

ANNEXES

ANNEX 3

ROAD INVENTORY

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Table A3.1 Road Length by Surface Type; Classified Road

Province	District	Surface Dressed	Premix	Gravel	Earth	Total
Nairobi	Nairobi	32.6	319.0	30.8	1.5	383.9
Central	Kiambu	494.2	68.9	594.5	123.6	1,281.2
	Kirinyaga	149.9	26.3	423.8	460.9	1,060.9
	Muranga	258.9	91.9	696.1	473.2	1,520.1
	Nyandurua	145.2	4.3	574.8	565.5	1,289.8
	Nyeri	343.7	34.7	806.9	570.8	1,756.1
	Thika	340.9	34.0	514.6	125.4	1,014.9
		1,732.8	260.1	3,610.7	2,319.4	7,923.0
Coast	Kilifi	143.0	92.1	717.3	735.4	1,687.8
	Kwale	183.9	0.0	680.7	681.4	1,546.0
	Lamu	0.0	0.0	59.6	423.7	483.3
	Mombasa	66.3	41.4	7.1	13.5	128.3
	Taita Taveta	154.8	0.0	279.2	508.4	942.4
	Tana River	79.0	0.0	88.8	903.3	1,071.1
		627.0	133.5	1,832.7	3,265.7	5,858.9
Eastern	Embu	127.9	0.0	930.7	253.6	1,312.2
	Isiolo	9.0	0.0	196.8	921.7	1,127.5
	Kitui	46.5	3.3	617.3	1,299.7	1,966.8
	Machakos	235.4	119.3	650.0	575.1	1,579.8
	Marsabit	9.5	0.0	376.5	1,830.4	2,216.4
	Meru	143.6	4.6	565.2	211.6	925.0
	Makueni	240.0	31.0	462.4	874.1	1,607.5
	Tharaka-Nithi	86.1	0.0	327.7	201.7	615.5
	Mwingi	72.0	0.0	370.0	584.7	1,026.7
Nyambene	60.7	0.0	402.2	242.0	704.9	
		1,030.7	158.2	4,898.8	6,994.6	13,082.3
North Eastern	Garissa	11.0	0.0	271.1	1,553.4	1,835.5
	Mandera	0.0	136.4	122.4	1,062.2	1,321.0
	Wajir	0.0	0.0	265.5	1,430.6	1,696.1
		11.0	136.4	659.0	4,046.2	4,852.6
Nyanza	Kisii	61.2	44.0	679.6	280.7	1,065.5
	Kisumu	298.9	0.0	547.2	808.0	1,654.1
	Siaya	147.4	0.0	776.0	397.1	1,320.5
	Homa Bay	20.6	61.6	839.2	397.5	1,318.9
	Nyamira	20.0	2.0	406.7	211.2	639.9
	Migori	10.7	85.5	639.3	547.2	1,282.7
	Kuria	0.0	19.0	157.0	91.1	267.1
		558.8	212.1	4,045.0	2,732.8	7,548.7

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Rift Valley	Kajiado	295.5	4.9	1,374.6	381.2	2,056.2
	Kericho	200.2	0.0	627.4	295.7	1,123.3
	Laikipia	141.3	13.7	491.1	423.1	1,069.2
	Nakuru	451.2	102.5	691.3	604.8	1,849.8
	Narok	2.0	0.0	1,064.9	473.0	1,539.9
	Trans Nzoia	106.3	0.0	931.0	100.9	1,138.2
	Uasin Gishu	335.8	17.5	814.5	75.1	1,242.9
	Bomet	123.0	14.7	627.9	272.9	1,038.5
	Baringo	342.7	0.0	708.8	662.6	1,714.1
	Elgeyo Marak	87.0	0.0	304.8	174.3	566.1
	Nandi	179.6	0.0	971.5	138.9	1,290.0
	Samburu	0.0	0.0	357.7	1,048.6	1,406.3
	Turkana	484.5	0.0	314.1	1,706.2	2,504.8
	West Pokot	137.9	0.0	712.2	370.2	1,220.3
	Transmara	0.0	0.0	211.6	171.2	382.8
	Marakwet	0.0	0.0	144.0	227.6	371.6
	2,887.0	153.3	10,347.4	7,126.3	20,514.0	
Western	Mt Elgon	1.0	0.0	145.3	79.5	225.8
	Bungoma	84.8	50.8	734.6	290.6	1,160.8
	Busia	41.1	1.0	601.0	153.2	796.3
	Kakamega	121.6	33.4	901.6	405.6	1,462.2
	Vihiga	34.9	69.6	251.8	44.2	400.5
	283.4	154.8	2,634.3	973.1	4,045.6	
All Provinces		7,163.3	1,527.4	28,058.7	27,459.6	64,209.0

Source: Schedule of Classified Roads in 1996

Note: In 1996 there were only 54 Districts. In 2001, there are now 70 Districts.

Table A3.2 Summary of Road Length by Class and Surface Type; Classified Roads

	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
ALL PROVINCES	A	2,044.5	627.5	716.9	241.0	3,629.9
	B	1,051.9	252.5	842.3	524.2	2,670.9
	C	2,199.9	371.8	3,657.6	1,835.3	8,064.6
	D	1,076.4	97.4	6,599.4	3,584.6	11,357.8
	E	670.2	79.1	7,678.2	18,761.4	27,188.9
	G	76.4	83.2	205.4	113.3	478.3
	L	0.0	0.0	405.6	535.4	941.0
	R	0.0	14.7	7,201.2	810.4	8,026.3
	S	6.7	0.0	80.0	855.7	942.4
	T	37.3	1.2	446.0	102.4	586.9
	W	0.0	0.0	226.2	95.9	322.1
		7,163.3	1,527.4	28,058.8	27,459.6	64,209.1

Source: Schedule of Classified Roads in 1996

Note: In 1996 there were only 54 Districts. In 2001, there are now 70 Districts.

Table A3.3 Road Length by Class and Surface Type; Classified Roads (Nairobi)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nairobi	Nairobi	A	15.4	75.1	0.0	0.0	90.5
		B	0.0	8.3	0.0	0.0	8.3
		C	12.7	106.4	1.5	1.5	122.1
		D	0.0	39.5	0.0	0.0	39.5
		E	4.5	8.5	0.0	0.0	13.0
		G	0.0	81.2	29.4	0.0	110.6
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			32.6	319.0	30.9	1.5	384.0

Table A3.4(1) Road Length by Class and Surface Type; Classified Roads (Kiambu)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Central	Kiambu	A	15.7	35.1	0.0	0.0	50.8
		B	20.0	0.0	0.0	0.0	20.0
		C	133.7	23.7	0.0	0.0	157.4
		D	146.3	10.1	65.4	43.0	264.8
		E	171.0	0.0	309.2	64.9	545.1
		G	0.3	0.0	9.9	6.0	16.2
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	154.4	9.7	164.1
		S	0.0	0.0	0.0	0.0	0.0
		T	7.2	0.0	55.6	0.0	62.8
		W	0.0	0.0	0.0	0.0	0.0
			494.2	68.9	594.5	123.6	1,281.2

Table A3.4(2) Road Length by Class and Surface Type; Classified Roads (Kirinyaga)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Central	Kirinyaga	A	19.1	18.6	0.0	0.0	37.7
		B	42.1	0.0	0.0	0.0	42.1
		C	46.8	0.0	0.0	0.0	46.8
		D	34.3	7.7	42.9	154.9	239.8
		E	6.2	0.0	124.5	285.8	416.5
		G	1.4	0.0	0.0	0.0	1.4
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	251.5	16.1	267.6
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	4.9	4.1	9.0
		W	0.0	0.0	0.0	0.0	0.0
			149.9	26.3	423.8	460.9	1,060.9

Table A3.4(3) Road Length by Class and Surface Type; Classified Roads (Muranga)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Central	Muranga	A	10.0	17.5	0.0	0.0	27.5
		B	0.0	0.0	0.0	0.0	0.0
		C	65.1	47.1	49.0	3.0	164.2
		D	135.3	13.3	122.7	77.3	348.6
		E	45.0	14.0	326.4	355.1	740.5
		G	0.6	0.0	2.9	0.7	4.2
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	178.6	20.7	199.3
		S	0.0	0.0	0.0	0.0	0.0
		T	2.9	0.0	16.5	16.4	35.8
		W	0.0	0.0	0.0	0.0	0.0
			258.9	91.9	696.1	473.2	1,520.1

Table A3.4(4) Road Length by Class and Surface Type; Classified Roads (Nyandurua)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Central	Nyandurua	A	0.0	4.3	0.0	0.0	4.3
		B	27.8	0.0	0.0	0.0	27.8
		C	94.8	0.0	146.5	8.0	249.3
		D	12.1	0.0	216.8	55.1	284.0
		E	10.0	0.0	46.8	162.2	219.0
		G	0.5	0.0	9.3	1.1	10.9
		L	0.0	0.0	70.1	294.6	364.7
		R	0.0	0.0	85.3	44.5	129.8
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	
			145.2	4.3	574.8	565.5	1,289.8

Table A3.4(5) Road Length by Class and Surface Type; Classified Roads (Nyeri)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Central	Nyeri	A	74.2	0.0	0.1	0.0	74.3
		B	60.3	4.0	0.0	0.0	64.3
		C	36.2	0.0	0.0	0.0	36.2
		D	98.5	22.2	144.4	28.1	293.2
		E	61.5	8.5	404.5	440.4	914.9
		G	7.7	0.0	2.7	3.7	14.1
		L	0.0	0.0	43.8	31.5	75.3
		R	0.0	0.0	200.3	57.9	258.2
		S	0.0	0.0	0.0	0.0	0.0
		T	5.3	0.0	11.1	9.2	25.6
		W	0.0	0.0	0.0	0.0	
			343.7	34.7	806.9	570.8	1,756.1

Table A3.4(6) Road Length by Class and Surface Type; Classified Roads (Thika)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Central	Thika	A	36.8	34.0	0.0	0.0	70.8
		B	0.0		0.0	0.0	0.0
		C	115.6	0.0	0.0	0.0	115.6
		D	85.4	0.0	113.2	13.0	211.6
		E	81.9	0.0	378.9	112.4	573.2
		G	2.6	0.0	0.7	0.0	3.3
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	18.6	0.0	21.8	0.0	40.4
		W	0.0	0.0	0.0	0.0	
			340.9	34.0	514.6	125.4	1,014.9

Table A3.4(7) Road Length by Class and Surface Type; Classified Roads (All Districts)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Central	ALL	A	155.8	109.5	0.1	0.0	265.4
		B	150.2	4.0	0.0	0.0	154.2
		C	492.2	70.8	195.5	11.0	769.5
		D	511.9	53.3	705.4	371.4	1,642.0
		E	375.6	22.5	1,590.3	1,420.8	3,409.2
		G	13.1	0.0	25.5	11.5	50.1
		L	0.0	0.0	113.9	326.1	440.0
		R	0.0	0.0	870.1	148.9	1,019.0
		S	0.0	0.0	0.0	0.0	0.0
		T	34.0	0.0	109.9	29.7	173.6
		W	0.0	0.0	0.0	0.0	0.0
			1,732.8	260.1	3,610.7	2,319.4	7,923.0

