CHAPTER 12 PRELIMINARY ENGINEERING DESIGN FOR HIGH PRIORITY PROJECTS

12.1 General

Supplemental field surveys was carried out along the high priority project roads selected in the previous chapter. On the basis of the data and information obtained through the supplementary field surveys, the preliminary engineering design was conducted using the existing topographical maps with a scale of 1/2,500.

12.2 Supplementary Field Surveys

The supplementary surveys conducted by the Study Team are the following:

- Topographical survey including preparation of Maps with a scale of 1/500 for junctions, cross section survey and right-of-way survey
- Utilities survey including water mains, telephone cables, electric wire and posts, and sewerage and sanitary drainage
- Traffic survey on area roads of Chang'ombe, Kariakoo, Mwinjuma and Central Areas
- Intersection traffic movement survey at major intersections of Morogoro, Upanga and New Bagamoyo Roads
- Pavement structural component survey including 24 nos. of sampling and laboratory tests
- Road inventory and drainage survey on all of the high priority project roads selected with a total length of 104.1 km

12.3 Preliminary Engineering Design

(1) Design Criteria

The function of proposed Morogoro and New Bagamoyo Roads are expected to be arterial roads focussing on the Central Area of the City with a high design standards. Design criteria to be applied for the project roads should be a high standard to meet the requirement of function as shown in Table S.12.1.

(2) Project Length by Improvement Measures

The project length by improvement measures was reviewed on the basis of field survey and the results are presented in Fig. S.12.1. through S.12.3 with minor correction of total length from 103.4 km to 104.1 km.

(3) Geometric Design

Since the Project aims at improvement of the existing roads. with overlay, reconstruction and widening, no major change of alignments were proposed in the Project. Typical cross sections to be applied for the project were presented in Fig. S.12.4

(4) Intersection Design

The analysis on traffic movement was carried out for the major junctions on the proposed roads. As the result, it was concluded that signal controlled facilities should be provided at the following junctions:

- 3 junctions on Morogoro Road
- 2 junctions on Upanga Road
- 5 junctions on New Bagamoyo Road

(5) Bus Bay and On/Off Loading Bay for Goods at Manzese

Bus service plays an important role in the public transport system in Dar es Salaam. As for Morogoro Road, special type of bus bay and on/ off loading bay were considered at Manzese area taking into account the large numbers of people as well as goods and products brought to the nearby market.

(6) Pedestrian Bridge

The proposed pedestrian bridge across Morogoro at Manzese is the first pedestrian bridge in Dar es Salaam. The main features of the bridge are as below:

- Type of Bridge : Prestressed Hollow Slab Concrete (PC)
- Bridge Length : 48 m
- Span Arrangement: 10.1 x 2@12.25 x 10.1
- Bridge Width : 5 m

Table S.12.1 Design Criteria for Widening Sections

Design	Morogoro Road	Upanga Road	New Bagamoyo Road
Design Speed	80 km/hr	60 km/hr	80 km/hr
Minimum Radius	300 m	150 m	300 m
Maximum Gradient	5 %	6 %	5 %
Pavement Width	4 lanes (2x2x3.75m)	4 lanes (2x2x3.50m)	4 lanes (2x2x3.75m)
Shoulder	1.50-2.50m	0.50 m	1.50-2.50m
Median Strip	7.50 m	0.50 m	7.50-10.0m
Sidewalk	2x3.50 m	2x3.00 m	2x3.50 m
Minimum Sigth Distance	115 m	75 m	115 m

