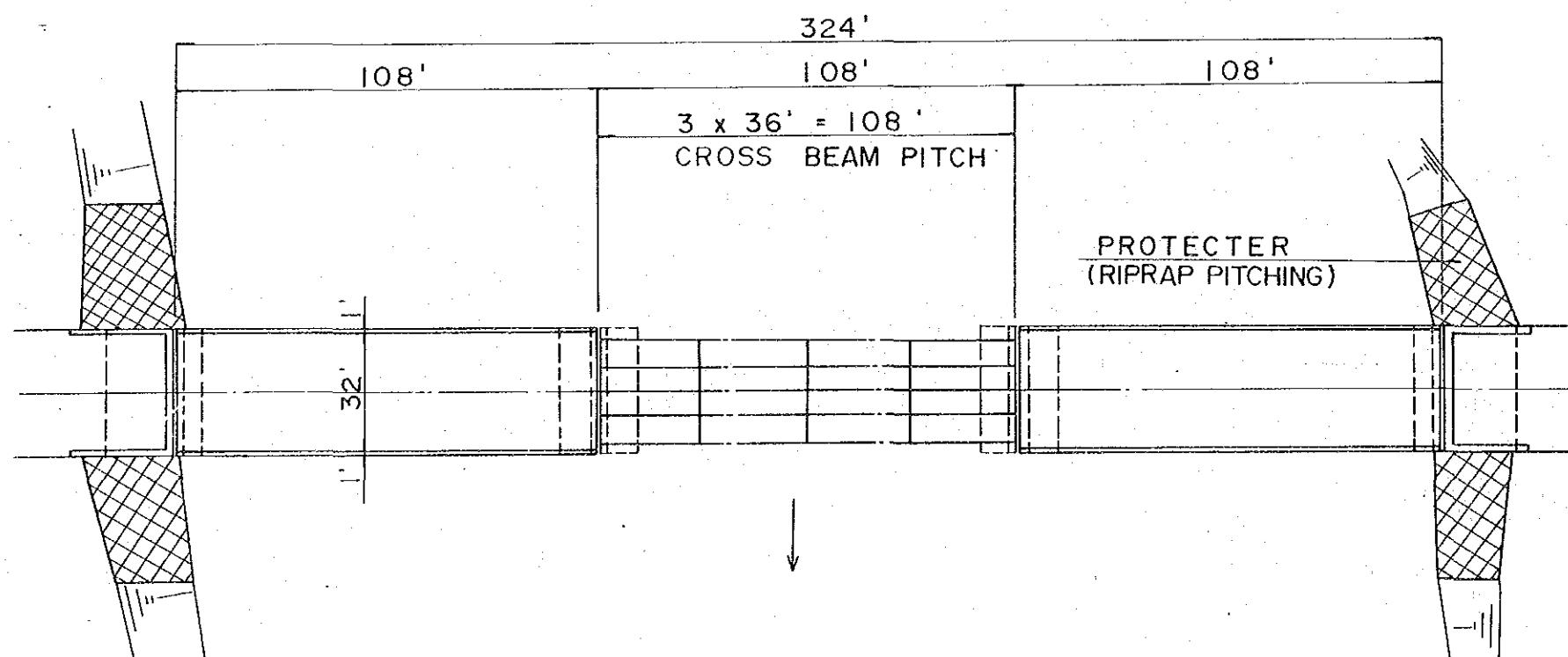
PROFIEL



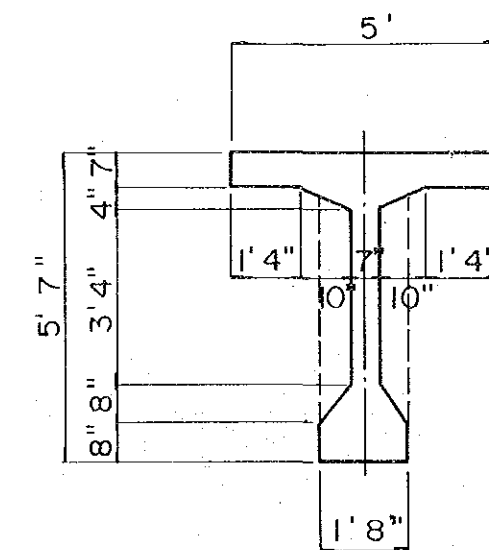
CROSS SECTION



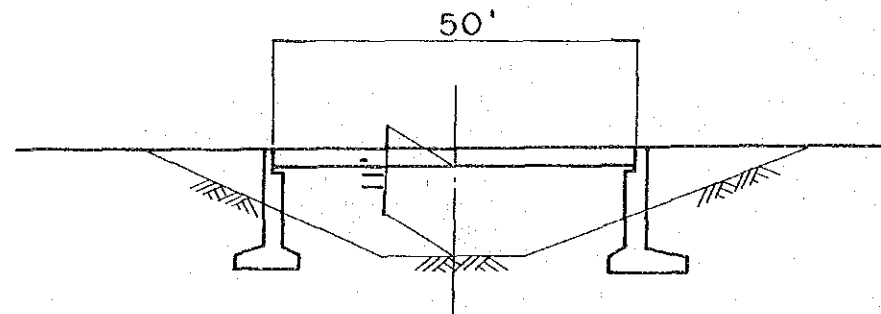
PLAN



SECTION OF POST-TENSION PRESTRESSED CONCRETE GIRDER

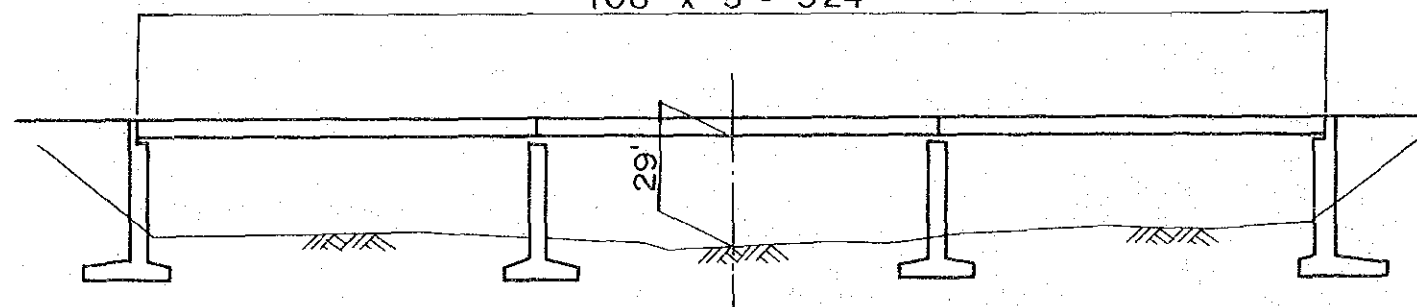


STA. 6+00
(3.7 MILES)

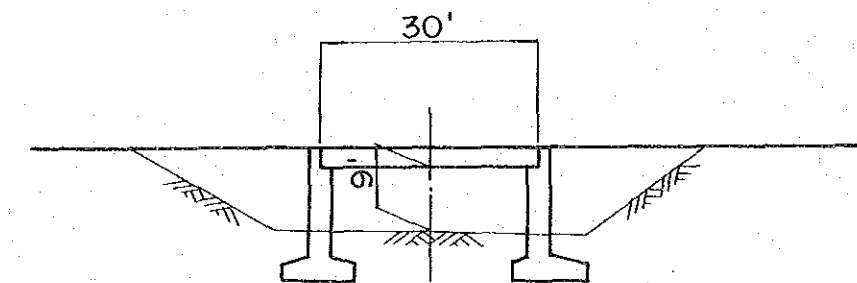


STA. 8+00
(5.0 MILES)

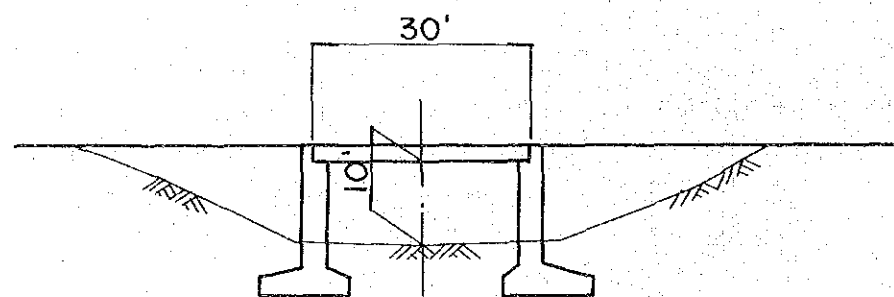
108' x 3 = 324'