Table A3.5(1) Road Length by Class and Surface Type; Classified Roads (Kilifi)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Coast	Kilifi	A	35.0	13.1	0.0	0.0	48.1
		B	29.2	74.3	52.1	0.0	155.6
		C	28.2	0.0	134.1	63.2	225.5
		D	2.6	0.0	311.2	87.0	400.8
		E	43.6	4.7	145.0	579.9	773.2
		G	4.4	0.0	6.0	2.4	12.8
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	68.9	2.9	71.8
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			143.0	92.1	717.3	735.4	1,687.8

Table A3.5(2) Road Length by Class and Surface Type; Classified Roads (Kwale)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Coast	Kwale	A	151.7	0.0	0.0	0.0	151.7
		B	0.0	0.0	0.0	0.0	0.0
		C	18.0	0.0	81.0	105.7	204.7
		D	0.0	0.0	129.8	129.0	258.8
		E	14.2	0.0	105.6	333.7	453.5
		G	0.0	0.0	0.0	3.7	3.7
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	364.3	109.3	473.6
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			183.9	0.0	680.7	681.4	1,546.0

Table A3.5(3) Road Length by Class and Surface Type; Classified Roads (Lamu)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Coast	Lamu	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	0.0	0.0	93.4	93.4
		D	0.0	0.0	22.6	49.5	72.1
		E	0.0	0.0	0.0	263.9	263.9
		G	0.0	0.0	0.0	1.5	1.5
		L	0.0	0.0	37.0	15.4	52.4
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	59.6	423.7	483.3

Table A3.5(4) Road Length by Class and Surface Type; Classified Roads (Mombasa)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Coast	Mombasa	A	6.2	33.9	0.0	0.0	40.1
		B	17.6	0.0	0.0	0.0	17.6
		C	18.8	0.0	3.8	0.0	22.6
		D	0.0	0.0	0.0	0.0	0.0
		E	9.6	7.5	3.2	13.5	33.8
		G	14.1	0.0	0.1	0.0	14.2
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			66.3	41.4	7.1	13.5	128.3

Table A3.5(5) Road Length by Class and Surface Type; Classified Roads (Taita Taveta)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Coast	Taita Taveta	A	130.2	0.0	88.8	0.0	219.0
		B	0.0	0.0	0.0	0.0	0.0
		C	22.0	0.0	0.6	0.0	22.6
		D	0.0	0.0	108.0	158.8	266.8
		E	0.0	0.0	75.7	349.6	425.3
		G	2.6	0.0	6.1	0.0	8.7
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			154.8	0.0	279.2	508.4	942.4

Table A3.5(6) Road Length by Class and Surface Type; Classified Roads (Tana River)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Coast	Tana River	A	25.5	0.0	0.0	89.0	114.5
		B	24.5	0.0	43.4	198.7	266.6
		C	29.0	0.0	0.0	0.0	29.0
		D	0.0	0.0	27.0	8.0	35.0
		E	0.0	0.0	18.4	607.6	626.0
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			79.0	0.0	88.8	903.3	1,071.1

Table A3.5(7) Road Length by Class and Surface Type; Classified Roads (All Districts)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Coast	ALL	A	348.6	47.0	88.8	89.0	573.4
		B	71.3	74.3	95.5	198.7	439.8
		C	116.0	0.0	219.5	262.3	597.8
		D	2.6	0.0	598.6	432.3	1,033.5
		E	67.4	12.2	347.9	2,148.2	2,575.7
		G	21.1	0.0	12.2	7.6	40.9
		L	0.0	0.0	37.0	15.4	52.4
		R	0.0	0.0	433.2	112.2	545.4
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			627.0	133.5	1,832.7	3,265.7	5,858.9

Table A3.6(1) Road Length by Class and Surface Type; Classified Roads (Embu)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Embu	A	0.0	0.0	0.0	0.0	0.0
		B	81.1	0.0	0.0	0.0	81.1
		C	0.0	0.0	45.1	8.3	53.4
		D	2.5	0.0	139.9	39.1	181.5
		E	42.2	0.0	293.0	202.2	537.4
		G	0.8	0.0	10.3	0.0	11.1
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	436.0	0.0	436.0
		S	0.0	0.0	0.0	0.0	0.0
		T	1.3	0.0	6.4	4.0	11.7
		W	0.0	0.0	0.0	0.0	0.0
			127.9	0.0	930.7	253.6	1,312.2

Table A3.6(2) Road Length by Class and Surface Type; Classified Roads (Isiolo)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Isiolo	A	9.0	0.0	36.0	0.0	45.0
		B	0.0	0.0	118.0	9.0	127.0
		C	0.0	0.0	0.0	0.0	0.0
		D	0.0	0.0	12.0	32.0	44.0
		E	0.0	0.0	13.0	876.7	889.7
		G	0.0	0.0	17.8	4.0	21.8
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			9.0	0.0	196.8	921.7	1,127.5

Table A3.6(3) Road Length by Class and Surface Type; Classified Roads (Kitui)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Kitui	A	10.8	0.0	0.0	0.0	10.8
		B	3.2	3.3	0.0	157.2	163.7
		C	25.5	0.0	45.0	0.0	70.5
		D	3.2	0.0	149.9	324.5	477.6
		E	1.6	0.0	14.9	793.3	809.8
		G	2.2	0.0	0.0	1.2	3.4
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	407.5	23.5	431.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			46.5	3.3	617.3	1,299.7	1,966.8

Table A3.6(4) Road Length by Class and Surface Type; Classified Roads (Machakos)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Machakos	A	98.6	10.0	0.0	0.0	108.6
		B	35.5	0.0	0.0	0.0	35.5
		C	53.3	95.0	117.7	0.0	266.0
		D	0.0	0.0	208.8	53.8	262.6
		E	43.9	14.3	105.0	508.6	671.8
		G	4.1	0.0	2.3	12.7	19.1
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	216.2	0.0	216.2
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			235.4	119.3	650.0	575.1	1,579.8

Table A3.6(5) Road Length by Class and Surface Type; Classified Roads (Marsabit)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Marsabit	A	9.5	0.0	370.0	0.0	379.5
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	0.0	0.0	492.1	492.1
		D	0.0	0.0	0.0	116.0	116.0
		E	0.0	0.0	6.5	1,222.3	1,228.8
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			9.5	0.0	376.5	1,830.4	2,216.4

Table A3.6(6) Road Length by Class and Surface Type; Classified Roads (Meru)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Meru	A	73.0	0.0	0.0	0.0	73.0
		B	56.0	0.0	0.0	0.0	56.0
		C	0.0	0.0	33.0	0.0	33.0
		D	8.6	4.6	184.7	0.0	197.9
		E	4.5	0.0	128.5	211.6	344.6
		G	1.5	0.0	3.9	0.0	5.4
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	195.9	0.0	195.9
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	19.2	0.0	19.2
		W	0.0	0.0	0.0	0.0	0.0
			143.6	4.6	565.2	211.6	925.0

Table A3.6(7) Road Length by Class and Surface Type; Classified Roads (Makueri)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Makueri	A	189.4	31.0	0.0	0.0	220.4
		B	3.0	0.0	24.8	0.0	27.8
		C	0.0	0.0	151.0	0.0	151.0
		D	47.6	0.0	99.9	47.5	195.0
		E	0.0	0.0	11.8	823.6	835.4
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	174.9	3.0	177.9
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			240.0	31.0	462.4	874.1	1,607.5

Table A3.6(8) Road Length by Class and Surface Type; Classified Roads (Tharaka-Nithi)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Tharaka-Nithi	A	0.0	0.0	0.0	0.0	0.0
		B	32.9	0.0	0.0	0.0	32.9
		C	50.7	0.0	35.0	0.0	85.7
		D	1.5	0.0	103.5	60.0	165.0
		E	1.0	0.0	111.2	141.7	253.9
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	78.0	0.0	78.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			86.1	0.0	327.7	201.7	615.5

Table A3.6(9) Road Length by Class and Surface Type; Classified Roads (Mwingi)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Mwingi	A	72.0	0.0	51.0	0.0	123.0
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	0.0	125.7	0.0	125.7
		D	0.0	0.0	77.5	90.9	168.4
		E	0.0	0.0	0.0	434.5	434.5
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	115.8	59.3	175.1
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			72.0	0.0	370.0	584.7	1,026.7

Table A3.6(10) Road Length by Class and Surface Type; Classified Roads (Nyambene)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	Nyambene	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	0.0	66.0	66.0
		C	60.7	0.0	7.6	13.1	81.4
		D	0.0	0.0	134.1	19.0	153.1
		E	0.0	0.0	144.4	124.3	268.7
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	64.7	0.0	64.7
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	51.4	19.6	71.0
		W	0.0	0.0	0.0	0.0	0.0
			60.7	0.0	402.2	242.0	704.9

Table A3.6(11) Road Length by Class and Surface Type; Classified Roads (All Districts)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Eastern	ALL	A	462.3	41.0	457.0	0.0	960.3
		B	211.7	3.3	142.8	232.2	590.0
		C	190.2	95.0	560.1	513.5	1,358.8
		D	63.4	4.6	1,110.3	782.8	1,961.1
		E	93.2	14.3	828.3	5,338.8	6,274.6
		G	8.6	0.0	34.3	17.9	60.8
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	1,689.0	85.8	1,774.8
		S	0.0	0.0	0.0	0.0	0.0
		T	1.3	0.0	77.0	23.6	101.9
		W	0.0	0.0	0.0	0.0	0.0
			1,030.7	158.2	4,898.8	6,994.6	13,082.3

Table A3.7(1) Road Length by Class and Surface Type; Classified Roads (Garissa)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
North Eastern	Garissa	A	3.0	0.0	79.0	122.0	204.0
		B	0.0	0.0	37.1	15.0	52.1
		C	0.0	0.0	35.0	141.5	176.5
		D	0.0	0.0	0.0	311.5	311.5
		E	3.0	0.0	120.0	963.4	1,086.4
		G	5.0	0.0	0.0	0.0	5.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			11.0	0.0	271.1	1,553.4	1,835.5

Table A3.7(2) Road Length by Class and Surface Type; Classified Roads (Mandera)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
North Eastern	Mandera	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	136.4	122.4	14.0	272.8
		C	0.0	0.0	0.0	0.0	0.0
		D	0.0	0.0	0.0	362.0	362.0
		E	0.0	0.0	0.0	686.2	686.2
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			0.0	136.4	122.4	1,062.2	1,321.0

Table A3.7(3) Road Length by Class and Surface Type; Classified Roads (Wajir)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
North Eastern	Wajir	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	220.0	46.0	266.0
		C	0.0	0.0	12.0	336.0	348.0
		D	0.0	0.0	33.5	250.1	283.6
		E	0.0	0.0	0.0	798.5	798.5
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	265.5	1,430.6	1,696.1

Table A3.7(4) Road Length by Class and Surface Type; Classified Roads (All Districts)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
North Eastern	ALL	A	3.0	0.0	79.0	122.0	204.0
		B	0.0	136.4	379.5	75.0	590.9
		C	0.0	0.0	47.0	477.5	524.5
		D	0.0	0.0	33.5	923.6	957.1
		E	3.0	0.0	120.0	2,448.1	2,571.1
		G	5.0	0.0	0.0	0.0	5.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			11.0	136.4	659.0	4,046.2	4,852.6