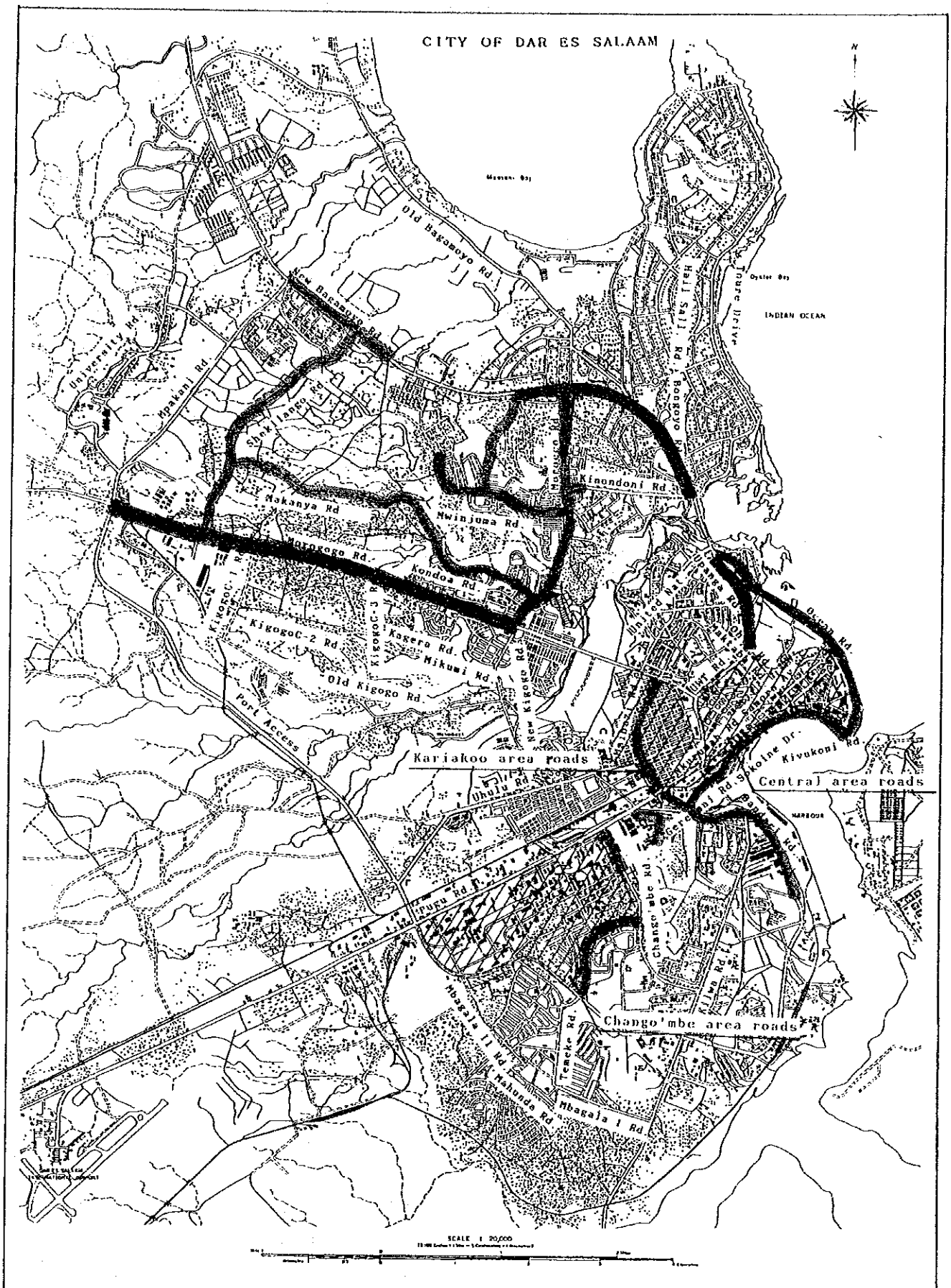
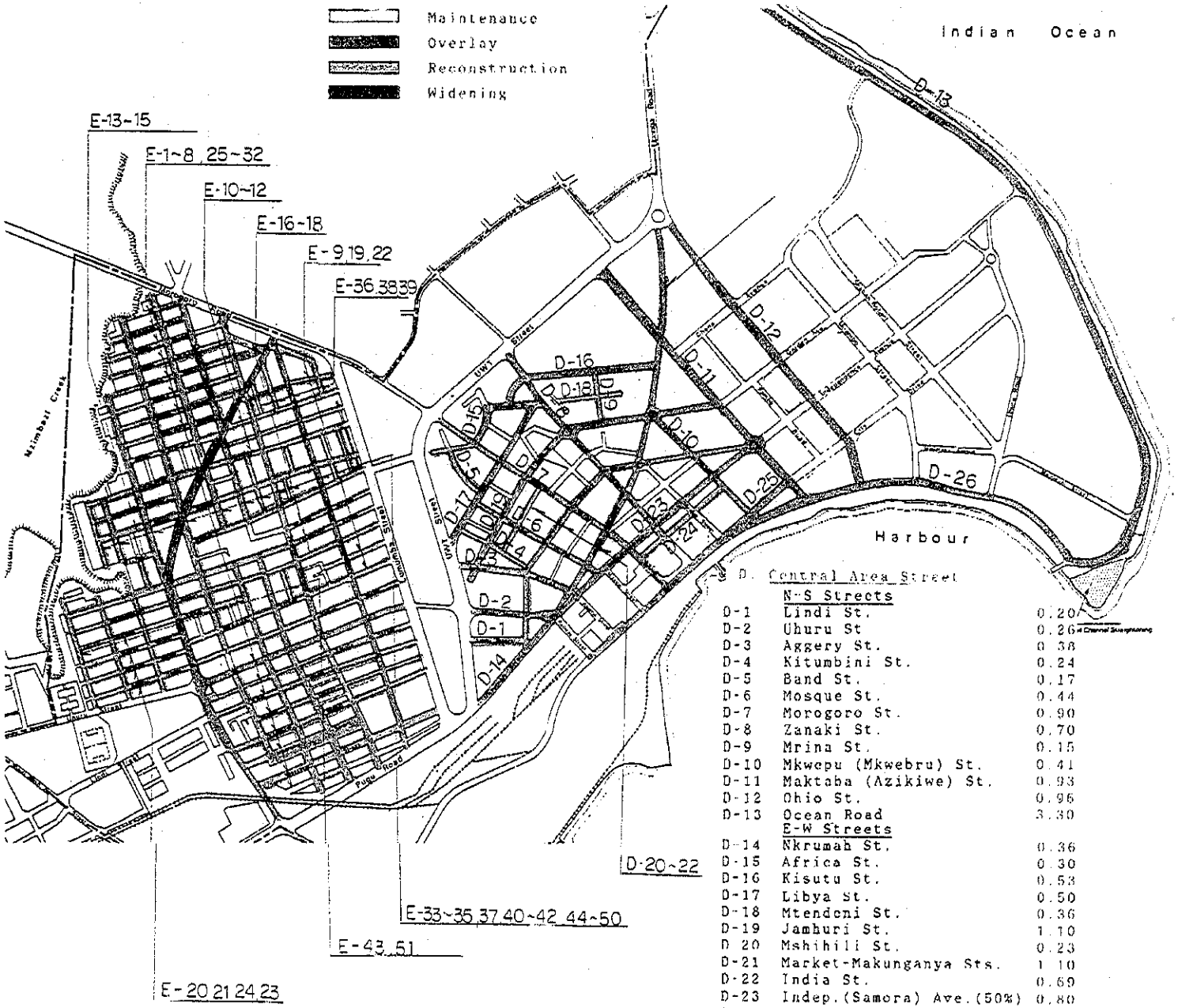