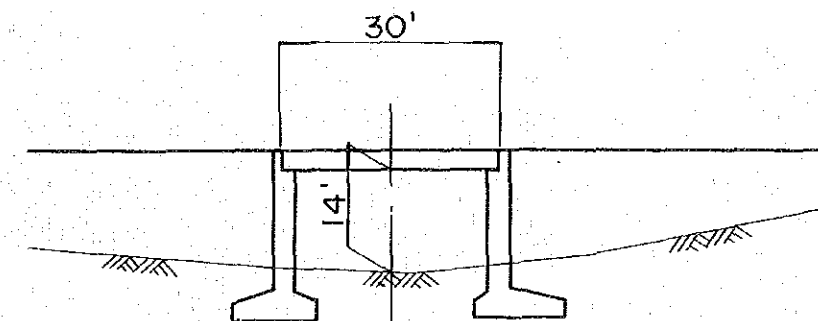
STA. 22+20
(13.9 MILES)



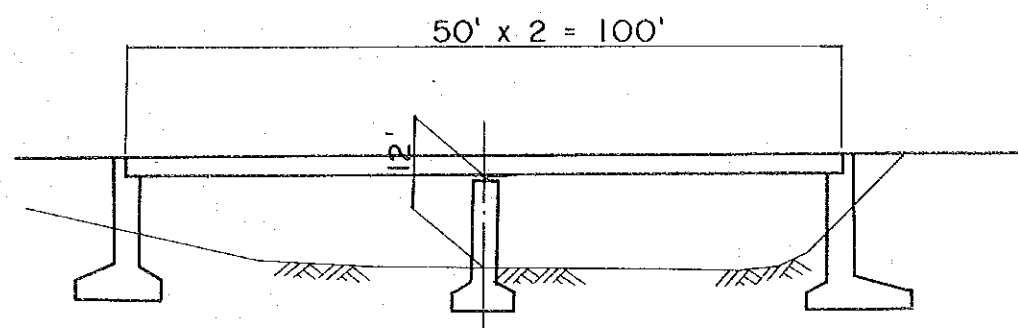
STA. 13+20
(8.3 MILES)



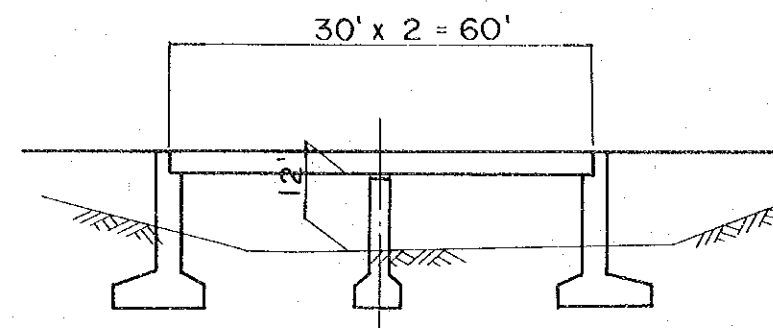
STA. 26+30
(16.4 MILES)



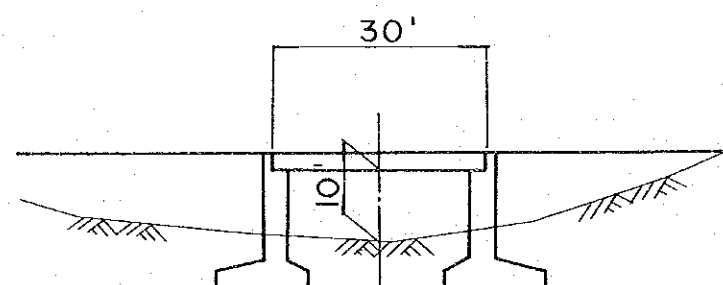
STA. 27+20
(17.0 MILES)



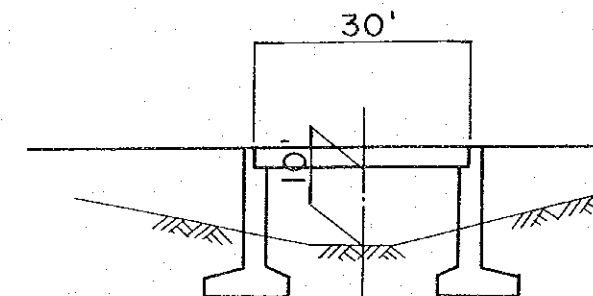
STA. 43+10
(26.6 MILES)



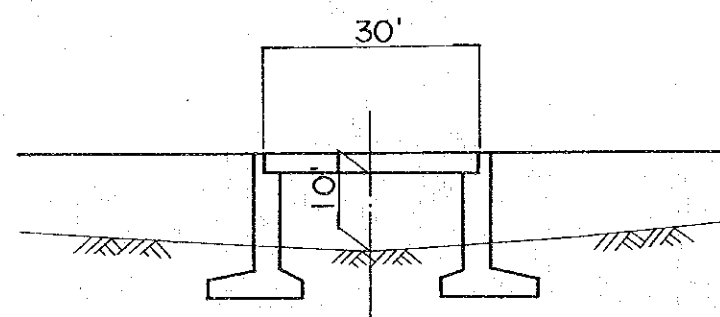
STA. 34+00
(21.3 MILES)



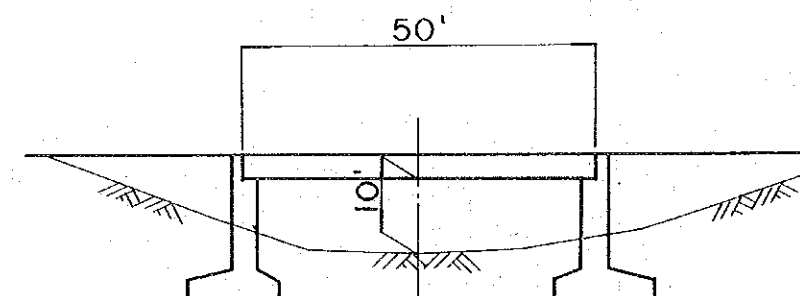
STA. 45+40
(28.4 MILES)



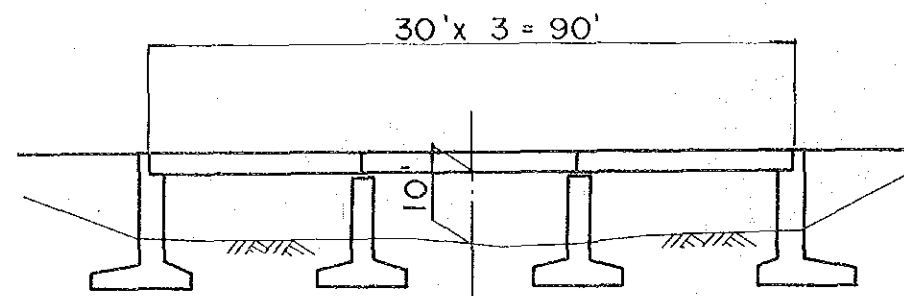
STA. 35+10
(21.9 MILES)



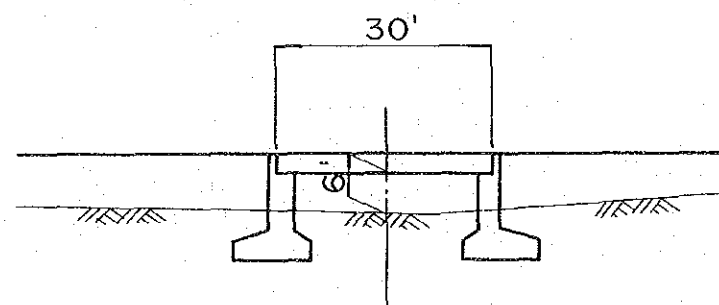
STA. 51+20
(32.0 MILES)