Table A3.8(1) Road Length by Class and Surface Type; Classified Roads (Kisii)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	Kisii	A	31.0	0.0	0.0	0.0	31.0
		B	30.2	0.0	0.0	0.0	30.2
		C	0.0	42.0	43.0	0.0	85.0
		D	0.0	0.0	115.6	41.6	157.2
		E	0.0	0.0	165.4	217.5	382.9
		G	0.0	2.0	3.2	0.0	5.2
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	339.3	12.1	351.4
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	13.1	9.5	22.6
		W	0.0	0.0	0.0	0.0	0.0
			61.2	44.0	679.6	280.7	1,065.5

Table A3.8(2) Road Length by Class and Surface Type; Classified Roads (Kisumu)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	Kisumu	A	68.1	0.0	0.0	0.0	68.1
		B	55.2	0.0	0.0	0.0	55.2
		C	162.7	0.0	7.9	0.0	170.6
		D	12.9	0.0	85.2	50.0	148.1
		E	0.0	0.0	254.0	150.1	404.1
		G	0.0	0.0	3.2	1.6	4.8
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	196.9	0.0	196.9
		S	0.0	0.0	0.0	606.3	606.3
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			298.9	0.0	547.2	808.0	1,654.1

Table A3.8(3) Road Length by Class and Surface Type; Classified Roads (Siaya)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	Siaya	A	0.0	0.0	0.0	0.0	0.0
		B	49.5	0.0	0.0	0.0	49.5
		C	93.4	0.0	135.3	0.0	228.7
		D	0.0	0.0	187.8	18.0	205.8
		E	1.0	0.0	270.0	362.1	633.1
		G	3.5	0.0	0.0	17.0	20.5
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	182.9	0.0	182.9
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			147.4	0.0	776.0	397.1	1,320.5

Table A3.8(4) Road Length by Class and Surface Type; Classified Roads (Homabay)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	Homa Bay	A	0.0	42.0	0.0	0.0	42.0
		B	0.0	0.0	0.0	0.0	0.0
		C	20.6	19.6	172.7	0.0	212.9
		D	0.0	0.0	237.2	21.0	258.2
		E	0.0	0.0	148.2	363.5	511.7
		G	0.0	0.0	0.0	0.5	0.5
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	281.1	12.5	293.6
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			20.6	61.6	839.2	397.5	1,318.9

Table A3.8(5) Road Length by Class and Surface Type; Classified Roads (Nyamira)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	Nyamira	A	0.0	0.0	0.0	0.0	0.0
		B	18.0	0.0	0.0	0.0	18.0
		C	0.0	0.0	88.7	0.0	88.7
		D	0.0	0.0	136.9	6.9	143.8
		E	0.0	2.0	57.7	154.8	214.5
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	19.4	34.5	53.9
		R	0.0	0.0	89.8	0.0	89.8
		S	0.0	0.0	0.0	0.0	0.0
		T	2.0	0.0	14.2	15.0	31.2
		W	0.0	0.0	0.0	0.0	0.0
			20.0	2.0	406.7	211.2	639.9

Table A3.8(6) Road Length by Class and Surface Type; Classified Roads (Migori)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	Migori	A	0.0	69.0	0.0	0.0	69.0
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	16.5	72.1	0.0	88.6
		D	4.0	0.0	153.9	0.0	157.9
		E	0.0	0.0	247.0	297.3	544.3
		G	0.0	0.0	0.0	0.5	0.5
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	166.3	0.0	166.3
		S	6.7	0.0	0.0	249.4	256.1
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			10.7	85.5	639.3	547.2	1,282.7

Table A3.8(7) Road Length by Class and Surface Type; Classified Roads (Kuria)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	Kuria	A	0.0	19.0	0.0	0.0	19.0
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	0.0	24.0	0.0	24.0
		D	0.0	0.0	29.0	0.0	29.0
		E	0.0	0.0	27.0	91.1	118.1
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	77.0	0.0	77.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			0.0	19.0	157.0	91.1	267.1

Table A3.8(8) Road Length by Class and Surface Type; Classified Roads (All Districts)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Nyanza	ALL	A	99.1	130.0	0.0	0.0	229.1
		B	152.9	0.0	0.0	0.0	152.9
		C	276.7	78.1	543.7	0.0	898.5
		D	16.9	0.0	945.6	137.5	1,100.0
		E	1.0	2.0	1,169.3	1,636.4	2,808.7
		G	3.5	2.0	6.4	19.6	31.5
		L	0.0	0.0	19.4	34.5	53.9
		R	0.0	0.0	1,333.3	24.6	1,357.9
		S	6.7	0.0	0.0	855.7	862.4
		T	2.0	0.0	27.3	24.5	53.8
		W	0.0	0.0	0.0	0.0	0.0
			558.8	212.1	4,045.0	2,732.8	7,548.7

Table A3.9(1) Road Length by Class and Surface Type; Classified Roads (Kajiado)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Kajiado	A	131.5	0.0	0.0	0.0	131.5
		B	0.0	0.0	0.0	0.0	0.0
		C	109.6	4.9	281.4	0.0	395.9
		D	49.4	0.0	214.5	0.0	263.9
		E	2.0	0.0	877.4	380.7	1,260.1
		G	3.0	0.0	1.3	0.5	4.8
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			295.5	4.9	1,374.6	381.2	2,056.2

Table A3.9(2) Road Length by Class and Surface Type; Classified Roads (Kericho)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Kericho	A	0.0	0.0	0.0	0.0	0.0
		B	90.4	0.0	0.0	0.0	90.4
		C	73.9	0.0	75.4	0.0	149.3
		D	33.9	0.0	162.2	21.1	217.2
		E	2.0	0.0	178.2	243.7	423.9
		G	0.0	0.0	16.6	19.7	36.3
		L	0.0	0.0	10.4	0.0	10.4
		R	0.0	0.0	155.4	11.2	166.6
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	29.2	0.0	29.2
		W	0.0	0.0	0.0	0.0	0.0
			200.2	0.0	627.4	295.7	1,123.3

Table A3.9(3) Road Length by Class and Surface Type; Classified Roads (Laikipia)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Laikipia	A	3.8	0.0	0.0	0.0	3.8
		B	24.6	13.7	0.0	0.0	38.3
		C	82.3	0.0	149.3	15.5	247.1
		D	25.4	0.0	279.7	114.9	420.0
		E	0.0	0.0	54.9	270.4	325.3
		G	5.2	0.0	7.2	6.6	19.0
		L	0.0	0.0	0.0	15.7	15.7
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			141.3	13.7	491.1	423.1	1,069.2

Table A3.9(4) Road Length by Class and Surface Type; Classified Roads (Nakuru)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Nakuru	A	66.2	102.5	0.0	0.0	168.7
		B	107.6	0.0	0.0	0.0	107.6
		C	190.9	0.0	11.0	0.0	201.9
		D	76.2	0.0	208.4	236.7	521.3
		E	1.5	0.0	171.7	357.8	531.0
		G	8.8	0.0	16.5	10.3	35.6
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	271.7	0.0	271.7
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	12.0	0.0	12.0
		W	0.0	0.0	0.0	0.0	0.0
			451.2	102.5	691.3	604.8	1,849.8

Table A3.9(5) Road Length by Class and Surface Type; Classified Roads (Narok)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Narok	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	62.7	0.0	62.7
		C	2.0	0.0	264.4	0.0	266.4
		D	0.0	0.0	291.5	90.0	381.5
		E	0.0	0.0	216.5	280.7	497.2
		G	0.0	0.0	3.6	6.4	10.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	226.2	95.9	322.1
			2.0	0.0	1,064.9	473.0	1,539.9

Table A3.9(6) Road Length by Class and Surface Type; Classified Roads (Trans Nzoia)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Trans Nzoia	A	61.8	0.0	0.0	0.0	61.8
		B	18.6	0.0	0.0	0.0	18.6
		C	21.2	0.0	100.5	16.5	138.2
		D	1.9	0.0	132.2	10.0	144.1
		E	0.3	0.0	254.3	70.7	325.3
		G	2.5	0.0	12.4	3.7	18.6
		L	0.0	0.0	19.0	0.0	19.0
		R	0.0	0.0	412.6	0.0	412.6
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			106.3	0.0	931.0	100.9	1,138.2

Table A3.9(7) Road Length by Class and Surface Type; Classified Roads (Uasin Gishu)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Uasin Gishu	A	105.9	17.5	0.0	0.0	123.4
		B	35.2	0.0	0.0	0.0	35.2
		C	103.2	0.0	92.1	0.0	195.3
		D	89.0	0.0	174.7	7.4	271.1
		E	2.3	0.0	225.8	59.7	287.8
		G	0.2	0.0	4.6	1.7	6.5
		L	0.0	0.0	34.7	6.3	41.0
		R	0.0	0.0	282.6	0.0	282.6
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			335.8	17.5	814.5	75.1	1,242.9

Table A3.9(8) Road Length by Class and Surface Type; Classified Roads (Bomet)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Bomet	A	0.0	0.0	0.0	0.0	0.0
		B	62.0	0.0	0.0	0.0	62.0
		C	48.0	0.0	86.6	0.0	134.6
		D	13.0	0.0	186.8	16.4	216.2
		E	0.0	0.0	136.3	191.6	327.9
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	17.6	23.5	41.1
		R	0.0	14.7	157.8	41.4	213.9
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	42.8	0.0	42.8
		W	0.0	0.0	0.0	0.0	0.0
			123.0	14.7	627.9	272.9	1,038.5

Table A3.9(9) Road Length by Class and Surface Type; Classified Roads (Baringo)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Baringo	A	0.0	0.0	0.0	0.0	0.0
		B	88.4	0.0	118.0	0.0	206.4
		C	125.7	0.0	140.0	18.0	283.7
		D	74.0	0.0	266.7	0.0	340.7
		E	52.0	0.0	145.6	583.9	781.5
		G	2.6	0.0	3.0	0.3	5.9
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	35.5	60.4	95.9
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			342.7	0.0	708.8	662.6	1,714.1

Table A3.9(10) Road Length by Class and Surface Type; Classified Roads (Elgeyo Marak)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Elgeyo Marak	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	0.0	0.0	0.0
		C	87.0	0.0	81.6	0.0	168.6
		D	0.0	0.0	101.6	4.0	105.6
		E	0.0	0.0	5.6	68.6	74.2
		G	0.0	0.0	1.8	2.7	4.5
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	114.2	99.0	213.2
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			87.0	0.0	304.8	174.3	566.1

Table A3.9(11) Road Length by Class and Surface Type; Classified Roads (Nandi)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Nandi	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	0.0	0.0	0.0
		C	121.0	0.0	52.0	0.0	173.0
		D	47.0	0.0	180.8	28.2	256.0
		E	11.6	0.0	317.9	50.0	379.5
		G	0.0	0.0	8.4	1.1	9.5
		L	0.0	0.0	9.7	14.1	23.8
		R	0.0	0.0	272.5	24.8	297.3
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	130.2	20.7	150.9
		W	0.0	0.0	0.0	0.0	0.0
			179.6	0.0	971.5	138.9	1,290.0