Fig. S-12-1 Project Roads by Improvement Measures

- Maintenance
- Overlay
- Reconstruction
- Widening



E. Kariakoo Area Commercial Street

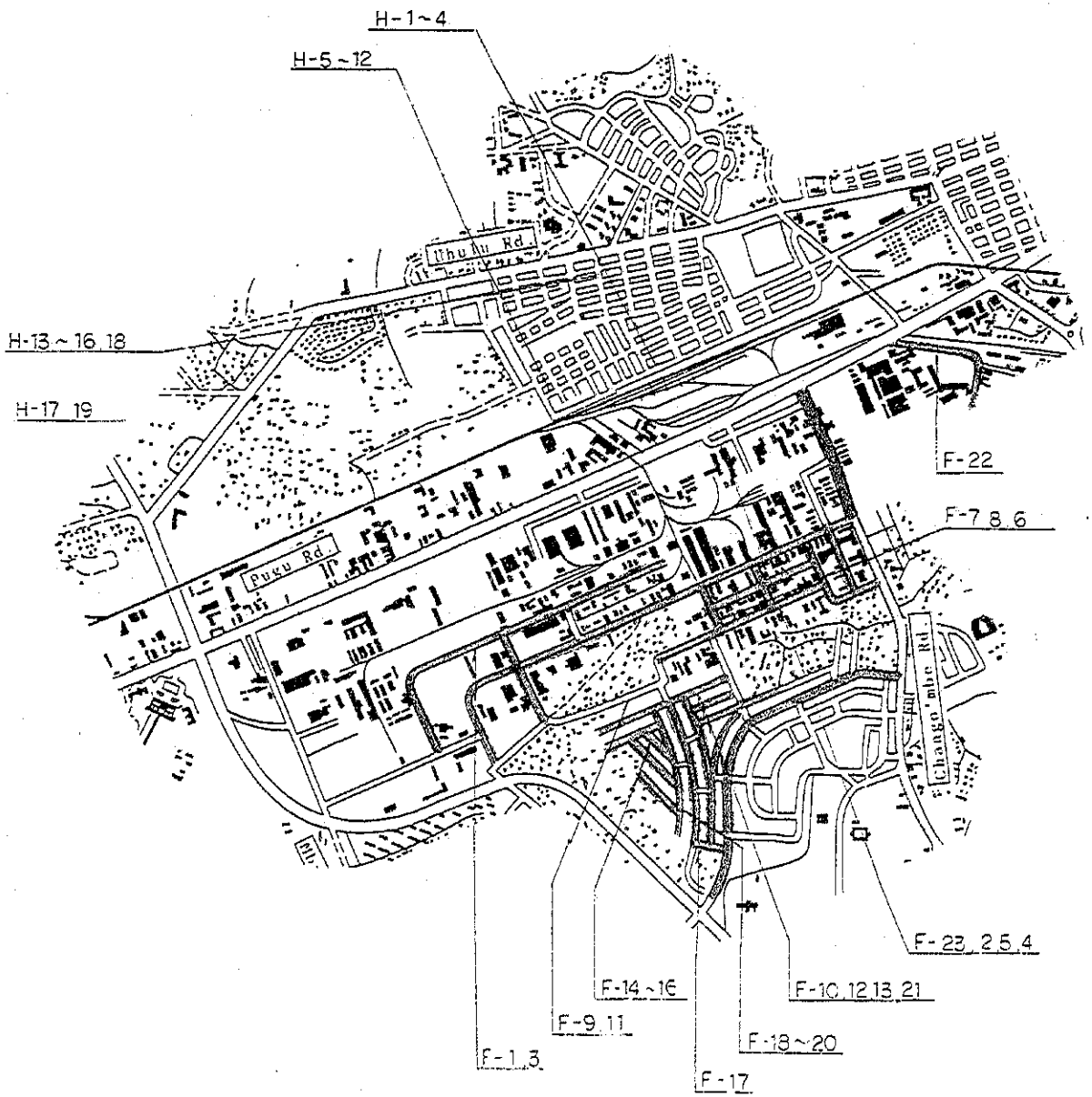
	E-W Streets	
E-1	Matumbi (A) St.	0.44
E-2	Matumbi (B) St.	0.24
E-3	Nyati St.	0.36
E-4	Faru St.	0.38
E-5	Twiga St.	0.50
E-6	Ndovu St.	0.40
E-7	Rufiji St.	0.39
E-8	Muhoro St.	0.70
E-9	Ungoni St.	0.30
E-10	Amani St.	0.60
E-11	Udowe St.	0.40
E-12	Kariakoo St.	0.88
E-13	Kibambawe St.	0.27
E-14	Mafia St.	0.83
E-15	Mkunguni St.	0.89
E-16	Pemba St.	0.30
E-17	Tandamuti St.	1.06
E-18	Narung'ombe St.	1.06
E-19	Mahiwa St.	0.23
E-20	Mhonda St.	0.55
E-21	Magila St.	0.32
E-22	Mchikichi St.	0.73
E-23	Aggrey St.	1.07
E-24	Masasi St.	0.32
E-25	Uhuru St.	1.20
E-26	Kipata St.	0.69
E-27	Lindi St.	0.65
E-28	Somali St.	0.60
E-29	Kiungani St.	0.70
E-30	Mbaruku St.	0.39
E-31	Kisarawe St.	0.66
E-32	Viwanda	0.58

	N-S Streets	
E-33	Lumumba St.	1.20
E-34	Nyasa St.	0.16
E-35	Ukami St.	0.15
E-36	Kipande St.	0.16
E-37	Livingstone St.	1.32
E-38	Mvita St.	0.14
E-39	Hivao St.	0.10
E-40	Chura St.	0.17
E-41	Sikuku St.	1.46
E-42	Sukuma St.	0.18
E-43	Gogo St.	0.10
E-44	Swahili St.	1.47
E-45	Wanyamwezi St.	1.34
E-46	Msimbazi St.	1.68
E-47	Kongo St.	1.27
E-48	Jangwani St.	0.59
E-49	Likoma St.	0.63
E-50	Mzizima St.	0.52
E-51	Muheza St.	0.35

D. Central Area Street

	N-S Streets	
D-1	Lindi St.	0.20
D-2	Uhuru St	0.26
D-3	Aggery St.	0.38
D-4	Kitumbini St.	0.24
D-5	Band St.	0.17
D-6	Mosque St.	0.44
D-7	Morogoro St.	0.90
D-8	Zanaki St.	0.70
D-9	Mrina St.	0.15
D-10	Mkwepu (Mkwebru) St.	0.41
D-11	Maktaba (Azikiwe) St.	0.93
D-12	Ohio St.	0.96
D-13	Ocean Road	3.30
	E-W Streets	
D-14	Nkrumah St.	0.36
D-15	Africa St.	0.30
D-16	Kisutu St.	0.53
D-17	Libya St.	0.50
D-18	Mtendeni St.	0.36
D-19	Jamhuri St.	1.10
D-20	Mshihili St.	0.23
D-21	Market-Makunganya Sts.	1.10
D-22	India St.	0.69
D-23	Indep.(Samora) Ave.(50%)	0.80
D-24	Mansfield St.	0.34
D-25	Sokoine(City) Drive(50%)	0.82
D-26	Kivukoni Front	1.22

Fig. S-12-2 Area Roads by Improvement Measures (Central and Kariakoo Areas)