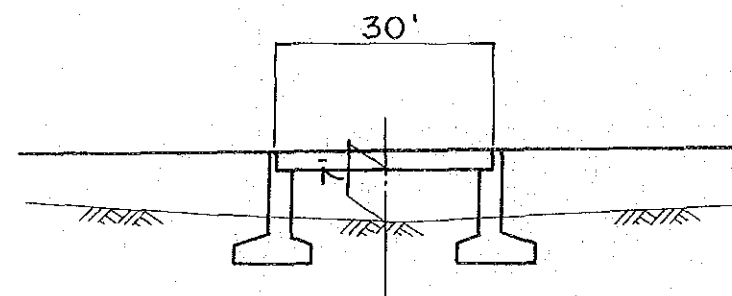
STA. 60+30
(37.7 MILES)



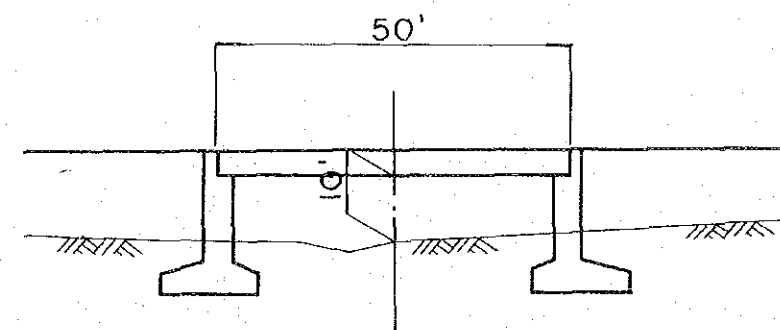
STA. 64+10
(40.0 MILES)



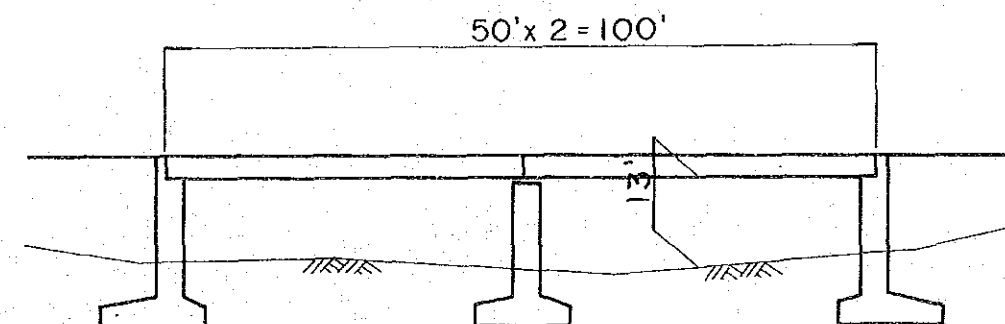
STA. 64+80
(40.5 MILES)



STA. 67+00
(41.90 MILES)



STA. 74+20
(46.4 MILES)



APPENDIX S-9 JUNCTIONS, BUS STOP AND PARKING LOT

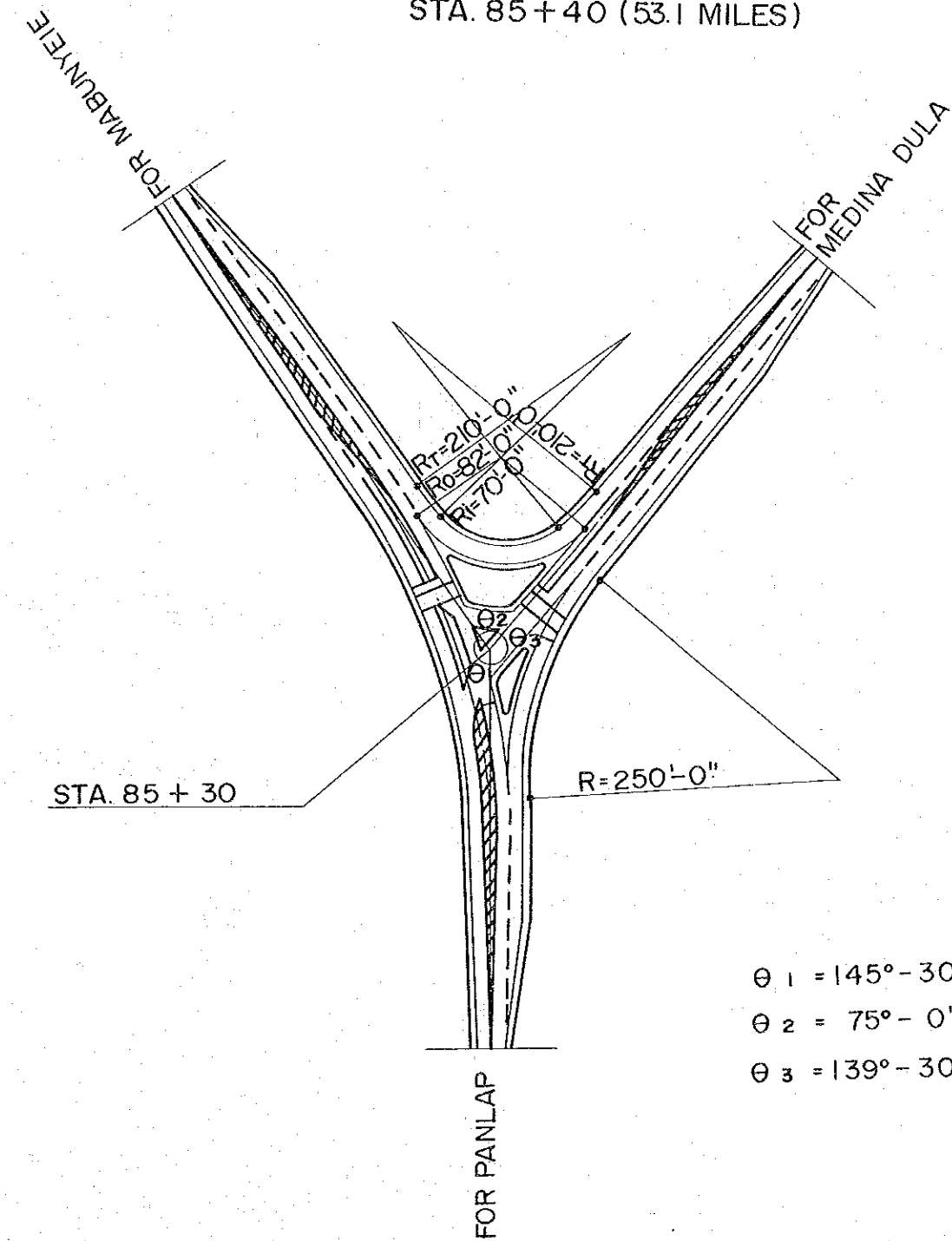
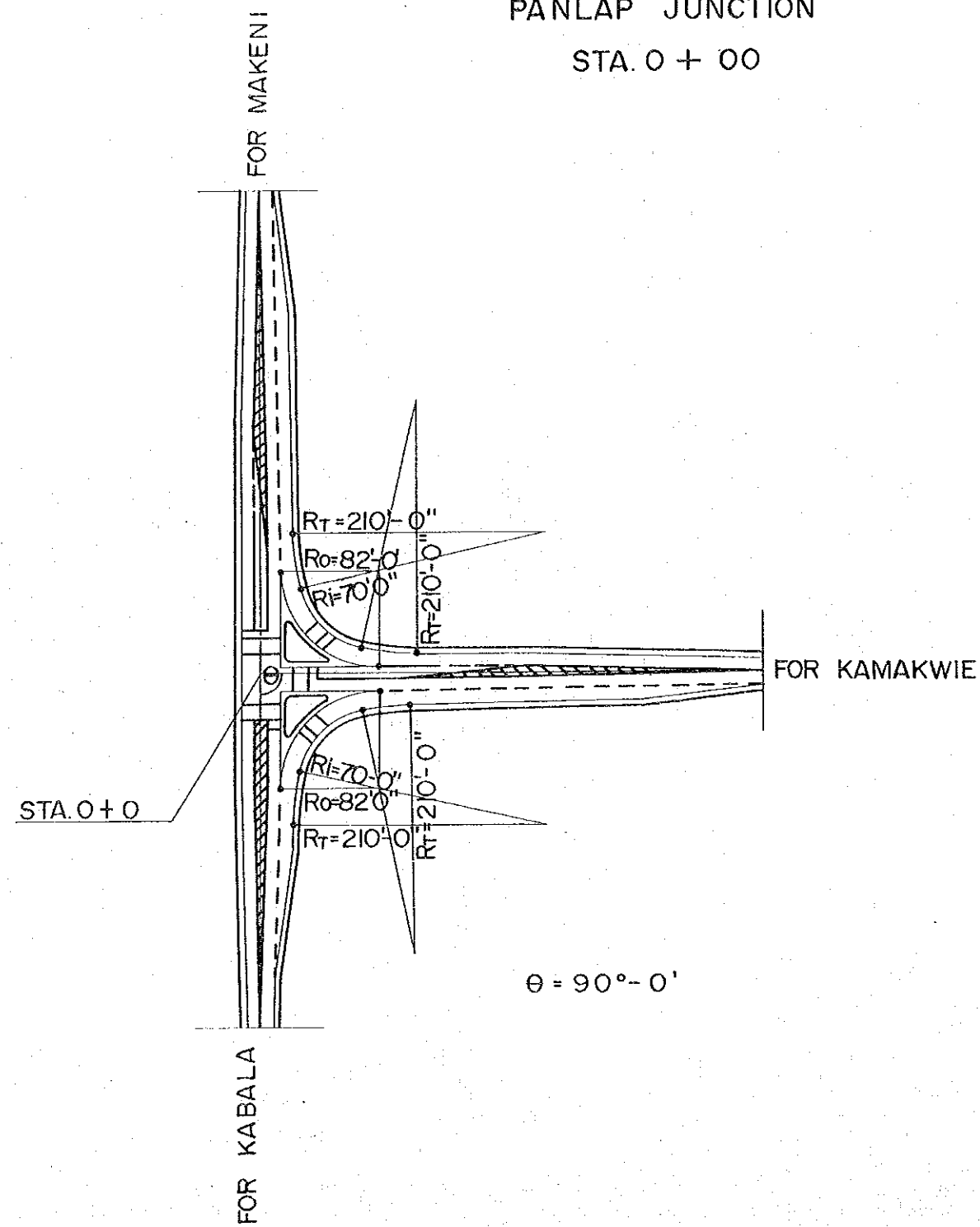
MAKENI-KAMAKWIE ROAD PROJECT FEASIBILITY STUDY	
JUNCTION	DWG-52
SHEET NO. 1	