Table A3.9(12) Road Length by Class and Surface Type; Classified Roads (Samburu)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Samburu	A	0.0	0.0	92.0	0.0	92.0
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	0.0	255.7	50.7	306.4
		D	0.0	0.0	0.0	33.0	33.0
		E	0.0	0.0	0.0	964.9	964.9
		G	0.0	0.0	10.0	0.0	10.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	357.7	1,048.6	1,406.3

Table A3.9(13) Road Length by Class and Surface Type; Classified Roads (Turukana)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Turkana	A	381.0	0.0	0.0	30.0	411.0
		B	0.0	0.0	0.0	0.0	0.0
		C	18.2	0.0	0.0	397.8	416.0
		D	62.0	0.0	50.2	122.7	234.9
		E	21.0	0.0	261.6	1,155.4	1,438.0
		G	2.3	0.0	2.3	0.3	4.9
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			484.5	0.0	314.1	1,706.2	2,504.8

Table A3.9(14) Road Length by Class and Surface Type; Classified Roads (West Pokot)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	West Pokot	A	102.3	0.0	0.0	0.0	102.3
		B	0.0	0.0	43.8	0.0	43.8
		C	0.0	0.0	0.0	45.0	45.0
		D	2.3	0.0	185.7	45.6	233.6
		E	32.8	0.0	144.2	279.6	456.6
		G	0.5	0.0	0.7	0.0	1.2
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	337.8	0.0	337.8
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			137.9	0.0	712.2	370.2	1,220.3

Table A3.9(15) Road Length by Class and Surface Type; Classified Roads (Transmara)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Transmara	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	0.0	18.3	18.3
		C	0.0	0.0	112.6	21.0	133.6
		D	0.0	0.0	19.0	39.3	58.3
		E	0.0	0.0	80.0	92.6	172.6
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	0.0	0.0
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	211.6	171.2	382.8

Table A3.9(16) Road Length by Class and Surface Type; Classified Roads (Marakwet)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	Marakwet	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	0.0	0.0	0.0	0.0
		D	0.0	0.0	122.6	0.0	122.6
		E	0.0	0.0	20.0	87.0	107.0
		G	0.0	0.0	1.4	0.0	1.4
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	0.0	140.6	140.6
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			0.0	0.0	144.0	227.6	371.6

Table A3.9(17) Road Length by Class and Surface Type; Classified Roads (All Districts)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Rift Valley	ALL	A	852.5	120.0	92.0	30.0	1,094.5
		B	426.8	13.7	224.5	18.3	683.3
		C	983.0	4.9	1,702.6	564.5	3,255.0
		D	474.1	0.0	2,576.6	769.3	3,820.0
		E	125.5	0.0	3,090.0	5,137.3	8,352.8
		G	25.1	0.0	89.8	53.3	168.2
		L	0.0	0.0	91.4	59.6	151.0
		R	0.0	14.7	2,040.1	377.4	2,432.2
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	214.2	20.7	234.9
		W	0.0	0.0	226.2	95.9	322.1
			2,887.0	153.3	10,347.4	7,126.3	20,514.0

Table A3.10(1) Road Length by Class and Surface Type; Classified Roads (Mt. Elgon)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Western	Mt Elgon	A	0.0	0.0	0.0	0.0	0.0
		B	0.0	0.0	0.0	0.0	0.0
		C	0.0	0.0	0.0	0.0	0.0
		D	1.0	0.0	14.4	39.0	54.4
		E	0.0	0.0	56.0	40.5	96.5
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	74.9	0.0	74.9
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			1.0	0.0	145.3	79.5	225.8

Table A3.10(2) Road Length by Class and Surface Type; Classified Roads (Bungoma)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Western	Bungoma	A	31.3	50.8	0.0	0.0	82.1
		B	0.0	0.0	0.0	0.0	0.0
		C	49.3	0.0	98.5	5.0	152.8
		D	4.2	0.0	189.0	60.2	253.4
		E	0.0	0.0	126.9	158.9	285.8
		G	0.0	0.0	0.0	2.6	2.6
		L	0.0	0.0	87.8	2.4	90.2
		R	0.0	0.0	232.4	61.5	293.9
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			84.8	50.8	734.6	290.6	1,160.8

Table A3.10(3) Road Length by Class and Surface Type; Classified Roads (Busia)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Western	Busia	A	14.1	1.0	0.0	0.0	15.1
		B	27.0	0.0	0.0	0.0	27.0
		C	0.0	0.0	165.4	0.0	165.4
		D	0.0	0.0	82.9	59.3	142.2
		E	0.0	0.0	130.3	93.1	223.4
		G	0.0	0.0	0.0	0.8	0.8
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	222.4	0.0	222.4
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	0.0	0.0	0.0	0.0
		W	0.0	0.0	0.0	0.0	0.0
			41.1	1.0	601.0	153.2	796.3

Table A3.10(4) Road Length by Class and Surface Type; Classified Roads (Kakamega)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Western	Kakamega	A	62.4	33.1	0.0	0.0	95.5
		B	12.0	0.0	0.0	0.0	12.0
		C	47.2	0.0	101.7	0.0	148.9
		D	0.0	0.0	278.8	5.0	283.8
		E	0.0	0.3	118.9	303.2	422.4
		G	0.0	0.0	7.8	0.0	7.8
		L	0.0	0.0	56.1	97.4	153.5
		R	0.0	0.0	252.1	0.0	252.1
		S	0.0	0.0	80.0	0.0	80.0
		T	0.0	0.0	6.2	0.0	6.2
		W	0.0	0.0	0.0	0.0	0.0
			121.6	33.4	901.6	405.6	1,462.2

Table A3.10(5) Road Length by Class and Surface Type; Classified Roads (Vihiga)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Western	Vihiga	A	0.0	20.0	0.0	0.0	20.0
		B	0.0	12.5	0.0	0.0	12.5
		C	32.6	16.6	22.1	0.0	71.3
		D	2.3	0.0	64.3	4.2	70.8
		E	0.0	19.3	100.3	36.1	155.7
		G	0.0	0.0	0.0	0.0	0.0
		L	0.0	0.0	0.0	0.0	0.0
		R	0.0	0.0	53.7	0.0	53.7
		S	0.0	0.0	0.0	0.0	0.0
		T	0.0	1.2	11.4	3.9	16.5
		W	0.0	0.0	0.0	0.0	0.0
			34.9	69.6	251.8	44.2	400.5

Table A3.10(6) Road Length by Class and Surface Type; Classified Roads (All Districts)

Province	District	Road Class	Surface Dressed	Premix	Gravel	Earth	Total
Western	ALL	A	107.8	104.9	0.0	0.0	212.7
		B	39.0	12.5	0.0	0.0	51.5
		C	129.1	16.6	387.7	5.0	538.4
		D	7.5	0.0	629.4	167.7	804.6
		E	0.0	19.6	532.4	631.8	1,183.8
		G	0.0	0.0	7.8	3.4	11.2
		L	0.0	0.0	143.9	99.8	243.7
		R	0.0	0.0	835.5	61.5	897.0
		S	0.0	0.0	80.0	0.0	80.0
		T	0.0	1.2	17.6	3.9	22.7
		W	0.0	0.0	0.0	0.0	0.0
			283.4	154.8	2,634.3	973.1	4,045.6

ANNEX 4

LAWS AND REGULATION RELATED TO KRB

ANNEX 4 LAWS AND REGULATIONS RELATED TO KRB

1. The Road Maintenance Levy Fund Act 1993 as amended in 1994.
2. The Finance Bill, 1997.
3. The Public Toll Act, Cap 407.
4. Kenya Revenue Authority Act.
5. The Public Roads and Roads of Access Act, Cap 399.
6. The Local Government Act, Cap 265.
7. The Traffic Act, Cap 403.
8. The Transport Licensing Act, Cap 404.
9. The Streets Adoption Act, Cap406.
10. The Exchequer & Audit Act, Cap 412.
11. The Valuation for Rating Act, Cap 266.
12. The Rating Act, Cap 267.
13. The Wildlife Management & Conservation Act.
14. The Road Authority Ordinance, 1961.
15. The Central Road Authority Act.
16. The Local authority Transfer Fund, 1999.
17. The Agriculture Act.
18. The Physical Planning Act, 1996.
19. The State Corporation Act.
20. The Environmental Management and Co-ordination Act, 1999.
21. The Traffic Act (Amendment) Bill(in draft).

ANNEX 5

**ROAD MAINTENANCE SYSTEM IN
GHANA**

ANNEX 5 ROAD MAINTENANCE SYSTEM IN GHANA

BACKGROUND

The Ministry of Roads and Highways (MRH) is the single ministry responsible for the 40,000km road network in Ghana. MRH is responsible for all policy and strategy matters. Three road agencies are responsible for implementing the maintenance works and they report directly to MRH.

Figure A5.1 shows the organization for the road sector in Ghana.

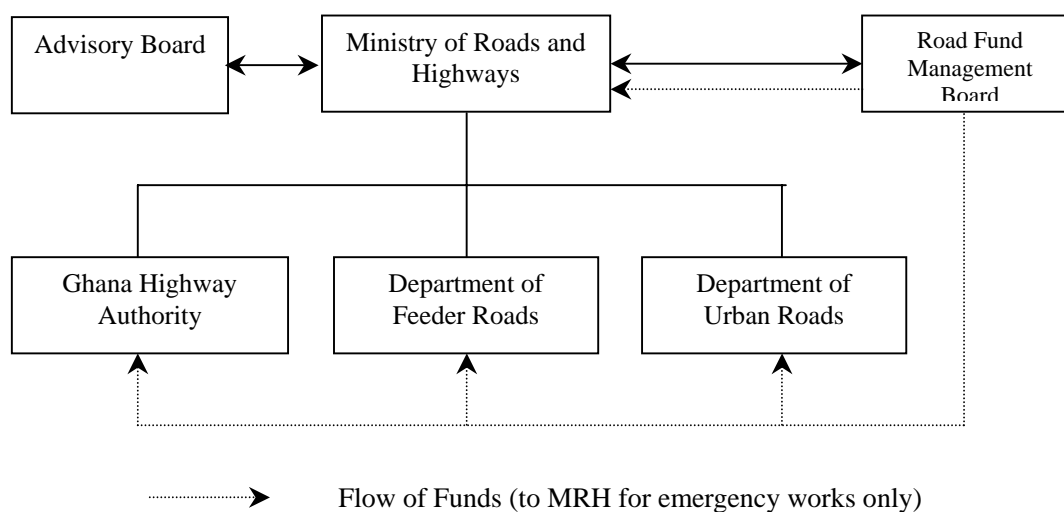


Figure A5.1 Organisation of the Road Sector in Ghana

- Ghana Highway Authority (GHA): Established in 1974 as an autonomous highway authority and is responsible for 13,400 km of trunk roads.
- Department of Feeder Roads (DFR): Established in 1981 and is responsible for 24,000 km of rural roads.
- Department of Urban Roads (DUR): Responsible for 2800 km of city roads in the urban areas.