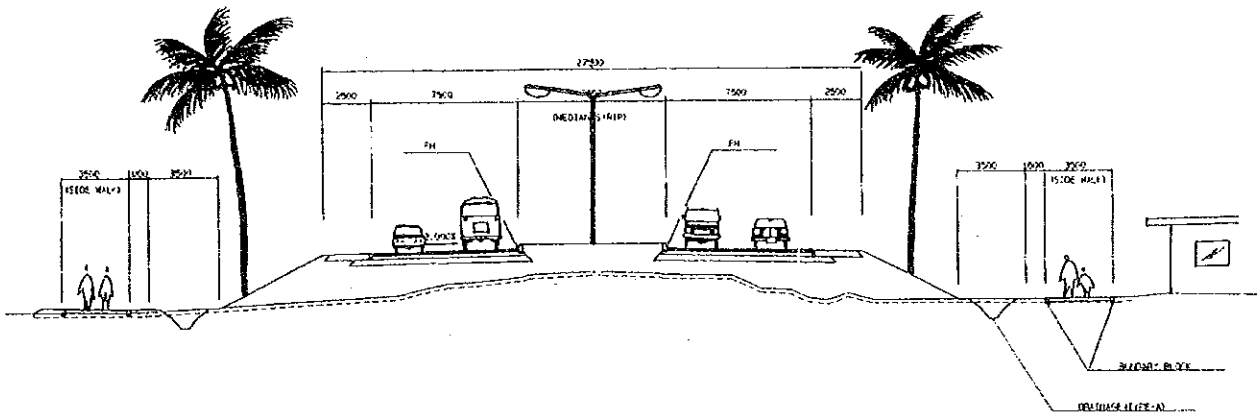


F.	Chang'ombe Industrail Area Street	
F-1	Saza Road	1.56
F-2	Migeyo Road	0.20
F-3	Mbozi Road	2.20
F-4	Dakawa St.	0.82
F-5	Upper Volta St.	0.49
F-6	Chuma Road	0.54
F-7	Rwanda Road	0.20
F-8	Uruwira Road	0.40
F-9	Wasambara Road	1.20
F-10	Manyara	0.61
F-11	Msikiti	0.25
F-12	Ismailia	0.21
F-13	Rwegasore	0.30
F-14	Kimathi	0.14
F-15	Tagore	0.28
F-16	Ivory Coast	0.38
F-17	Chamwenyewe	0.78
F-18	Mzore Road	0.40
F-19	Ubena	0.61
F-20	Diwani	0.66
F-21	Bazaar	0.27
F-22	Mapinduzi St.	0.80
F-23	Monrovia Road	1.30

Maintenance
Overlay
Reconstruction
Widening

Fig. S-12-3 Area Roads by Improvement Measures (Chang'ombe Area)

TYPICAL CROSS SECTION OF MOROGORO ROAD



MOROGORO ROAD

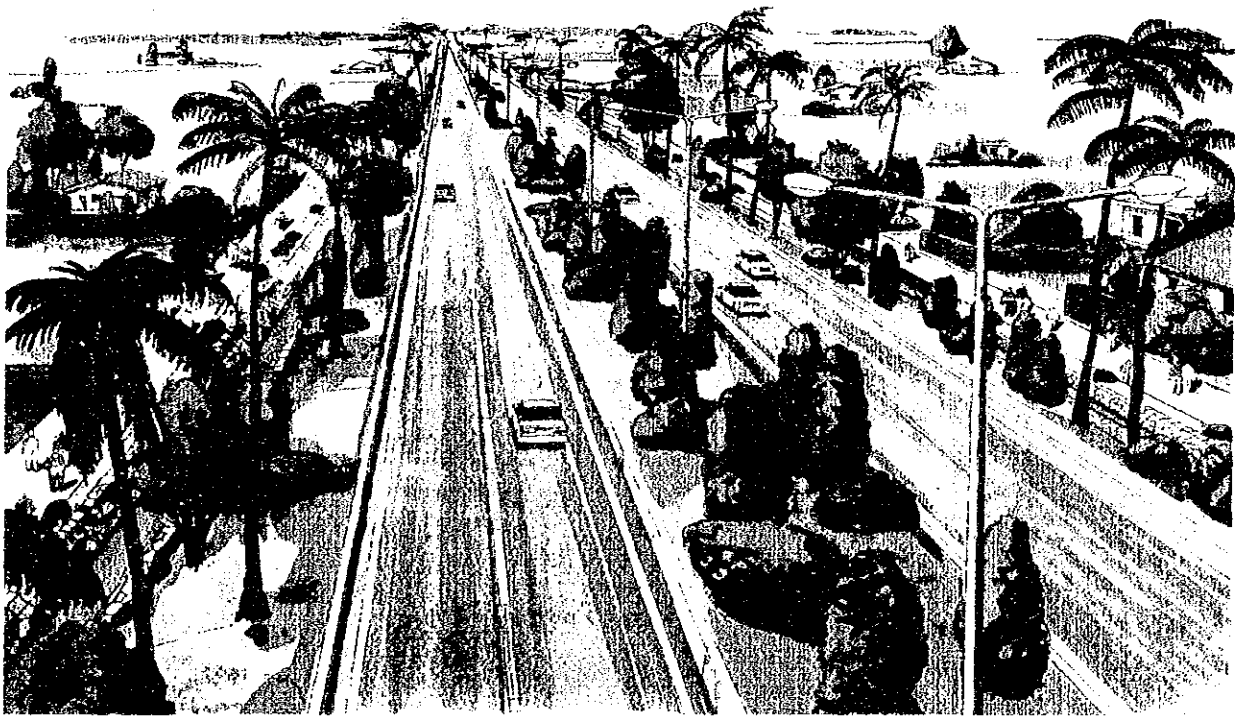
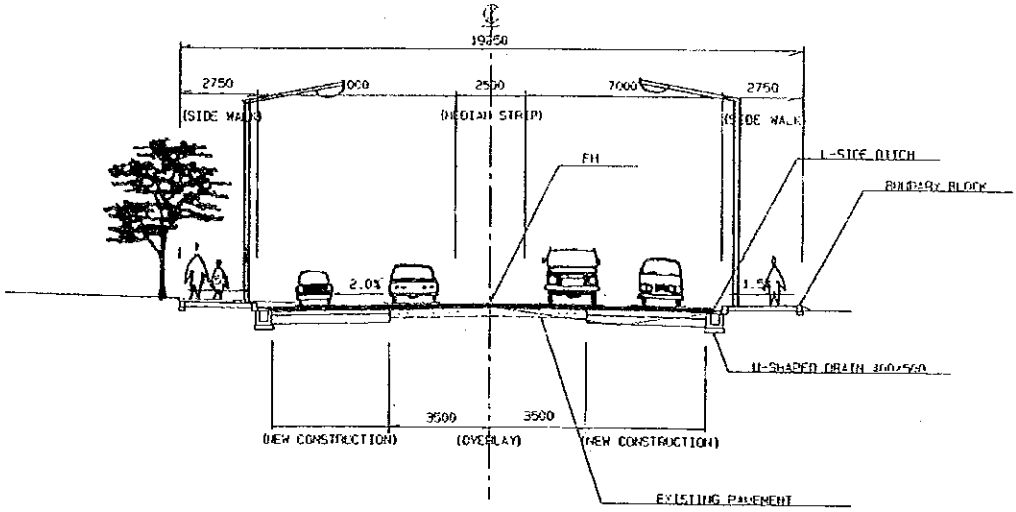
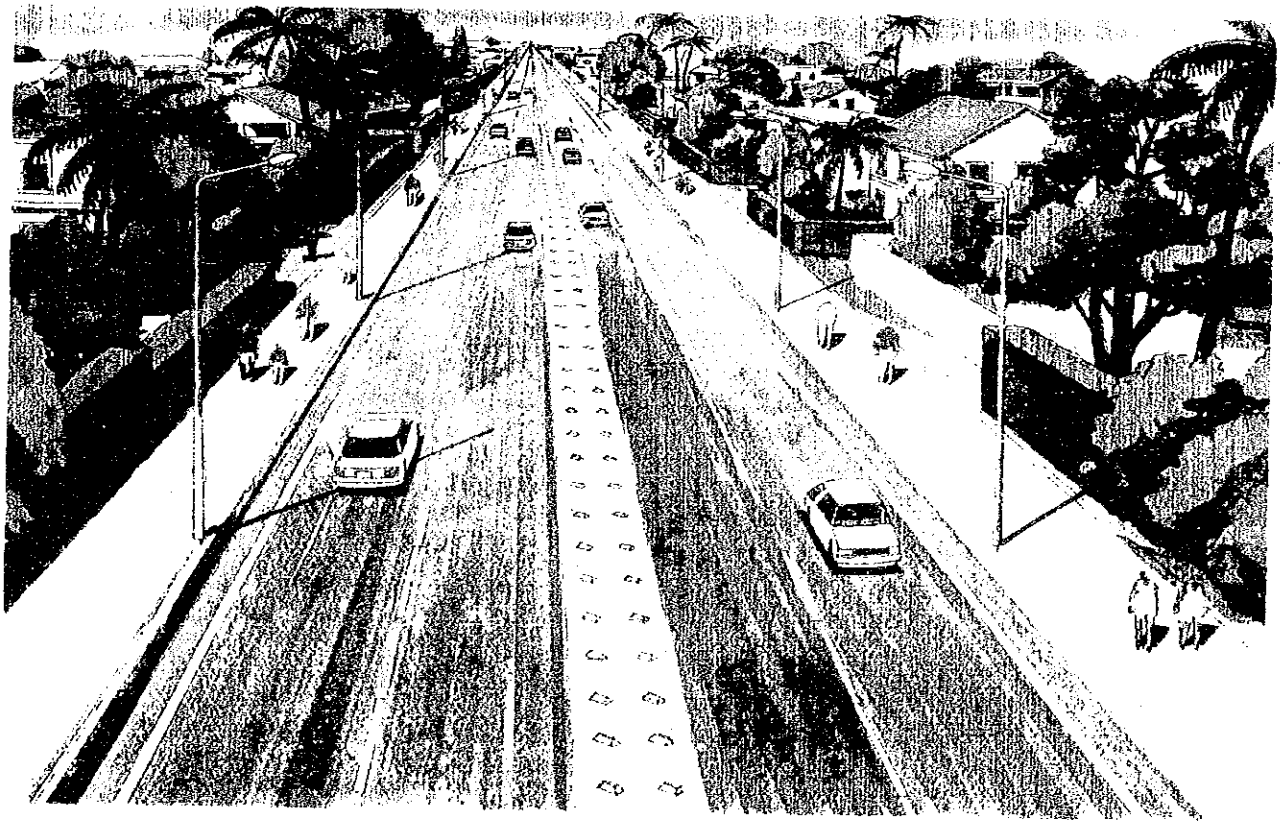