PANLAP JUNCTION

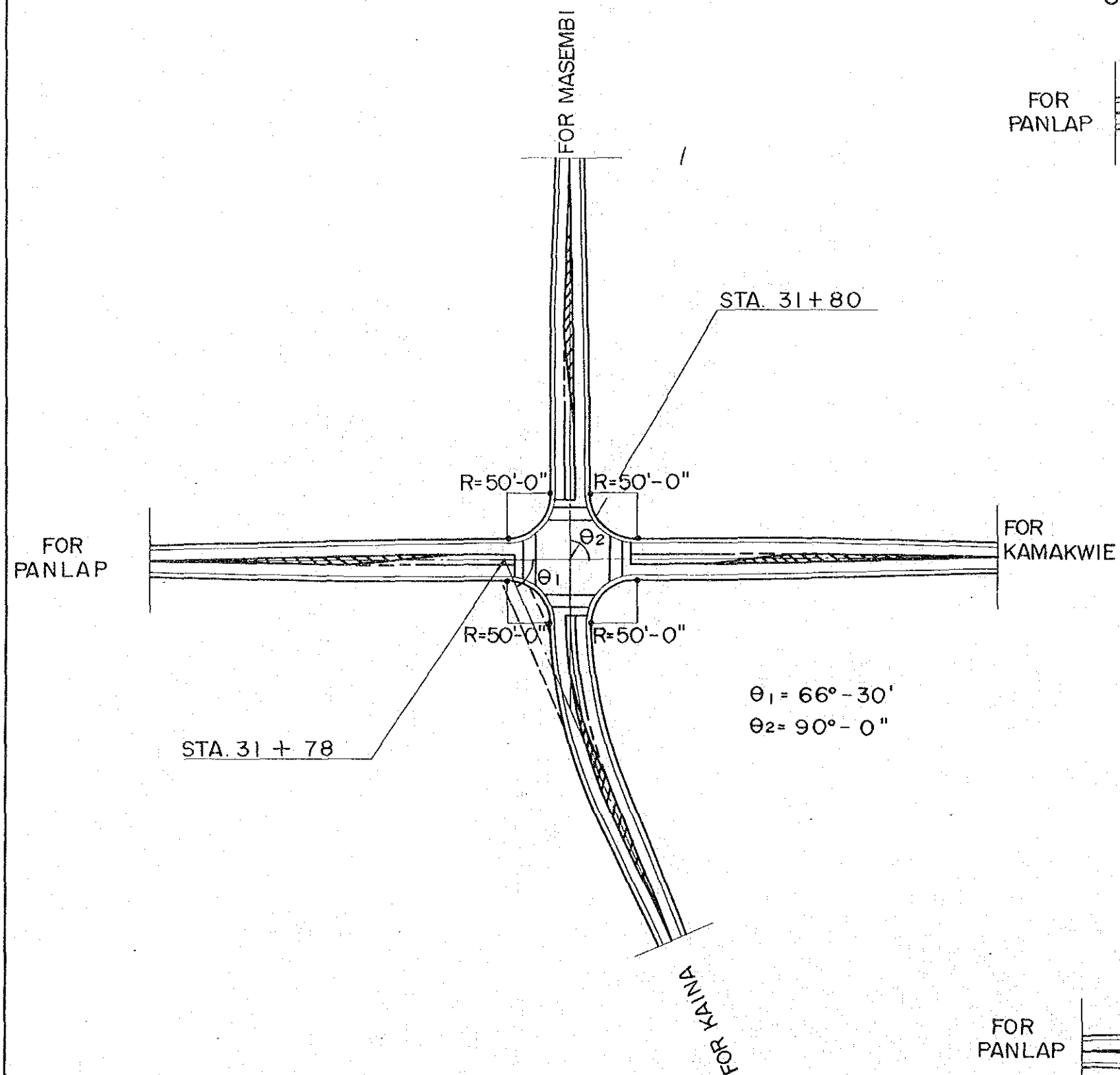
STA. 0 + 00

KAMAKWIE JUNCTION

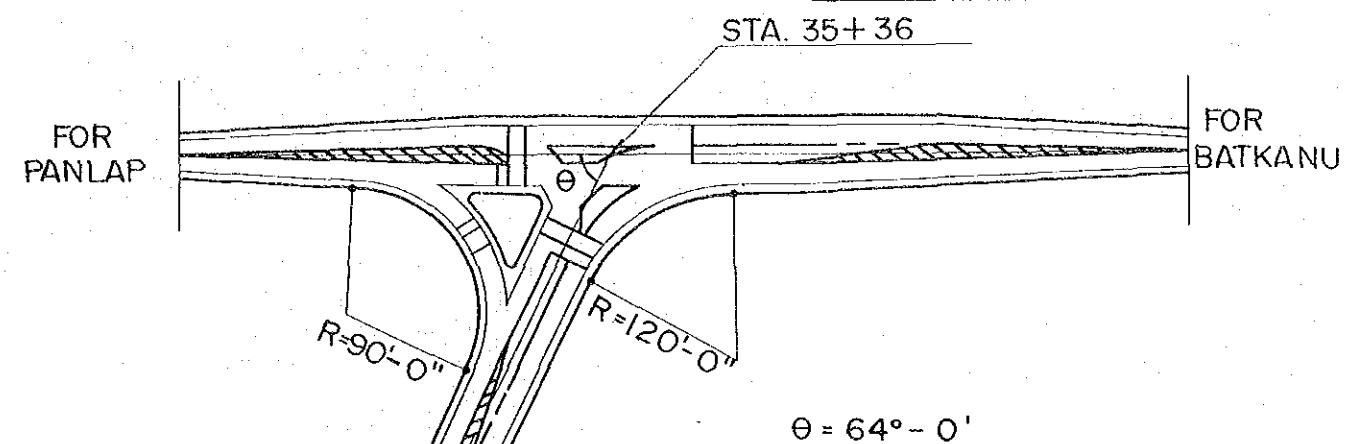
STA. 85 + 40 (53.1 MILES)