The role of the Advisory Board is as follows:

- To promote constant interaction between the Ministry and road users
- To advise the Minister on adjustments in policy direction, planning objectives and operational strategies
- To perform such other advisory functions as the Minister may direct

At the time of independence in 1957, the road network in Ghana was in very good condition. In the 1960's the road budget declined, maintenance suffered and the road network was in a very poor condition. During this period the roads were under Ministry of Works and Housing. In 1982 Ministry of Roads and Highways (MRH) was created to:

- (i) formulate road sector strategy and policy
- (ii) co-ordinate and monitor performance of GHA, DFR and DUR
- (iii) improve the condition of roads

GHA was transferred to MRH and the Ministry of Works and Housing was drastically downsized in order to focus solely on government buildings. The Department of Feeder Roads was set up taking staff from GHA and from the Districts and later the Department of Urban Roads was also set up taking staff from GHA, DFR and the city and local councils. However, the creation of the new Ministry did not solve the problem and in 1999, The Ministry of Roads and Transport (MRT) was created with the three Road Agencies reporting to MRT.

In 2001, MRT changed its name back to the Ministry of Roads and Highways (MRH)

The DUR was considered to be essential as the cities and Local Government were very weak technically, short of staff and lacked fund allocation. The urban roads were deteriorating very quickly. Bringing this team together centrally to control the selected urban roads and building the team and their technical knowledge has greatly strengthened the urban road capability. The results can very clearly be seen by the excellent road network and condition in Accra but this has to do with fund allocation to the capital as well.

There are 8 Metropolitan Assemblies that used to control the Urban Roads as one of their functions. The DUR feels strong enough now to decentralise back to these Metropolitan Assemblies over the next few years. They have established teams in 6 of these so far by releasing staff from HQ together with local staff recruitment.

The Government objective is to clear the large backlog of maintenance work on the road network while concurrently maintaining roads that have been rehabilitated and to put the financing of maintenance on a sustainable basis. MRT does not have offices in the regions but operates through GHA and DFR, which have regional offices. There are ten regions and 110 districts.

ROAD FUND

The Road Fund was established in 1985 under an Executive (military) Decree. The objective was to secure adequate and stable funding for routine and periodic maintenance and for the rehabilitation of public roads. Revenue sources were:

- (i) fuel levy on petrol, diesel and refined fuel oil
- (ii) bridge, ferry and road tolls
- (iii) vehicle licence and inspection fees
- (iv) international transit fees
- (v) central government funds as agreed

The Road Fund was managed by the Minister of Finance, the Minister of Roads and Highways and the Comptroller and Auditor General. The Ghana Highway Authority, the Department of Feeder Roads and the Department of Urban Roads are the three road agencies entitled to receive funds from the Road Fund. Funds were nominally divided between the three agencies in the ration of 50:30:20 respectively.

The road fund was besieged with problems. Even though the Minister of Finance, the Minister of Roads and Highways and the Comptroller and Auditor General were involved in management of Road Fund, no one was really responsible. The day-to-day management of Road Fund was inadequate. The Road Fund was simply a bank account with no Oversight Board. Although the levy was periodically revised, by 1995 the revenue from the Road Fund was covering less than 50 % of the maintenance requirements. Funds were collected in the regions and paid into local treasuries and transferred to the Road Fund account. There were delays in transfers, leakage of funds and there was no accounting system in place. There was no way of knowing whether the Road Fund was receiving all the revenue attributable to it. Audit reports regularly complained about the accuracy and reliability of Road Fund balances. There was no consistent procedure for dividing funds between the Ghana Highway Authority (GHA), the Department of Feeder Roads (DFR) and the Department of Urban Roads (DUR). This mismanagement of the Road Fund continued for many years.

RESTRUCTURING OF GHANA ROAD FUND

By 1995 it was realized that the Road Fund was not working i.e. it was not providing adequate and sustainable funds for road maintenance. In 1995 the government proposed wide-ranging changes for the roads sector:

- Establishment of a public-private Board to oversee the management of the Road Fund
- Establishment of a secretariat to manage the day to day operations of the Road Fund according to sound commercial principles
- Comprehensive legal framework for 'Establishment of Road Fund' and 'Management of Road Fund'

MANAGEMENT BOARD

It is interesting to note that the members of the Board, as proposed by draft law, were approved and had their first sitting on January 31, 1997, six months before the Road Fund Law became effective. The Road Fund was restructured to become a commercially managed road fund by the Road Fund Law in August 1997.

The Board consists of thirteen members and is private sector driven as eight members are from the private sector and five are from public sector. The private sector members who are in the majority are nominees of road users:

1. Association of Road Contractors
 2. Ghana Private Road Transport Union
 3. Ghana Private Enterprise Foundation
 4. Ghana Road Haulage Association
 5. Ghana Institute of Engineers
 6. Ghana Association of Farmers and Fishermen
- Plus two other private sector persons nominated by the Minister.

The public sector members represent the relevant Government Ministries:

1. Roads and Highways
2. Finance
3. Mines and Energy
4. Local Government and Rural Development
5. Accountant General

The chairman is the Minister of Roads and Highways.

The main functions of the Board are:

- arrange for collection of funds and improve arrangements for collection of revenues to reduce evasion and avoidance
- recommend the level of fuel levy and other road user charges
- review annual budgets of road agencies
- establish certification procedures to ensure work is completed according to specification
- prepare and publish procedures for disbursement

With the setting up of the Roads Board, all arrears to contractors for maintenance work which were carried forward, were paid off within two months.

SECRETARIAT

The Secretariat consists of a Director, engineer, accountant, secretary and two drivers. The staff are paid competitive market rate. The Secretariat manages the day-to-day affairs of the Road Fund. They also carry out financial and technical audits using their own staff and also using external consultants.

FUNDS

The Road Fund Act, 1997, clearly defines spending priorities:

- first, routine and periodic maintenance
- second, upgrading and rehabilitation of roads
- third, road safety activities

Of the Road Fund revenues, 88 % comes from the fuel levy, 3 % from tolls and transit fees and 9 % comes from licence and inspection fees. Originally, the Fuel Levy provided nearly 95% of the total Road Fund.

In Ghana there exists a clear arrangement for separating the fuel levy from general taxes. The fuel levy is collected by the Ghana National Petroleum Company and deposited directly into the Road Fund account. The Ministry of Roads and Highways collects licensing and examination fees. Road, bridge and ferry tolls are collected by GHA. The road fund does not pay these agencies any collection fees.

There is no contribution from the consolidated budget for maintenance. Railways and Power are exempted from the fuel levy.

The staff from GHA, DFR and DUR are very happy with the Road Fund and Roads Board even

though the Board has imposed stringent guidelines on the road agencies for disbursement of funds. For the road agencies, the major constraint for maintenance was lack of resource. With the establishment of Roads Board to oversee allocation and disbursement of funds, the agencies are getting money for maintenance on time. The backlog is so huge that it will take time for all maintenance needs to be met. People are seeing results and have stopped complaining.

On their side, the road agencies are required to submit roads programmes which are reviewed by the Secretariat and approved by the Board. A Maintenance Performance Budgeting System (MPBS) is used to pick all roads which are in maintainable condition. The road agencies prepare the budget and prioritise the roads according to their maintenance needs. Money from the Road Fund is disbursed only for goods and services that form the Annual Expenditure Programme. The Secretariat performs financial and technical audits of the work done. Vehicle Overloading is a serious problem in Ghana and the Ministry is proposing to set up a separate division to tackle the problems of overloading.

CAPACITY

About 90 % of road works are executed by private contractors (Ministry policy). The Government owns only limited equipment for emergency road maintenance operations. Equipment for road construction is primarily owned by private contractors. Apart from the staff for the road agencies, consultants are also used for planning, design and supervision of road works. For Feeder Roads, labour-based methods are frequently used. In 1981, there were 5000 workers at the DFR and most of the work was done by force account. Currently, there are 700 workers and 90 % of the work is contracted out. The main weakness is that districts do not have capacity for planning and supervision.

Contracts are awarded by Tender Boards. The Roads Board members are not members of Tender Board but staff from GHA, DUR and DFR act as advisors to the Tender Boards. Contracts valued up to US\$ 100,000 are awarded by the District Tender Boards, contracts between US\$ 100,000 to US\$ 500,000 by the Regional Tender Boards and contracts above US\$ 500,000 by the National Tender Board.

Table A5.1 shows the allocation, based on estimated revenues, and the actual disbursement made for 1999. As can be seen there is often a considerable shortfall in the disbursement figures. In 1999, the actual total revenue collected was Cidie 228.2 billion (US\$64.5 million). An allocation of Cidie 219 million (US\$60.7 million) was made and the actual amount disbursed to the Road Agencies was Cidie 186 billion (US\$52.5 million). The disbursement from the Road Fund to three agencies in 1999 was: GHA 42%, DFR 21 % and DUR 21%. The remaining 16%

was to MRT (now MRH) for emergency works and to MOF for the repayment of funds from the NRB inception. The allocation to the road agencies is not based on any criteria or formula. It reflects the government priority which currently is rural development. The priority of government can change and so would the allocation between DFR and DUR.

Table A5.1 Ghana Road Fund Allocation and Disbursement

ROAD FUND ALLOCATION FOR 1999				
AGENCY	Routine US\$ millions	Periodic US\$ millions	Total US\$ millions	Share %
Ghana Highway Authority	8.5	22.6	31.1	51.2
Department of Feeder Roads	4.2	9.6	13.8	22.8
Department of Urban Roads	3.4	12.4	15.8	26.0
National Road Safety Committee	0.0	0.0	0.0	0.0
Ministry of Roads & Transport	0.0	0.0	0.0	0.0
Total	16.1	44.6	60.7	100.0
ROAD FUND ACTUAL DISBURSEMENT FOR 1999				
AGENCY	Routine US\$ millions	Periodic US\$ millions	Total US\$ millions	Share %
Ghana Highway Authority	5.6	16.4	22.0	42.0
Department of Feeder Roads	3.2	7.9	11.1	21.1
Department of Urban Roads	2.3	8.8	11.1	21.1
National Road Safety Committee	0.0	0.0	0.0	0.0
Ministry of Roads & Transport	0.0	0.5	0.5	1.0
Ministry of Finance	0.0	7.8	7.8	14.8
Total	11.1	41.4	52.5	100.0
Source of data: The Ghana Road Fund, 1999 Annual Report and Accounts				
US\$1 = 3,540 Ghana Cidie (31/12/99 source Ghanaweb.com)				

The Fund covers about 60% of the needs of the Road Agencies. The Road Fund Management Board has a target to reach 100% by the year 2003. The Board prepares a rolling 4-year budget and monitors actual performance against this budget.

Disbursement Procedures

Routine Maintenance

Agencies submit their budgets before the beginning of the financial year for approval of the Road Fund Management Board.

The Board releases funds monthly to the Head Office of each agency which then allocate funds

for agreed works.

Agencies submit to the Road Fund Secretariat a Payment Report which gives details of the utilized funds. This statement must be received by the Secretariat before the next monthly allocation is released.