Fig. S.12.4 Typical Cross Sections of Proposed Roads

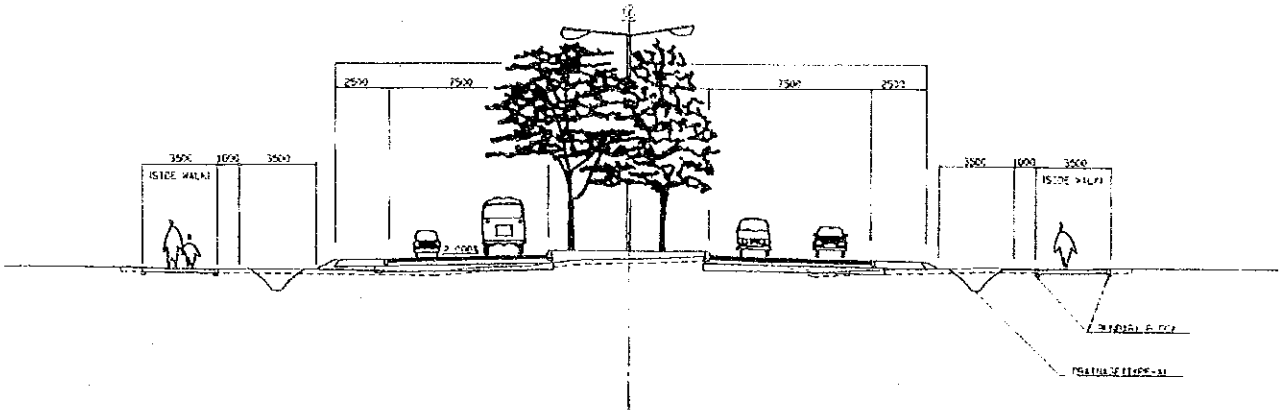
TYPICAL CROSS SECTION OF UPANGA ROAD



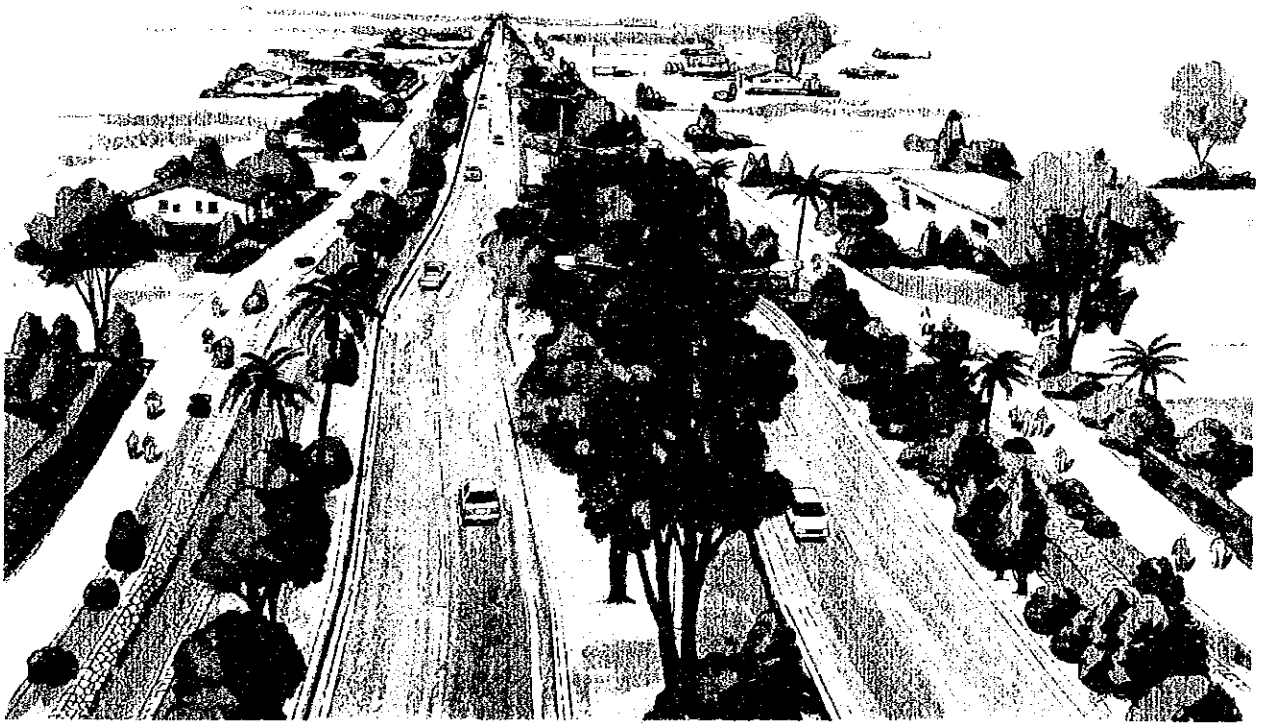
UPANGA ROAD



TYPICAL CROSS SECTION OF NEW BAGAMOYO ROAD



NEW BAGAMOYO ROAD



CHAPTER 13 CONSTRUCTION PLAN AND COST ESTIMATE

13.1 Main Feature of the Project

The construction works consist of improvement of road structures, urgent repair of pot-holes and improvement of road maintenance system. The main features of the Project are summarized in Table S.13.1.

13.2 Construction Plan and Schedule

13.2.1 Construction Conditions

The annual workable days are varried from 216 to 252 days due to nature of construction conditions on each work.

13.2.2 Temporary Construction Facilities

After land compensation, temporary facilities shall be provided prior to commencement of construction works.

13.2.3 Construction Package

-Category A : Improvement of road structures

LOT A-1	New Bagamoyo group	(9.8 Km)
LOT A-2	Morogoro road	(5.7 Km)
LOT A-3	Chang'ombe area group	(19.2 Km)
LOT A-4	Kariakoo area group	(31.7 Km)
LOT A-5	Mwinjuma area group	(16.7 Km)
LOT A-6	Central area group	(21.0 Km)

Category B(LOT B-1) Urgent repair of pot-holes : 206 km

Category C : Improvement of road maintenance system

LOT C-1 Construction of main depot

LOT C-2 Provision of maintenance equipment

-LOT C-2(1) Equipment for main depot

-LOT C-2(2) Equipment for road maintenance

LOT C-3 Guidance and training

13.2.4 Construction Plan and Schedule

Construction period is estimated as shown below.

-Category A : 1990.Dec. - 1994.Mar. (40 months)

-Category B 1990.Dec. - 1992.Mar. (16 months)

-Category C 1990.Dec. - 1994.Mar. (40 months)

13.3 Cost Estimate

13.3.1 Conditions for Cost Estimate

-Price level : October, 1989

-Exchange rates : US$ 1.0 = TShs.144.0 = ¥ 144.0

-Project Cost

A.Construction cost

B.Physical contingency

C.Engineering service cost

D.Relocation cost of public utilities

E.Government administration expense

F.Land Compensation cost

13.3.2 Unit Price

Unit prices for major work items were developed by the Study Team as shown in Table S.13.2. These unit prices shows the direct construction cost(A-2) excluding temporary works(A-1) and indirect expense(A-3).

13.3.3 Major Work Quantities

Majour work quantities are shown in Table S.13.3.

13.3.4 Estimated Project Cost

On the basis of unit prices and quantities, the project cost was estimated as shown in Table S.13.4 and summarized in Table S.13.5.