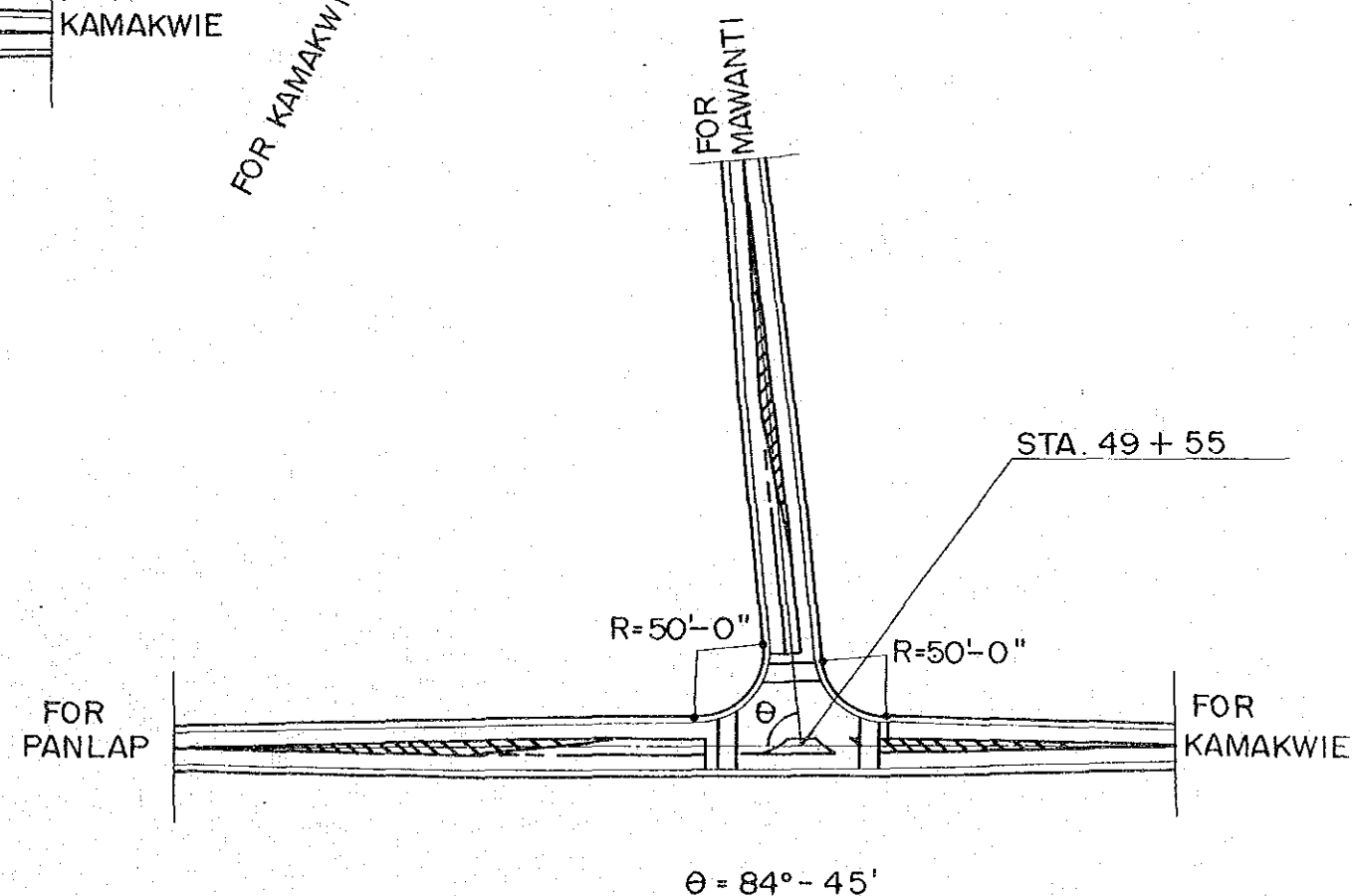
GBENDEMBU JUNCTION
STA. 31+80 (19.8 MILES)



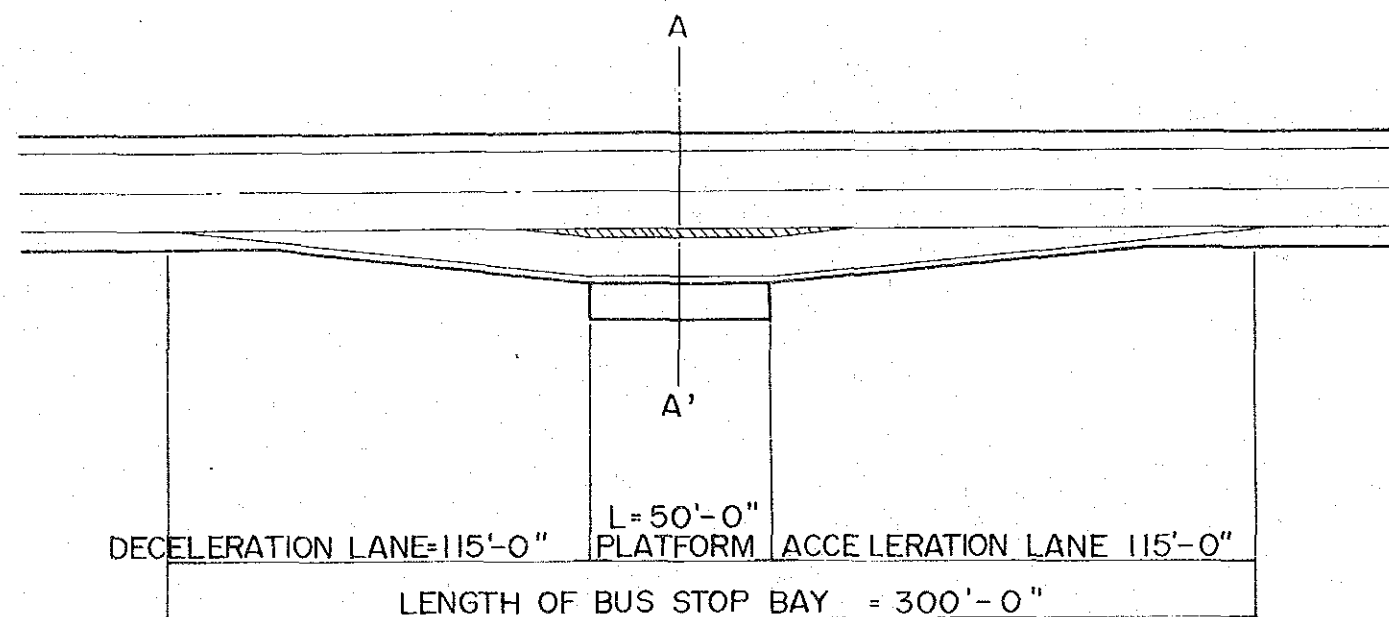
MAGBANDANI JUNCTION
STA. 35+36 (22.0 MILES)