Periodic Maintenance

Agencies submit their budgets before the beginning of the financial year for approval of the Road Fund Management Board.

Payment certificates for completed works are sent to the Agencies for approval by the awarding authorities. After the end of each month, Agencies submit to the Road Fund Secretariat, a schedule of approved payment certificates received by them.

After checking, the Road Fund Secretariat releases the total amount to each Agency for payment to the contractors in accordance with the schedule. After payment, the Agencies submit a Payment Report to the Secretariat.

As can be seen from the Table A5.2, there has been a considerable improvement in the road condition since 1997. The length of road in Good/Fair condition has gone up by nearly 50%.

Table A5.2 Comparison of the Road Condition in Ghana from 1997 to 1999

Condition\Year	By Length (km)			By Percentage (%)		
	1997	1998	1999	1997	1998	1999
Good	8,176	8,651	11,910	30.3	31.8	41.3
Fair	7,969	7,493	11,134	29.6	27.5	38.6
Poor	10,821	11,071	5,798	40.1	40.7	20.1
Total	26,966	27,215	28,842	100.0	100.0	100.0
US\$1 = 3,540 Ghana Cidie (31/12/99 source Ghanaweb.com)						
(Excludes non-maintainable Feeder Roads)						

Other Specific Agency Issues

Ghana Highway Authority (GHA)

The GHA is managed by a Board of Directors. It has 3 Departments, Administration, Maintenance and Development. They have an HQ staff dealing with the whole country and they also have 10 Regional Directors reporting separately to the Director. Under the Regional Offices there are 32 District Offices.

Figure A5.2 shows the national organisation for GHA.

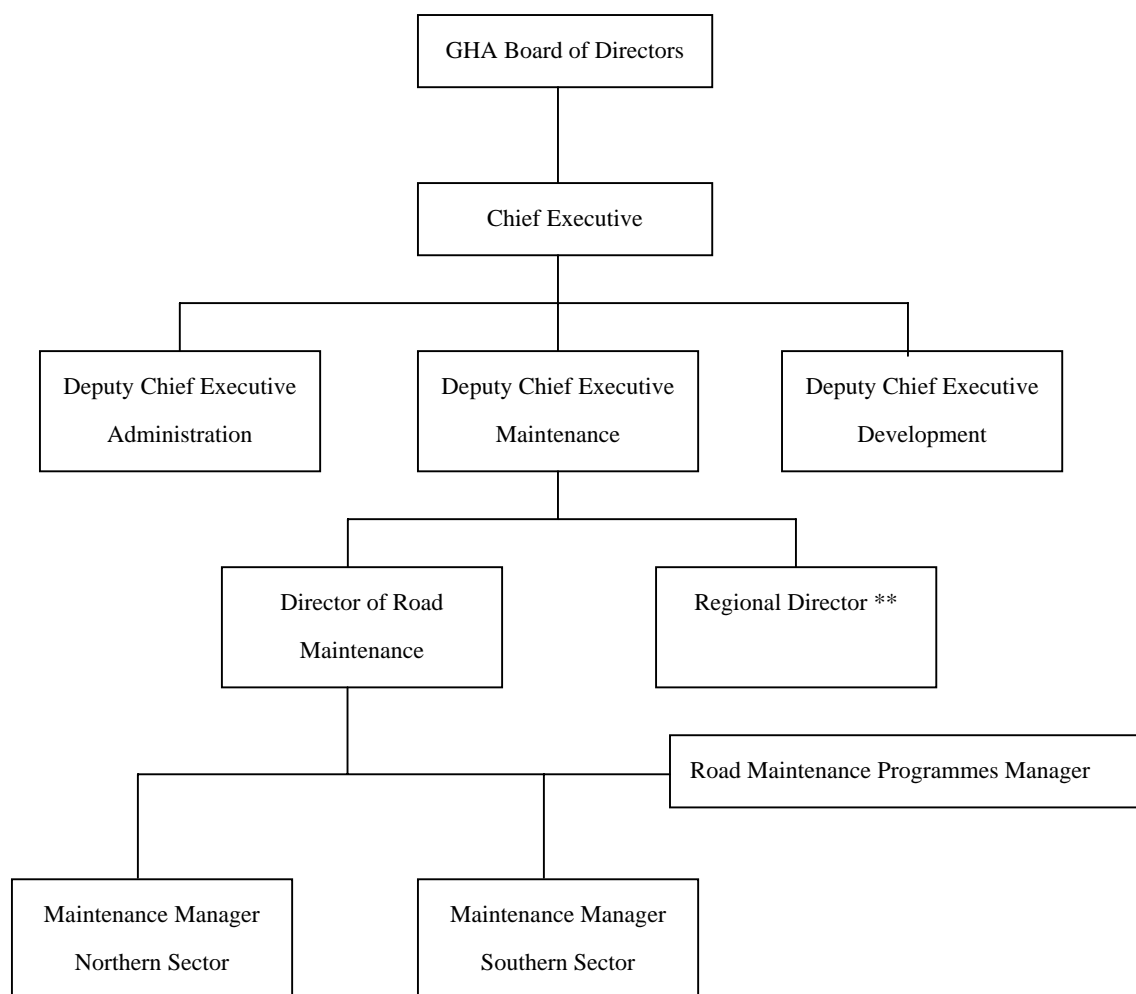


Figure A5.2 National Organisation of the Ghana Highway Authority

GHA has developed a good set of procedural manuals to ensure consistency in their activities. These were prepared with donor assistance and provide a sound base for the management of the maintenance works. The manuals are:

- Maintenance Operations Manuals An Overview
- Maintenance Organisation Structures
- Maintenance Activities Manual
- Maintenance Work Procurement including Model Bidding Documents
- Maintenance Supervision Manual

Figure A5.3 shows the regional organisation for GHA.

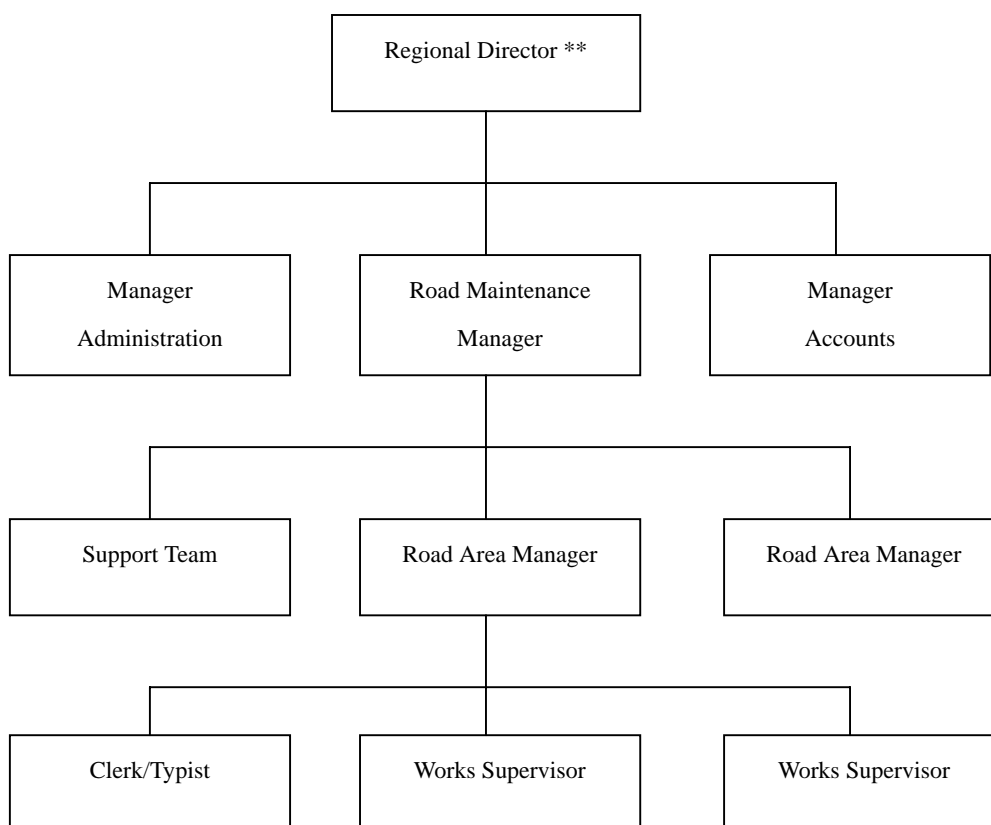


Figure A5.3 Regional Maintenance Organisation for the Ghana Highway Authority

GHA has identified all the key activities and has developed a series of 1 or 2 page activity specifications referring back to the relevant clauses of the Technical Specifications but also stating the key points about each activity, including the basic materials and equipment required. GHA policy is that Force Account shall execute not more than 10% of maintenance works. With this in mind, their Work Procurement document describes the various options for contracts, bidding and evaluation

GHA has also developed a standard procedure and standard reporting forms for carrying out road condition surveys. As these are a key indicator for future road maintenance works it is essential for standard procedures to be adopted across the country. They carry out an annual condition survey and have a target to achieve only 10% of their network in a ‘poor’ condition by 2005.

GHA is responsible for Trunk Roads and has divided their network into zones and has let term contracts for 3 years to carry out all maintenance works in each zone. In the pilot trials of their

term contracts there were some problems. In the future they will go for larger lengths of road in each zone. Also they used Single Man Contracts (like Lengthman in Kenya) and the GHA were supervising vast numbers of these small contracts. They have decided that all the works carried out under the Single Man contracts will be part of the main Term Contracts and it will be up to the Main Contractor to employ the Single Man contractors and to supervise their work. The GHA will then only have the main contract to administer and to monitor overall performance of the main contractors.

GHA has some mobile maintenance units which are to be phased out over the next few years as contracting out reaches its target. They have sold off all their equipment and depots as it was not economic or practical to retain them.

Department of Feeder Roads (DFR)

DFR has a Maintenance Management Manual and a Field Maintenance Manual. With assistance from donors, they have produced a Maintenance Performance Budgeting System (MPBS). The object of this system is to provide standard methods and procedures to enable an adequate level of maintenance to be provided on the Feeder Road Network. The MPBS defines the duties and responsibilities of all sections of the organization and the timing of certain procedures to meet programme requirements.

They have developed standard procedures for road condition surveys including Bump Integrator (BI) surveys and a simple drive-through technique which relates vehicle speed to road roughness using calibrated graphs to provide an International Roughness Index (IRI) for analysing maintenance intervention requirements. The Drive-Through method gives less accurate results but provides a back-up when the BI surveys are not available.

From all the input field data, standard unit costs and work items, the MPBS has a facility to produce a Bill of Quantities for the various maintenance works.

Labour-Based activities are encouraged where appropriate and DFR has adopted the policy that all routine maintenance works are to be contracted out. They have decided to award term contracts of 1 year for a network of roads of up to 120km.

DFR has also developed 1 or 2 page Activity Specification Forms which state the approved working method, manpower, equipment and materials, a brief technical specification and a method of measurement. A simple contract has been developed.

The HQ staff deals with policy and strategy. They have 10 Regions with an Engineer in each region. Currently 95% of the maintenance work is by contract.