13.4 Implementation Agency

DCC will be responsible for the implementation of the Project and act as the execution agency for the Project in corporation with MOCW.

13.5 Implementation Programme

Total implementation period is estimated at 46 months. Whole implemented schedule is shown in Figure S.13.1.

13.6 Annual Disbursement Schedule

Fiscal year for the disbursement schedule is assumed to start in April and end in March next year. The project cost is assumed to be disbursed as shown in Table S.13.6.

Table S.13.1 Project Principal Features

NAME OF ROADS	Total Length (km)	Section of Maintenance level (km)	Category A (1) Overlay (km)	(2) Reconst-ruction (km)	(3) Widening (km)	(4) Drainage Structure (km)	(5) Bus bay (nos.)	(6) Inter-section (nos.)	(7) Lightng (nos.)	(8) Signal (nos.)
1. New bagamoyo	**9.8**	**2.3**	**2.3**	**1.4**	**3.9**	**0.2**	**19**	**4**	**91**	**7**
1.1 Up to Morocco J.	3.5	1.0	0.0	0.0	2.5	0.1	3	3	25	4
1.1 Beyond Morocco J.	4.4	1.3	2.0	1.2	0.0	0.0	12	0	0	1
1.13 Upanga	1.9	0.0	0.3	0.2	1.3	0.0	4	1	66	2
2. 1.4 Morogoro (Up to Port Ac.J.)	**5.7**	**0.0**	**0.0**	**0.0**	**5.7**	**0.2**	**16**	**2**	**98**	**3**
3. Chang'ombe Area Group	**19.2**	**5.4**	**4.8**	**9.0**	**0.0**	**0.0**	**0**	**0**	**0**	**0**
3.F Chang'ombe area	14.6	2.6	3.0	9.0	0.0	0.0	0	0	0	0
2.17 Chang'ombe	4.6	2.8	1.8	0.0	0.0	0.0	0	0	0	0
4. Kariakoo Area Group	**31.7**	**3.3**	**3.7**	**24.7**	**0.0**	**0.0**	**0**	**0**	**0**	**0**
3.E Kariakoo area	30.0	3.3	2.0	24.7	0.0	0.0	0	0	0	0
1.11 Msimbazi	1.7	0.0	1.7	0.0	0.0	0.0	0	0	0	0
5. Mwinjuma Area Group	**16.7**	**0.4**	**7.0**	**9.4**	**0.0**	**0.0**	**12**	**8**	**0**	**0**
2.7 Mwinjuma	2.2	0.0	0.8	1.4	0.0	0.0	0	0	0	0
3.I Mwinjuma,L-1	1.5	0.0	0.0	1.5	0.0	0.0	0	0	0	0
1.2 Morocco	3.6	0.0	2.8	0.8	0.0	0.0	12	8	0	0
1.3 Kinondoni	0.7	0.4	0.0	0.4	0.0	0.0	0	0	0	0
2.5 Shekilango	3.8	0.0	2.0	1.8	0.0	0.0	0	0	0	0
2.8 Makanya	5.0	0.0	1.5	3.5	0.0	0.0	0	0	0	0
6. Central Area Group	**21.0**	**0.2**	**17.1**	**3.7**	**0.0**	**0.0**	**0**	**0**	**0**	**3**
3.D Central area	9.8	0.0	6.1	3.7	0.0	0.0	0	0	0	0
1.8 Bandari	2.2	0.2	2.0	0.0	0.0	0.0	0	0	0	0
1.15.1 Nkrumah	0.4	0.0	0.4	0.0	0.0	0.0	0	0	0	0
1.15.3 Sokoine	0.8	0.0	0.8	0.0	0.0	0.0	0	0	0	0
1.15.4 Gerezani	1.4	0.0	1.4	0.0	0.0	0.0	0	0	0	0
1.15.5 Kivukoni	1.2	0.0	1.2	0.0	0.0	0.0	0	0	0	0
1.15.6 Maktaba	0.9	0.0	0.9	0.0	0.0	0.0	0	0	0	3
1.15.7 Ohio	1.0	0.0	1.0	0.0	0.0	0.0	0	0	0	0
1.15.8 Ocean	3.3	0.0	3.3	0.0	0.0	0.0	0	0	0	0
Total	**104.1**	**11.5**	**34.9**	**48.1**	**9.6**	**0.4**	**47**	**14**	**189**	**13**