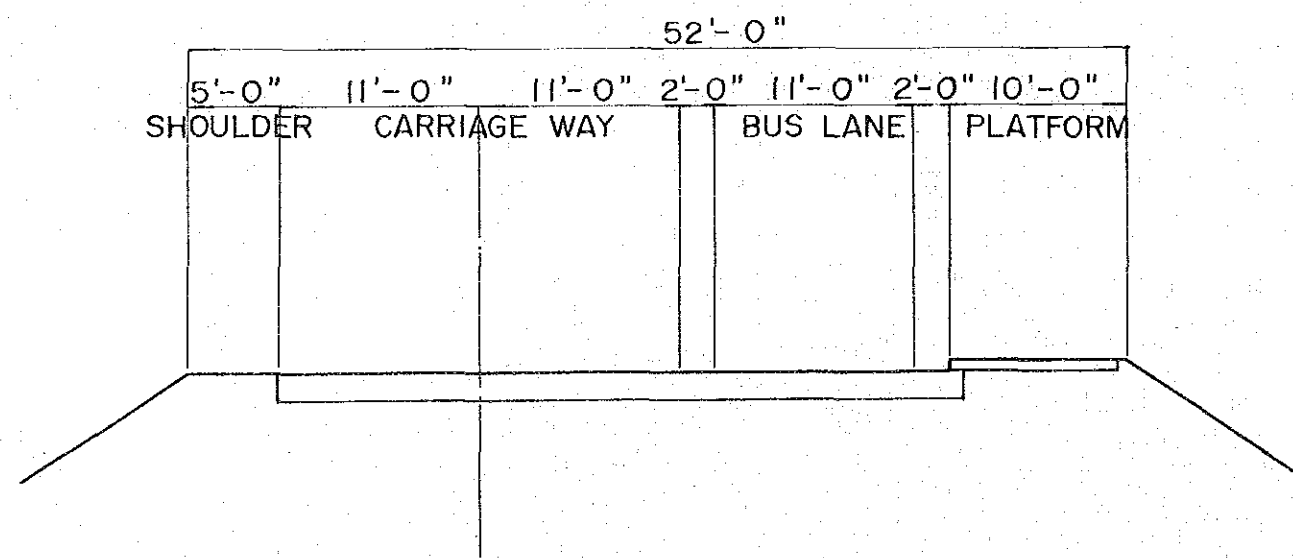
MASAKTABU JUNCTION
STA. 49+55 (30.8 MILES)