Department of Urban Roads (DUR)

The DUR originally controlled roads in 4 urban centres including Accra. This increased to 7 with Cape Coast being added this year to make 8. One more is to be added in the future which will make 9 urban centres under DUR. They now have about 3000km of road under their control.

Under Local Government Law, the responsibility for urban roads is decentralised and lies with the Municipal and Metropolitan Authorities. This responsibility was waived when DUR was set up but it has always been the long-term objective to return this responsibility at the appropriate time. So a key part of the DUR plan is to build a system with a central core team with all the necessary technical and management skills to be able eventually to go back to the Municipal Authorities and run the urban roads locally. They have now built the core team through recruitment and training and over the next 5 years they will establish core teams from HQ in each of the Municipal Authorities. In this way the system will remain consistent with HQ practice and the technical and management skills will be used to the full but the responsibility will return to the Municipal Authority.

Approximately 90% of maintenance work is now done under contract.

* Some sections of this annex are extracted from the World Bank document 'Roads and Road Financing: Annex 10.'

ANNEX 6

ROAD MAINTENANCE SYSTEM IN ZAMBIA

ANNEX 6 ROAD MAINTENANCE SYSTEM IN ZAMBIA

BACKGROUND

Zambia is a landlocked country surrounded by eight neighbouring countries. Zambia has a road network of 37,000 km of various classes of gazetted roads. Of this total, 21,000 km of roads are the responsibility of the Roads Department, whilst the remaining 16,000 km is under the jurisdiction of the District Councils. In addition there are about 30,000 km. of ungazetted roads administered by local authorities and a small amount of park roads by the Ministry of Tourism.

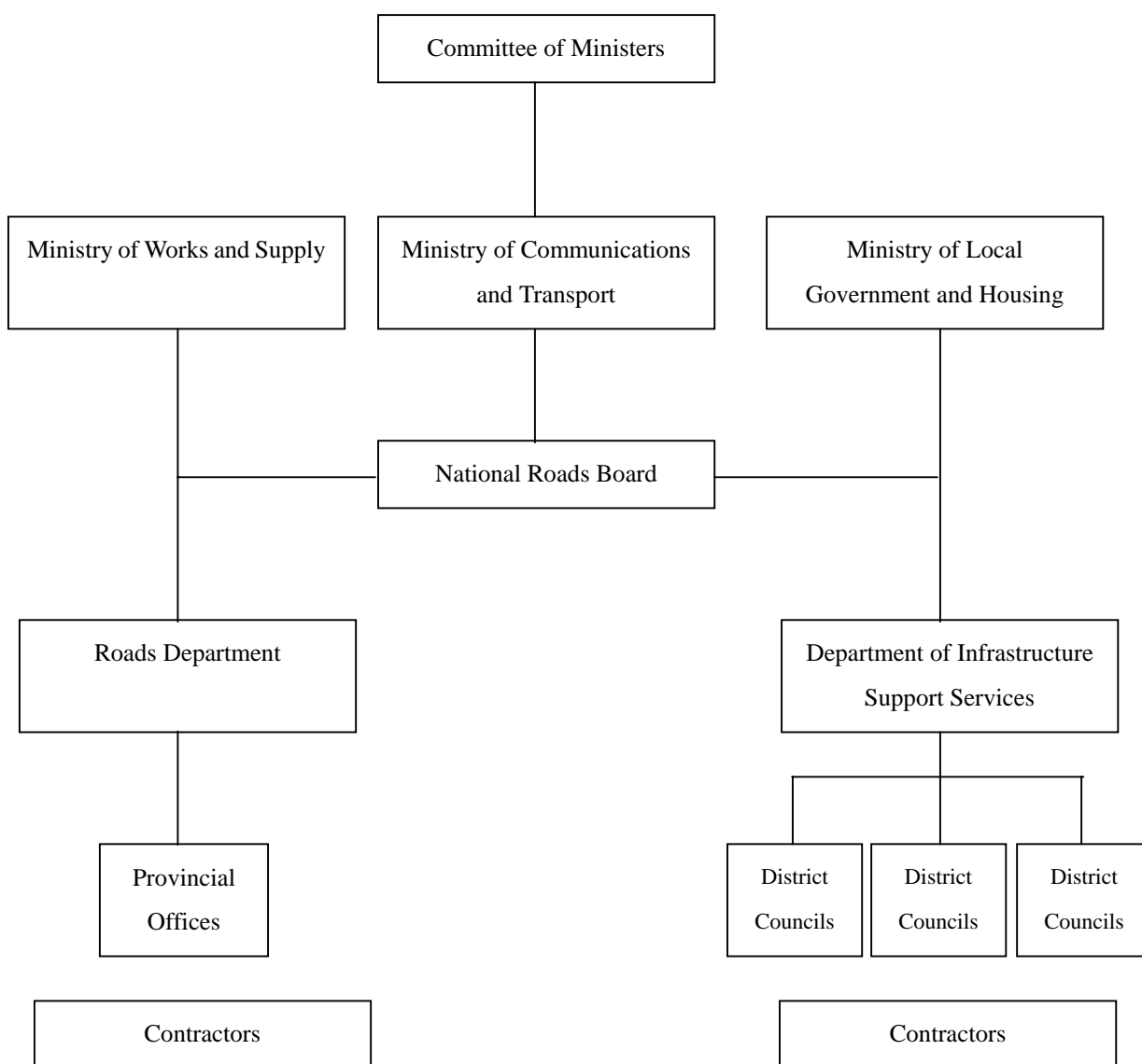


Figure A6.1 Outline Organisation of the Road Sector in Zambia

- The Ministry of Communications and Transport (MOCT) is responsible for policy and strategy for roads in Zambia. It has overall responsibility for roads and implementation of the Roads and Road Traffic Act. The ministries responsible for implementing maintenance works and the National Road Board all report to MOCT.
- The Ministry of Works and Supply (MOWS) has responsibility for 21,000km of Trunk, Main and District roads.
- The Ministry of Local Government (MOLG) is responsible for 16,000km of Feeder and Urban Roads. It also has responsibility for 30,000km of ungazetted roads.

The government objective is to focus all maintenance funds on a core network of 33,500km and to achieve 50% of all roads in good condition and a maximum of 10% of all roads in poor condition.

In 1987 about 40% of the primary road network in Zambia was in good condition. By 1990 the percentage of the good roads had declined to 20%. The value of the Zambian road network was initially assessed at US \$2.3 billion. It has during recent years declined by more than US\$400 million due to neglect of maintenance. Road maintenance and other expenditures were financed from general tax revenues and the competition from other sectors resulted in a decline in maintenance funds. Maintenance allocations declined to only about 15% of requirements.

The poor institutional framework within which roads were managed further complicated the inadequate funding. Poor conditions of service, lack of clearly defined responsibilities, ineffective and weak management structures and lack of managerial accountability have all contributed to poor use of the meagre funds available. Consequently, the Roads Agencies suffered from a lack of suitable qualified and experienced staff to plan, programme, organize, monitor and regulate the work undertaken by their own forces as well as by private Consultants and Contractors. It was very clear that the problem of road maintenance was not one of engineering but of policies and management.

At the recommendation of Road Maintenance Policy Seminar, February 1993, a road user charge in the form of a fuel levy was introduced from May 1, 1993. Initially it was about US\$ 0.01 per litre but has now been increased to 15 percent of the wholesale price of fuel which is around US\$ 0.07 per litre.

MANAGEMENT BOARD

After the fuel levy was instituted there was no Board for one and a half years. There was a National Task Force under the Ministry of Public Works to administer the funds. Chair of the

Task Force was the Deputy Minister and 60 % of the funds were misused. They were used for the purchase of vehicles, office equipment, payment of hotel and telephone bills and so on.

The setting up of a National Roads Boards (NRB) to manage the Road Fund took longer to be instituted than the fuel levy, but was eventually done through a Statutory Instrument in October 1994. The Board is private sector driven as seven members are from the private sector and four are from the public sector. The private sector members have the right to vote whereas the public sector members do not. The private sector members are nominees of road users:

1. Chamber of Commerce
2. Automobile Association
3. Chartered Institute of Transport
4. Transporters Association
5. Farmers
6. Engineering Institute of Zambia
7. Copperbelt University

The four public sector members represent the relevant Government Ministries:

8. Communications and Transport
9. Works and Supply
10. Local Government and Housing
11. Finance

The Chairman and Vice Chairman are elected by the Board from among the private sector representatives. The road user dominated Board represents a major change of policy in the institutional structure of the roads sector. It is also a deliberate attempt by the Government to hand over ownership of the roads to the private sector as well as to create a partnership between the private and public sector for the management of roads. Roads in Zambia were always perceived as the responsibility of the Government.

With the institution of the Roads Board, this perception is changing slowly. The board conducts effective public relations programmes including mediums such as radio programmes and monthly press releases, to enhance the sense of the ownership among the road users.

BOARD OPERATIONS

The first task of the board was to institute policy guidelines to manage and administer the Road Fund. The next step for the Board was to establish systems and procedures to ensure total transparency and accountability in the management of the Road Fund. This included:

- System for receipt of money
- Banking System
- Internal Control System
- Auditing Systems

Another innovative institutional structure was to set up committees which provide opportunities for participation by the various stakeholders and key players and thus involve interested groups in the management of roads:

- Technical Committee
- Finance Committee
- Road Sector Investment Program (ROADSIP) Coordinating Committee
- Transport Engineering and Technical Assistance (TETAP) Steering Committee

The most important are the Technical and Finance Committees.

Finance Committee: meets at least once a month and comprises three members of the Board, a representative from Auditor General's office and a financial expert from the Secretariat. The representative from the Ministry of Finance chairs the Committee. Other Board members are selected on the basis of their expertise. The finance committee makes recommendations of where the road fund money should be held. This is a very important decision as a number of banks have gone under in the last few years. The finance committee monitors the liquidity of the banks where the money is held, and at the first sign of problem withdraws the money and moves to another bank. The decision of which bank to use is reviewed annually through a tendering process to ensure that services are competitive. Facilities offered by the Banks include attractive interest rates, honouring of cheques throughout the country and minimal or no charges on services offered.

Technical Committee: is the "think tank" of the Board. It meets at least twice a month and comprises three members of the Board, a representative from the Engineering Institute of Zambia, a representative of the Roads Department, a representative of the Ministry of Local Government and Housing and a technical expert from the Secretariat. The Vice Chairman of the Board chairs the committee.

The committee's main responsibility is to get "No Objection" from the Board for the Annual Road Maintenance Programme. It also undertakes site visits to ensure that road users get 'best

value for money' from the Road Fund. Not all members of Technical Committee are technical experts.

The National Roads Board by law is an advisory Board but over time has evolved into an Executive Board.

SECRETARIAT

The Secretariat of the Road Fund is the foundation of the Board as it manages the day-to-day operations of the Road Fund. Staffing of the Secretariat is critical. The ability to deliver goods lies in the capacity, capability and creativity of the staff. The Secretariat started with just three staff members. It has taken on additional responsibilities and has grown considerably with highly skilled staff. It consists of an Executive Secretary, an Engineer for Quality Assurance, a Highway Engineer, a Coordinator for Procurement, and an Accountant. There are three experts who work part time – a Financial Analyst, a Transport Economist and a Human Resource expert. The functions of the Secretariat are to prepare:

- (i) policy guidelines to manage the fund
- (ii) procedures to administer the fund
- (iii) financial regulations and systems to account for the fund. It makes payments only after technical and financial audits are done

The Secretariat has also set up a small engineering unit because the Board perceived that it needed a sound technical basis for deploying its resources.