Table S.13.2 Unit Price List for Major Work Items

(Exchange Rate : 1.0US$ = TShs.144.0 = JYE 144.0)

Item No.	Work	Unit	F/C Portion (TShs.)	L/C Portion (TShs.)	Total (TShs.)
1.EARTH WORKS					
E-1	Clearing and removal of unsuitable materials	sq.m	55	25	80
E-2	Waste excavation,common	cu.m	335	135	470
E-3	Waste excavation,rock	cu.m	530	200	730
E-4	Embankment, borrowed material	cu.m	370	150	520
E-5	Embankment, excavated material	cu.m	230	60	290
E-6	Removal of existing pavement	cu.m	470	200	670
2.PAVEMENT WORKS					
P-2	Sub-base course pavement	cu.m	930	1,930	2,860
P-3	Base course pavement	cu.m	1,630	2,400	4,030
P-4	Shoulder pavement	cu.m	1,470	2,830	4,300
P-5	Prime coat	sq.m	65	5	70
P-6(F)	Asphalt pavement, t=50,100mm	ton	4,210	1,630	5,840
P-7	Sidewalk	sq.m	390	460	850
P-8	Kerb stone	lin.m	310	880	1,190
P-9	Boundary block	lin.m	180	550	730
3.DRAINAGE WORKS					
D-1	Side riprap drainage	sq.m	70	280	350
D-2(B)	Side flume drainage, 400 x 500	lin.m	1,930	4,140	6,070
D-3	L-shaped side ditch	lin.m	590	1,180	1,770
D-6	Pipe culvert,type A, diam.= 600mm	lin.m	2,950	11,750	14,700
D-7(B)	Pipe culvert,type B, diam.= 600mm	lin.m	1,130	8,300	9,430
D-8	Re-installation of existing drainage	lin.m	780	380	1,160

Table S.13.3 Major Work Quantities

Item No.	Description		Unit	Quantity						
				Total	LOT A-1	LOT A-2	LOT A-3	LOT A-4	LOT A-5	LOT A-6
	1.Earth Works									
E-1	Clearing and removal of unsuitable materials		sq.m	301,000	95,000	206,000				
E-2	Waste excavation	common	cu.m	145,000	19,000	51,000	13,000	37,000	20,000	5,000
E-3	Waste excavation	rock	cu.m	10,700	10,700					
E-4	Embankment	borrowed material	cu.m	45,100	11,900	33,200				
E-5	Embankment	excavated material	cu.m	30,400	9,700	20,700				
E-6	Removal of existing pavement		cu.m	63,800	4,300	9,600	12,400	22,600	7,400	7,500
	2.Pavement Works									
P-2	Sub-base course pavement		cu.m	121,000	21,000	32,000	13,000	33,000	15,000	7,000
P-3	Base course pavement		cu.m	84,300	13,600	20,300	9,300	26,600	10,400	4,100
P-4	Shoulder pavement		cu.m	9,100	2,000	7,100				
P-5	Prime coat		sq.m	441,000	75,000	95,000	51,000	136,000	57,000	27,000
P-6	Asphalt pavement		ton	114,000	20,000	22,000	12,000	22,000	19,000	19,000
P-7	Sidewalk		sq.m	68,400	25,800	40,400			2,200	
P-8	Kerb stone		lin.m	18,400	5,500	12,900				
P-9	Boundary block		lin.m	45,300	14,200	30,400			700	
	3.Drainage Works									
D-1	Side riprap drainage		sq.m	10,600	2,400	8,200				
D-2(B)	Side flume drainage	400 x 500	lin.m	4,700	4,700					
D-3	L-shaped side ditch		lin.m	8,900	6,200	2,000			700	
D-4&5	Catch pit and Man hole		nos.	240	140	80			20	
D-7(A)	Pipe culvert	Diam.= 300 mm	lin.m	640		640				
D-6&7(B)	Pipe culvert	Diam.= 600 mm	lin.m	3,490	750	2,740				
D-7(C)	Pipe culvert	Diam.= 1,000 mm	lin.m	360	180	180				
D-8	Re-installation of existing drainage		lin.m	4,990			1,750	2,500		740
	4.Others									
O-1	Road lighting pole	L type	nos.	66	66					
O-2	Road lighting pole	Y type	nos.	123	25	98				
O-3	Traffic signal		sec.	11	8	3				
O-4	Pedestrian bridge		no.	1		1				
O-5	Relocation of utilities	Telephone line	lin.m	11,000	5,300	5,700				
O-6	Relocation of utilities	Water supply valb	nos.	5	5					
O-7	Relocation of utilities	Power supply	lin.m	16,700	5,300	11,400				