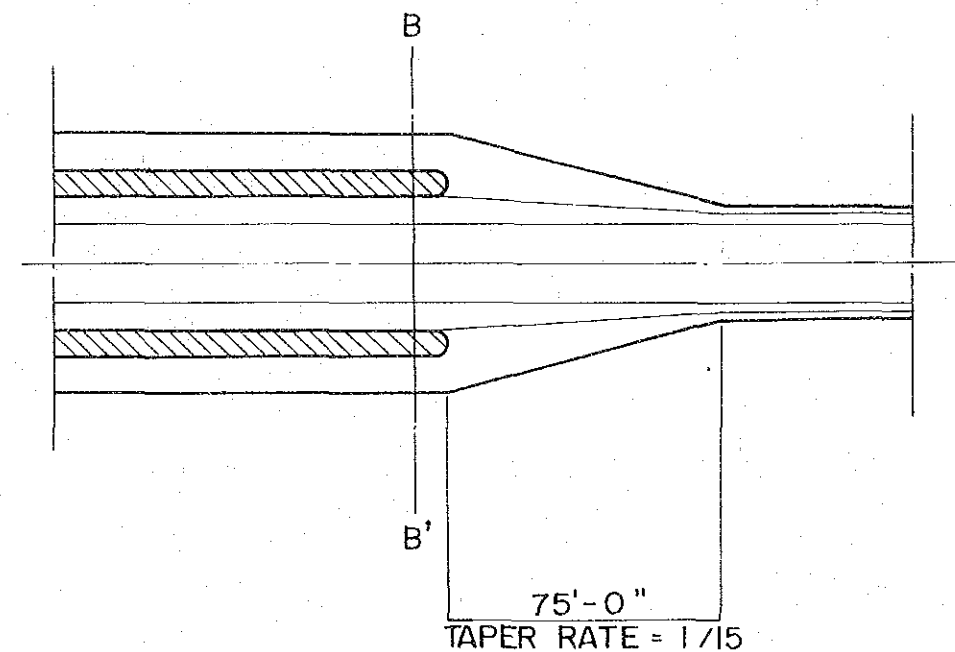
LANE OF BUS STOP



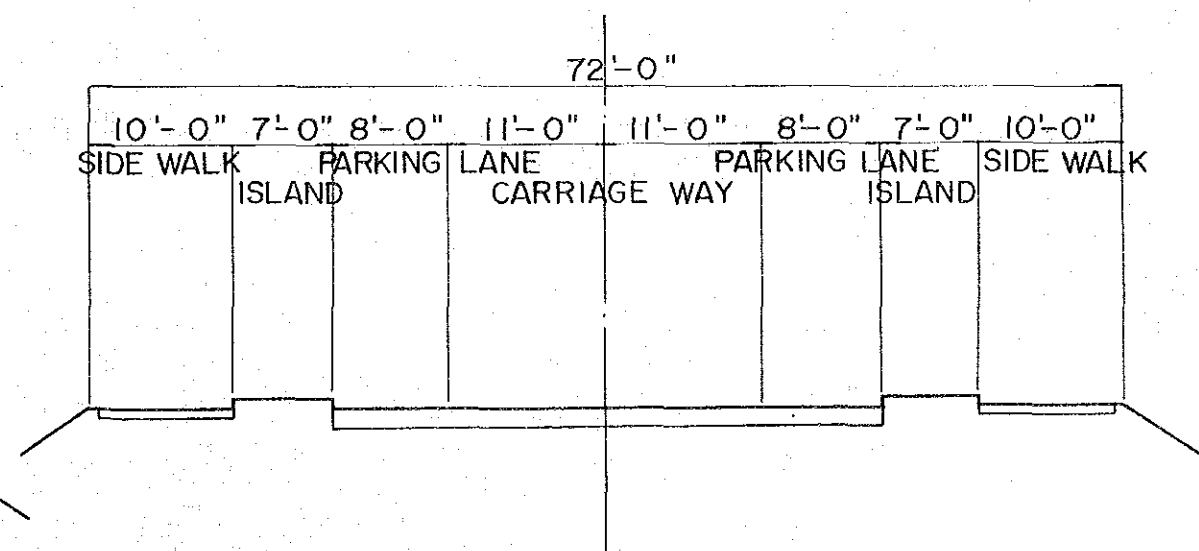
SECTION A - A



ROAD SECTION FOR DENSE-POPULATED AREA



SECTION B - B



APPENDIX T-1 PRELIMINARY ESTIMATE OF FINANCIAL AND ECONOMIC CONSTRUCTION COSTS

1. Calculation of Direct Construction Cost for Alternative Plan A in 1978

Unit : Le, 1000

Work Item	Unit of Quantity	Bill of Quantity	Unit Price (Le)	Financial Cost						Economic Cost		Labour Cost	
				Local		Foreign		Total		Rate	Cost	Rate	Cost
				Rate	Cost	Rate	Cost	Rate	Cost				
Construction work													
Earth work													
Site Clearance & Grubbing	Acre	50	468.0	5.0	1.2	95.0	22.2	1.00	23.4	68.0	15.9	2.8	0.7
Fell trees 2 ft. dia.	Sq.yd	35,000	1.2	100.0	42.0	0	-	"	42.0	20.0	8.4	80.0	33.6
Strip top soil	Sq.yd	99,600	0.4	33.5	13.3	66.5	26.5	"	39.8	69.0	15.0	2.5	1.0
Soil excavation	Cu.yd	1,005,200	1.4	8.0	112.6	92.0	1,294.7	"	1,407.3	65.0	914.7	8.0	112.6
Excavation of rippable rock	Cu.yd	3,300	2.9	5.0	0.5	95.0	9.1	"	9.6	67.0	6.4	4.2	0.4
Embankment	Cu.yd	606,000	5.6	10.0	339.4	90.0	3,054.2	"	3,393.6	65.0	2,205.8	8.3	281.7
Riprap slope protection	Sq.yd	195,700	0.2	100.0	39.1	-	-	"	39.1	20.0	7.8	80.0	31.3
Side ditch	ft.	78,300	0.6	100.0	47.0	0	-	"	47.0	20.0	9.4	80.0	37.6
Culvert work													
Pipe culvert 3 ft. dia.	ft.	6,798	56.4	32.0	122.9	68.0	260.5	1.00	383.4	70.0	268.4	9.7	37.2
Pipe culvert 4 ft. dia.	ft.	105	93.6	31.5	3.0	68.5	6.8	"	9.8	72.4	7.1	9.2	0.9
Pipe culvert 5 ft. dia.	ft.	63	130.8	28.0	2.3	72.0	5.9	"	8.2	70.7	5.8	8.5	0.7
Box culvert 5 ft. x 5 ft.	ft.	33	151.2	48.0	2.4	52.0	2.6	"	5.0	68.0	3.4	16.0	0.8
Box culvert 7 ft. x 7 ft.	ft.	333	212.4	45.8	32.4	54.0	38.3	"	70.7	68.0	48.1	15.9	11.2
Box culvert 10 ft. x 10 ft.	ft.	675	345.6	45.0	105.0	55.0	128.3	"	233.3	68.0	158.4	15.5	36.2
Box culvert 13 ft. x 13 ft.	ft.	249	606.0	40.0	60.4	60.0	90.5	"	150.9	68.0	102.6	14.0	21.1
Box culvert 10 ft. x 10 ft. Double	ft.	33	639.6	42.2	8.9	57.8	12.2	"	21.1	68.0	14.3	14.5	3.1
Bridge work													
30 ft. Span Bridge	Sq.yd	1,345	281.5	41.3	156.4	58.7	222.2	1.00	378.6	69.2	261.9	13.2	50.1
50 ft. Span Bridge	Sq.yd	1,380	340.7	41.3	194.2	58.7	276.0	"	470.2	69.2	325.2	13.2	62.1
Mabole Bridge	Sq.yd	1,152	528.6	41.3	251.5	58.7	357.4	"	608.9	69.2	421.2	13.2	80.4
Pavement work	Sq.yd	673,300	8.1	39.5	2,154.2	60.5	3,299.5	1.00	5,453.7	79.7	4,346.6	2.2	120.0
Miscellaneous work	-			29.0	185.5	71.0	454.2	1.00	639.7	72.0	460.7	7.1	45.4
Total				28.8	3,874.2	71.2	9,561.1	1.00	13,435.3	71.5	9,607.1	7.2	968.1

Source : JICA Mission.

2. Calculation of Direct Construction Cost for Alternative B at Stage I in 1978

Unit : Le. 1000

Work Item	Unit of Quantity	Bill of Quantity	Unit Price	Financial Cost						Economic Cost		Labour Cost	
				Local		Foreign		Total		Rate	Cost	Rate	Cost
				Rate	Cost	Rate	Cost	Rate	Cost				
Construction work													
Earth work													
Site Clearance & Grubbing	Acre	45	468.0	5.0	1.1	95.0	20.0	1.00	21.1	68.0	14.3	2.8	0.6
Fell trees 2 ft. dia.	Sq.yd	34,000	1.2	100.0	40.8	0	0	"	40.8	20.0	8.2	80.0	32.6
Strip top soil	Sq.yd	80,600	0.4	33.5	10.8	66.5	21.4	"	32.2	69.0	22.2	2.5	0.8
Soil excavation	Cu.yd	867,800	1.4	8.0	97.2	92.0	1,117.7	"	1,214.9	65.0	789.7	8.0	97.2
Excavation of rippable rock	Cu.yd	3,300	2.9	5.0	0.5	95.0	9.1	"	9.6	67.0	6.4	4.2	0.4
Embankment	Cu.yd	556,300	5.6	10.0	311.5	90.0	2,803.8	"	3,115.3	65.0	2,024.9	8.3	258.6
Riprap slope protection	Sq.yd	176,300	0.07	100.0	12.3	0	0	"	12.3	20.0	2.5	82.0	10.1
Side ditch	ft.	70,800	0.6	100.0	42.5	0	0	"	42.5	20.0	8.5	80.0	34.0
Culvert work													
Pipe culvert 3 ft. dia.	ft.	6,798	56.4	32.0	122.7	68.0	260.7	1.00	383.4	70.0	268.4	9.7	37.2
Pipe culvert 4 ft. dia.	ft.	105	93.6	31.5	3.1	68.5	6.7	"	9.8	72.4	7.1	9.2	0.9
Pipe culvert 5 ft. dia.	ft.	63	130.8	28.1	2.3	72.0	5.9	"	8.2	70.7	5.8	8.5	0.7
Box culvert 5 ft. x 5 ft.	ft.	33	151.2	48.0	2.4	52.0	2.6	"	5.0	68.0	3.4	16.0	0.8
Box culvert 7 ft. x 7 ft.	ft.	333	212.4	46.0	32.5	54.0	38.2	"	70.7	68.0	48.1	15.9	11.2
Box culvert 10 ft. x 10 ft.	ft.	675	345.6	45.0	105.0	55.0	128.3	"	233.3	68.0	158.6	15.5	36.2
Box culvert 13 ft. x 13 ft.	ft.	249	606.0	40.0	60.4	60.0	90.5	"	150.9	68.0	102.6	14.0	21.1
Box culvert 10ft.x10ft. Double	ft.	33	639.6	42.2	8.9	57.8	12.2	"	21.1	68.0	14.3	14.5	3.1
Bridge work													
30 ft. Span bridge	Sq.yd	1,345	281.5	41.3	156.4	58.7	222.2	1.00	378.6	69.2	262.0	13.2	50.0
50 ft. Span bridge	Sq.yd	1,380	340.7	41.3	194.2	58.7	276.0	"	470.2	69.2	325.4	13.2	62.1
Mabole bridge	Sq.yd	-	528.6	-	-	-	-	"	-	-	-	-	-
Pavement work	Sq.yd	664,200	7.8	39.5	2,049.5	60.5	3,139.2	1.00	5,188.7	79.5	4,125.0	2.3	119.3
Miscellaneous work					162.7		407.7		570.4	71.9	409.9	6.8	38.8
Total				28.5	3,416.7	71.5	8,562.2	1.00	11,978.9	71.9	8,607.3	6.8	815.7

Source : JICA Mission.

3. Calculation of Direct Construction Cost for Alternative Plan B at Stage 2 in 1978

Unit : Le. 1000

Work Item	Unit of Quantity	Bill of Quantity	Unit Price (Le)	Financial Cost						Economic Cost		Labour Cost	
				Local		Foreign		Total		Rate	Cost	Rate	Cost
				Rate	Cqst	Rate	Cost	Rate	Cost				
Construction work													
Earth work													
Site Clearance & Grubbing	Acre	6	468.0	5.0	0.1	95.0	2.7	1.00	2.8	68.0	1.9	2.8	0.1
Fell trees 2 ft. dia.	Nos.	4,200	1.2	100.0	5.0	0	0	"	5.0	20.0	1.0	80.0	4.0
Strip top soil	Sq.yd	39,000	0.4	33.5	5.2	66.5	10.4	"	15.6	69.0	10.8	2.5	0.4
Soil excavation	Cu.yd	206,000	1.4	8.0	23.1	92.0	265.3	"	288.4	65.0	187.5	8.0	23.1
Excavation of rippable rock	Cu.yd	-	2.9	0	-	0	-	"	-	-	-	-	-
Embankment	Cu.yd	113,000	5.6	10.0	63.3	90.0	569.5	"	632.8	65.0	411.3	8.3	52.5
Rip rap slope protection	Sq.yd	34,800	0.2	100.0	7.0	0	-	"	7.0	21.4	1.5	82.0	5.7
Side ditch	ft.	15,600	0.6	100.0	9.4	0	-	"	9.4	20.0	1.9	80.0	7.5
Culvert work													
Pipe culvert 3 ft. dia.	ft.	417	56.4	32.0	7.5	68.0	16.0	1.00	23.5	70.0	16.5	9.7	2.3
Pipe culvert 4 ft. dia.	ft.	51	93.6	31.5	1.5	68.5	3.3	"	4.8	72.4	3.5	9.2	0.4
Pipe culvert 5 ft. dia.	ft.	-	130.8	0	-	0	-	"	-	-	-	0	-
Box culvert 5 ft. x 5 ft.	ft.	-	151.2	0	-	0	-	"	-	-	-	0	-
Box culvert 10 ft. x 10 ft.	ft.	-	345.6	0	-	0	-	"	-	-	-	0	-
Box culvert 13 ft. x 13 ft.	ft.	-	606.0	0	-	0	-	"	-	-	-	0	-
Box culvert 10 ft. x 10 ft. Double	ft.	-	639.6	0	-	0	-	"	-	-	-	0	-
Bridge work													
30 ft. Span Bridge	Sq.yd	-	281.5	0	-	0	-	1.00	-	-	-	0	-
50 ft. Span Bridge	"	-	340.7	0	-	0	-	"	-	-	-	0	-
Mabole Bridge	"	1,152	528.6	41.3	251.5	58.7	357.4	"	608.9	69.2	421.2	13.2	80.5
Pavement work	Sq.yd	68,500	9.1	36.2	225.7	63.8	397.7	1.00	623.4	79.7	496.8	1.7	10.6
Miscellaneous work	-			31.1	30.0	68.9	81.1	1.00	111.1	72.0	80.0	7.3	8.1
Total				27.0	629.3	73.0	1,703.4	1.00	2,332.7	70.0	1,633.9	8.4	196.0

Source : JICA Mission.