Table S.13.4 Total Project Cost

Exchange Rate:1.0US$=TShs.144.0=JYE144.0

Description	F/C Portion (Mil.TShs)	L/C Portion (Mil.TShs)	Total (Mil.TShs)
A.Construction Cost			
A-1 Temporary Works	399.0	171.3	570.3
A-1-1 Direct Works	15.9	11.5	27.4
A-1-2 General Works	77.0	120.3	197.3
A-1-3 Transportation	306.1	39.5	345.6
A-2 Construction Works	1,588.6	1,150.6	2,739.2
A-2-1 Category A	1,299.1	970.2	2,269.3
1)LOT A-1 New Bagamoyo	(320.4)	(217.2)	(537.6)
2)LOT A-2 Morogoro	(398.3)	(316.3)	(714.6)
3)LOT A-3 Chang'ombe	(104.4)	(79.4)	(183.8)
4)LOT A-4 Kariakoo	(223.5)	(193.7)	(417.2)
5)LOT A-5 Mwinjuma	(138.3)	(100.1)	(238.4)
6)LOT A-6 Central	(114.2)	(63.5)	(177.7)
A-2-2 Category B	102.7	87.3	190.0
A-2-3 Category C	186.8	93.1	279.9
1)LOT C-1 Main depot	(87.0)	(93.1)	(180.1)
2)LOT C-2 Equipment	(99.8)	(0.0)	(99.8)
3)LOT C-3 Guidance	(0.0)	(0.0)	(0.0)
A-3 Indirect Expense	368.0	86.1	454.1
A-3-1 Site Expense	197.3	17.1	214.4
A-3-2 Construction expert	75.4	0.0	75.4
A-3-3 General Expense	95.3	69.0	164.3
Total of A	2,355.6	1,408.0	3,763.6
B.Physical Contingency	220.9	135.5	356.4
C.Engineering Service	360.0	90.0	450.0
Total of A to C	2,936.5	1,633.5	4,570.0
D.Relocation Cost	70.0	50.0	120.0
E.Administration Cost	0.0	23.0	23.0
F.Land Compensation	0.0	30.0	30.0
Total of D to F	70.0	103.0	173.0
Grand Total (A to F)	3,006.5	1,736.5	4,743.0

Table S.13.5 Summary of the Project Cost

Items	F/C (Mil.TShs.)	L/C (Mil.TShs.)	Total (Mil.TShs.)
A. Construction Works	2,355.6	1,408.0	3,763.6
B. Physical Contingency	220.9	135.5	356.4
C. Engineering Service	360.0	90.0	450.0
sub-total (A to C)	2,936.5	1,633.5	4,570.0
D. Relocation Cost	70.0	50.0	120.0
E. Administration Cost	0.0	23.0	23.0
F. Land Compensation	0.0	30.0	30.0
Sub-total (D to F)	70.0	103.0	173.0
Grand Total (A to F)	3,006.5	1,736.5	4,743.0

Table S.13.6 Summary of Annual Disbursement Schedule

YEAR	FOREIGN PORTION (Mill.TShs.)	LOCAL PORTION (Mill.TShs.)	TOTAL (Mill.TShs.)
(1)Total Construction Works(Item No.A to C)			
1990/91	874.9	495.1	1,370.0
1991/92	937.3	452.7	1,390.0
1992/93	830.8	529.2	1,360.0
1993/94	293.5	156.5	450.0
Total	2,936.5	1,633.5	4,570.0
(2)Complementary Works(Item No.D to F)			
1990/91	40.0	28.2	68.2
1991/92	30.0	65.4	95.4
1992/93	0.0	7.4	7.4
1993/94	0.0	2.0	2.0
Total	70.0	103.0	173.0

Figure S.13.1 Implementation Schedule

DESCRIPTION	ROAD LENGTH	1st Year 1990/91	2nd Year 1991/92	3rd Year 1992/93	4th Year 1993/94
CONTRACT PHASE AND KEY EVENTS		Phase 1 Contract	Phase 2	Phase 3	Phase 4 Completion
PRE-CONSTRUCTION STAGE					
Detailed design					
Tendering					
CONSTRUCTION STAGE					
Preparatory Works	L.S.				
Category A	104.1 km				
A-1 New Bagamoyo Group	9.8 km		LOT A-1		
A-2 Morogoro Road	5.7 km			LOT A-2	
A-3 Chang'ombe Area Group	19.2 km		LOT A-3		
A-4 Kariakoo Area Group	31.7 km			LOT A-4	
A-5 Mwinjuma Area Group	16.7 km				LOT A-5
A-6 Central Area Group	21.0 km		LOT A-6		
Category B	206 km		LOT B-1		
Category C					
C-1 Main Depot	L.S.		LOT C-1		
C-2 Provision of Equipment	L.S.		LOT C-2		
C-3 Training	L.S.			LOT C-3	

CHAPTER 14 ECONOMIC EVALUATION

14.1 General

High priority project roads proposed in the previous chapter are economically evaluated. First of all, the estimated project costs for each of the road improvement and rehabilitation projects are economically evaluated in relation with the expected benefits produced by each project so as to ascertain their economic feasibility from the view point of the national economy. Second, the socio-economic impacts of the project roads are analysed so as to clarify the role of project roads for the realization of better socio-economic conditions in the city of Dar es Salaam and its surrounding areas.

14.2 Results of Economic Evaluation

Project costs estimated in chapter 13 were evaluated in terms of economic costs through three indicators, i.e. Benefit-Cost Ratio (B/C), Net Present Value (NPV) and Internal Rate of Return (IRR). Preposition for the economic evaluation were set up as below;

-Projects to Be Evaluated
A set of high priority projects contained in Category A and C of the short plan is defined as the base for the evaluation.

-Project Life
15 years of project life was assumed.

-Discount Rate
10% of discount rate was applied throughout the project life on the basis of estimated opportunity cost of capital in Tanzania.

The results are far beyond the benchmark values of these indicators and it could be concluded that the Projects are highly feasible. The calculated values of these indicators are shown below;

Table S.14.1 Result of Estimated Indicators

B/C*	NPV(M.Tsh.)*	IRR(%)
2.46	4888.4	25.1

*10% of discount rate was assumed

14.3 Foreseeable Socio-economic Impact from the Project

Besides the above, it is easily expected that the Projects would come up with great amount of socio-economic impact to the surrounding areas. Some of the conceivable impacts are itemized below;

- Promotion of efficient land use plan
- Realization of functional hierarchy among roads
- Enhancement of urban amenities
- Stimulation of regional economy
- Incentive for the succeeding road developement

It is strongly recommended that these impacts be fostered and directed for future urban development in the city of Dar es Salaam.

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