4. Summary of Construction Cost in 1978

Unit : Le. 1000

Item	Alternative Plan A				
	Financial Cost			Ec	La
	Lo	Fo	To		
Direct Construction Cost	3,874.2	9,561.1	13,435.3	9,607.1	968.1
Physical Contingency *1	193.7	478.1	671.8	480.4	48.4
Engineering & Administration					
Detailed Design *2	80.7	322.4	403.1	403.1	-
Supervision *3	134.4	537.4	671.8	671.8	-
Accommodation for Engineer *4	77.5	191.2	268.7	192.1	19.4
Price Contingency *5	387.4	956.1	1,343.5	-	-
Total	4,747.9	12,046.3	16,794.2	11,354.5	1,035.9

Note : Abbreviation "Lo" is Local Cost

"Fo" is Foreign Cost

"To" is Total Cost

"Ec" is Economic Cost

"La" is Labor Cost

*1 5% of direct Construction Cost

*2 3% of direct Construction Cost

*3 5% of direct Construction Cost

*4 2% of direct Construction Cost

*5 10% of direct Construction Cost

Unit : Le. 1000

Item	Alternative Plan B														
	Stage 1					Stage 2					Total				
	Financial Cost			Ec	La	Financial Cost			Ec	La	Financial Cost			Ec	La
	Lo	Fo	To			Lo	Fo	To			Lo	Fo	To		
Direct Construction Cost	3,416.7	8,562.2	11,978.9	8,607.3	815.7	629.3	1,703.4	2,332.7	1,633.9	196.0	4,046.0	10,265.6	14,311.6	10,241.2	1,011.7
Physical Contingency *1	170.8	428.1	598.9	430.4	40.8	31.5	85.2	116.7	81.7	9.8	202.3	513.3	715.6	512.1	50.6
Engineering & Administration															
Detailed Design *2	71.9	287.5	359.4	359.4	-	13.4	53.6	67.0	67.0	-	85.3	341.1	426.4	426.4	-
Supervision *3	119.8	479.1	598.9	598.9	-	23.3	93.4	116.7	116.7	-	143.1	572.5	715.6	715.6	-
Accommodation for Engineer *4	68.3	171.2	239.5	172.1	16.3	12.6	34.1	46.7	32.7	3.9	80.9	205.3	286.2	204.8	20.2
Price Contingency *5	341.7	856.2	1,197.9	-	-	62.9	170.4	233.3	-	-	404.6	1,026.6	1,431.2	-	-
Total	4,189.2	10,784.3	14,973.5	10,168.1	872.8	77.3	2,140.1	2,913.1	1,932.0	209.7	4,962.2	12,924.4	17,886.6	12,100.1	1,082.5

Source : JICA Mission.

APPENDIX T-2 PRELIMINARY ESTIMATE OF MAINTENANCE COST

Preliminary Estimate for Maintenance Cost

1. Unit Cost for Routine Maintenance Work

Unit : Le. Per mile per year

ADT \ Work items	Over 400	150 ~ 400	50 ~ 150
Surface	1233	237	80
Drainage	99	75	28
Road Side	89	54	51
Bridges	7	5	11
Other	28	21	14
Total	1456	392	184

Note : Unit cost in 1978.

Rate of cost increase is 5% each year.

Source : Roy Jorgenson, UNDP Technical Assistance for Highway Organization and Maintenance, proposed 4 year Highway Programme, Ministry of Works, Sierra Leone 1976.

2. Unit Cost for Remedial Maintenance Work

Unit : Le. Per mile

Work items	Cost
Resurfacing Add only	2191
Rehabilitation	2308
Reballast laterite shoulders	182
Re-excavate Side Drains	230
Total	4911

Note : Unit Cost in 1978.

Source : Maintenance Division, Ministry of Works
Sierra Leone.

3. Average ADT for whole Project Road Section

Unit : Vehicle number

Year	1985	1990	1995	2000	2005	2010
ADT	157	201	257	325	408	506

Source : JICA Mission.

4. Maintenance Cost for Alternative Plan A and B in 1978

Unit : Le. 1000

Year	Alternative Plan A			Alternative Plan B		
	Routine	Remedial	Total	Routine	Remedial	Total
1987	20.8	-	20.8	20.8	-	20.8
1988	20.8	-	20.8	20.8	-	20.8
1989	20.8	-	20.8	20.8	-	20.8
1990	20.8	260.8	281.6	20.8	222.5	243.3
1991	20.8	-	20.8	20.8	-	20.8
1992	20.8	-	20.8	20.8	-	20.8
1993	20.8	-	20.8	20.8	-	20.8
1994	20.8	-	20.8	20.8	-	20.8
1995	20.8	260.8	281.6	20.8	222.5	243.3
1996	20.8	-	20.8	20.8	-	20.8
1997	20.8	-	20.8	20.8	-	20.8
1998	20.8	-	20.8	20.8	-	20.8
1999	20.8	-	20.8	20.8	-	20.8
2000	20.8	260.8	281.6	20.8	260.8	281.6
2001	20.8	-	20.8	20.8	-	20.8
2002	20.8	-	20.8	20.8	-	20.8
2003	20.8	-	20.8	20.8	-	20.8
2004	20.8	-	20.8	20.8	-	20.8
2005	77.3	260.8	338.1	77.3	260.8	338.1
2006	77.3	-	77.3	77.3	-	77.3
2007	77.3	-	77.3	77.3	-	77.3
2008	77.3	-	77.3	77.3	-	77.3
2009	77.3	-	77.3	77.3	-	77.3
2010	77.3	260.8	338.1	77.3	260.8	338.1

Source : JICA Mission.

APPENDIX T-3 ESTIMATE OF ECONOMIC COST

Unit : Le 1000

	Alternative A		Alternative B				
	Total Cost		Construction Cost		Maintenance Cost	Total Cost	
	With Labour Cost	Without Labour Cost	With Labour Cost	Without Labour Cost		With Labour Cost	Without Labour Cost
1983	4,398.9	4,053.6			-	3,919.9	3,629.0
1984	3,995.8	3,650.5			-	3,560.5	3,269.6
1985	3,995.8	3,650.5			-	3,560.5	3,269.6
1986					-		
1987	20.8	20.8			20.8		
1988	20.8	20.8			20.8		
1989	20.8	20.8			20.8		
1990	281.6	281.6			243.3		
1991	20.8	20.8			20.8		
1992	20.8	20.8			20.8		
1993	20.8	20.8			20.8		
1994	20.8	20.8			20.8		
1995	281.6	281.6	1,104.4	999.5	243.3	1,347.7	1,242.8
1996	20.8	20.8	1,037.4	932.5	20.8	1,058.2	953.3
1997	20.8	20.8			20.8		
1998	20.8	20.8			20.8		
1999	20.8	20.8			20.8		
2000	281.6	281.6			281.6		
2001	20.8	20.8			20.8		
2002	20.8	20.8			20.8		
2003	20.8	20.8			20.8		
2004	20.8	20.8			20.8		
2005	338.1	338.1			338.1		
2006	77.3	77.3			77.3		
2007	77.3	77.3			77.3		
2008	77.3	77.3			77.3		
2009	77.3	77.3			77.3		
2010	338.1	338.1			338.1		

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