NATIONAL PROGRAMME OF ROAD MAINTENANCE

Another step taken by the Board was to establish a National Program of Road Maintenance. All 72 District Councils and 9 Provincial Road Engineers were required to submit a program of road maintenance, which included the selection criteria for roads and the type of maintenance intervention recommended, and the costs, for the consideration of the Board. There was no capacity at the council level and provincial road engineers, so private sector consultants were appointed to assist the councils and Provincial Road Engineers in drawing up, implementing, auditing, as well as certifying the payments to the Board.

Provincial Road Engineers and Directors of Works in the councils are also being trained to plan, programme, supervise road works and certify payments to promote total quality management of contracts.

CAPACITY BUILDING

The government has adopted a deliberate policy to move from force account to using private sector contractors. Previously, 94 % of work was done by force account. . Now 90 % of works under the Road Fund, including both routine and periodic maintenance, are done by contract. The main reason for this is that by using private sector contractors, there is more transparency and accountability. Also, under force account, only 15 % of equipment was in good condition and some of the limited funds had to be used for the maintenance of equipment.

The number of contractors increased from 50 in 1995 to 100 by the end of 2000. Consequently, the pricing for some road works also declined by about 40%. The Board is assisting in development of contractors. For this purpose, the Road Training School is being revamped and reorganized to train and develop contractor capacity with greater emphasis on labour-based road works. The consultant and the implementing agency i.e. Council or Provincial Road Engineer certify payments to contractors. Similarly, the implementing agency and the relevant ministry certifies payments to consultants. Through this internal control system the Board is able to ensure accountability of the Road Fund and value for the money spent. Contractors are pre-qualified only in the case of large contracts.

Consultants specializing in roads have also grown from 6 in 1995 to 20 in 2000 but all are based in urban areas.

FUNDS

The Road Fund is dedicated to road maintenance. At present, the only source of revenue for the road fund is the fuel levy which is collected from the road users. The fuel levy has increased from Kwacha10 per litre in 1994 to Kw30 per litre in 1995 to Kw40 per litre in 1996, and is now 15% of wholesale price of fuel. The revenue from the fuel levy has risen from about Kw12 Billion in 1994/95 to Kw35.5 Billion (US\$5.88million) in 2000. As can be seen from the Table A6.1, even though US\$5.88 million was collected, only US\$5.05 was made available for the Road Fund.

In order to broaden the revenue base, the Board has proposed that revenues from transit tolls, weighbridge charges, traffic fines, and motor vehicle licensing fees should go to the road fund. Government is considering this proposal. Funds are only disbursed for approved road maintenance programmes and the division between road type is clearly determined - 40% for Main Roads, 20% for Council Roads (Urban) and 40% for District Council/Feeder Roads.

Table A6.1 Fuel Levy Status at 31 December 2000

	US\$ millions		
	Collections	Funding	Arrears
1994/95	2.98	2.83	0.15
1996	3.48	2.65	0.83
1998	4.85	3.38	1.48
1999	5.78	5.75	0.03
2000	5.88	5.05	0.83
	22.95	19.65	3.30
Source: National Roads Board Annual Report 2000			

The revenues from the fuel levy cover around 60% of the entire needs of road maintenance. The gap is still funded by the government. The fuel levy is routed through the oil companies to the Zambian Revenue Authority which deposits it into the MOFED account. MOFED then issues a cheque to NRB. Initially, when the Board was set up, there were problems. The fuel levy was in arrears as civil servants sat on the money. For the fuel levy to be deposited into the Road Fund Account, the Revenue Act has to be amended. The contractors are generally paid on time, within 30 days of receipt of the certification. There are no exemptions for fuel levy. To compensate the farmers, NRB allocates more funds for the feeder roads. Railways are asking for exemption as they feel that by paying the fuel levy for maintenance of roads, they are funding competition.

Funds are focused on a 33,500km core road network which was identified by a National Road Task Force Committee involving Government and the private sector that included all interested parties. This Task Force reported to the NRB.

NRB has a policy not to commission any contract until it has the funds to cover the works costs. In this way, it can ensure that works can be completed and that contractors will not suffer any cash-flow problems.

One problem is that they need to do a great deal of rehabilitation to bring the network to a maintainable level. Only about 40% of the network is in a usable condition. Table A6.2 shows the level of improvement from 1995 to 2000. It is clear that the % of poor roads has not improved, as the policy has been to focus on the Good/Fair categories with good effect on the paved roads.

Table A6.2 Condition of the Road Network in Zambia

	% of network in different conditions		
	Good	Fair	Poor
Paved Network (6,500km)			
1995	20	40	40
2000	43	14	43
Feeder Roads (30,000km)			
1995	2	19	79
2000	5	19	76
Source: Republic of Zambia Road Sector Investment Programme Mid Term Review Report December 2000			

POLICY GUIDELINES ON ROAD FUND DISBURSEMENTS

1. Road Fund shall be disbursed on the recommendation of the National Roads Board, and approved by the Committee of Ministers on the Road Maintenance Initiative.
2. Road Fund shall be disbursed for road maintenance only and not for road rehabilitation, road reconstruction or new road construction.
3. Road Fund shall be disbursed for a programme of road maintenance undertaken with the approval of the National Roads Board/the Committee of Ministers on the Road Maintenance Initiative.
4. Road Fund shall not be disbursed for procurement of Capital Expenditure items, as these should be done through the Budget allocation.
5. Road Fund shall not be disbursed to meet travelling and subsistence allowances or pay for Hotel bills and meet any administrative/overhead expenditure.
6. Road Fund shall not be paid to meet outstanding debts as these were budgeted for and were not undertaken on the initiative and approval the National Roads Board/the Committee of Ministers.
7. Road Fund shall not be disbursed to pay for counterpart funding as it should be budgeted and hence paid from budget allocation.
8. Road Fund shall be disbursed for road maintenance in the following proportions: Main/Trunk Roads = 40%; Council Roads = 20%; District Council/Feeder Roads = 40%
9. Road Fund loaned to Ministries to meet budgeted road works should be reimbursed before further loans are considered.
10. No person shall direct payment to be made from Road Fund without the approval of the National Roads Board and Committee of Ministers on Road Maintenance Initiative.

AUDITING

External auditors audit the Road Fund accounts on a quarterly basis. The Auditor General also audits the books once a year. The financial statements are submitted to Parliament and also published in major newspapers. They are also available on the NRB web page.

The NRB accountant performs thorough financial audits. Technical audits are done for only a small sample of projects which are flagged during financial audit. Only 27 out of 119 projects got direct supervision from the Road Fund. This is the main weakness of NRB.

Specific Agency Issues

National Roads Board

With contracted work now at 90%, the quality has improved over the years. Large contractors from S Africa and Zimbabwe have come in for this contract work. The Road Agencies are using the World Bank Guidelines for Procurement of Small Works as the basis for their contract documents.

The Agency role has changed and is now very much setting up contracts, procurement of services, management and supervision. The HQ problem was that they lacked these skills and did not appreciate the need for such training early enough and there was no such experience in the Provinces.

Initially there was also a contractor shortage in both resources and expertise and work was given to overseas contractors in order to get the quality of work required. There was a dilemma in that there were then complaints that the work should be given to local contractors to develop the local industry. The local companies need to be trained or to link with foreign companies to learn from their experiences.

Registration of contractors is variable and through pressure from new contractors, the trained are often bidding against untrained which leads to all sorts of problems in pricing and evaluation. There is generally not enough continuity of work for the trained contractors.

NRB are trying to force the standardisation of contracts and specifications. They have not found manuals to be successful, so include what they need in the contract documents and specification for works. The Agencies have their own design standards.

A National Road Task Force Committee was set up involving Government and the private sector to cover all interested parties. This Task Force reported to the NRB. The first task was to identify a core network that was important for the national interest taking account of the movement of goods, tourism and other economic and traffic factors without ignoring the importance of some district and agricultural roads. The committee defined a core network of

33,500km which was to be the focus for road funds and maintenance operations.

Ministry of Works and Supply (MOWS)

MOWS has responsibility for Trunk, Main and District roads. The Ministry is organized on HQ and Provincial level.

They have a target to achieve 90% of maintenance work on a contract basis. The move from Force Account to Contract started about 3 years ago but there was not enough private sector capacity. The first year of contract work was very poor in terms of the quality and work output. Advance payments were wasted and so no money was available for materials and staff payments. The early contractors had little contractual knowledge and did not understand their contractual obligations.

There is a National Road Training School to train contractors including labour-based training courses. In the future they hope to make it a condition of registration that contractors have been through the National Road Training Programme.

When they were using Force Account they had a very large staff compliment. They got rid of the labour side but also downsized the technical staff without appreciating the need for retaining good technical staff and retraining in the new demand for Contract Managers and Contract Administrators. They are now training staff in all aspects of Contract Management and Administration.

They probably tried to move too quickly to a contract base without having the private sector capacity and quality plus the associated need for the management and supervision teams.

They have a Highway Management System (HMS) with HDM3 as the core tool. The HMS is currently being updated and they hope it will be used more for identifying the maintenance needs in the future.

All roads have reached their design life and so 3 to 4 years of rehabilitation work is needed to bring the roads back to a usable and maintainable condition. For condition surveys they use a bump integrator and develop an IRI for each road link.

For contract work, they use the World Bank Guidelines for Procurement of Small Works. They find this easier to use than FIDIC.

They are in the first year of a trial of a performance contract for off-carriageway works. In the future they may combine the off-carriageway with on-carriageway works so that the main/larger contractor can control a number of the off-carriageway labour-based contractors as sub-contractors.

Audits are carried out by a variety of bodies including financial audit for the Road Fund and by the Auditor General and Ministry of Finance and technical audits by the Roads Department HQ.

Ministry of Local Government

MOLG looks after 16,000km of roads and has a maintenance priority to look after roads in good/fair condition only.

Under the Local Government Act, the 72 Councils are responsible for their roads.

Under MOLG, The Department of Infrastructure and Support Services (DISS) is responsible for roads. DISS was established to try to strengthen the MOLG technical capability. Figure A6.2 shows the HQ organisation chart.

Most of the funding comes from the Fuel Levy but they do get some direct funding from Treasury.

Up until very recently, they did 100% of their work by Force Account. The new strategy is to move from Force Account to contract work. They let 90 contracts out as a trial and 20 have been completed. However, they have a cash flow problem which causes the contractors to have difficulties.

Payments from NRB are good. As soon as the Contractor's payment certificate is approved, MOLG submits it to NRB and payment is made. When the payment is from the Ministry of Finance there can be long delays causing problems for everyone.

They do not have much equipment as it was sold off to the private sector. They have retained a small amount for emergency use. There was a joint programme between Ministries to pool all the equipment in order to rent it out. However, there was a lack of funds and the programme stopped.

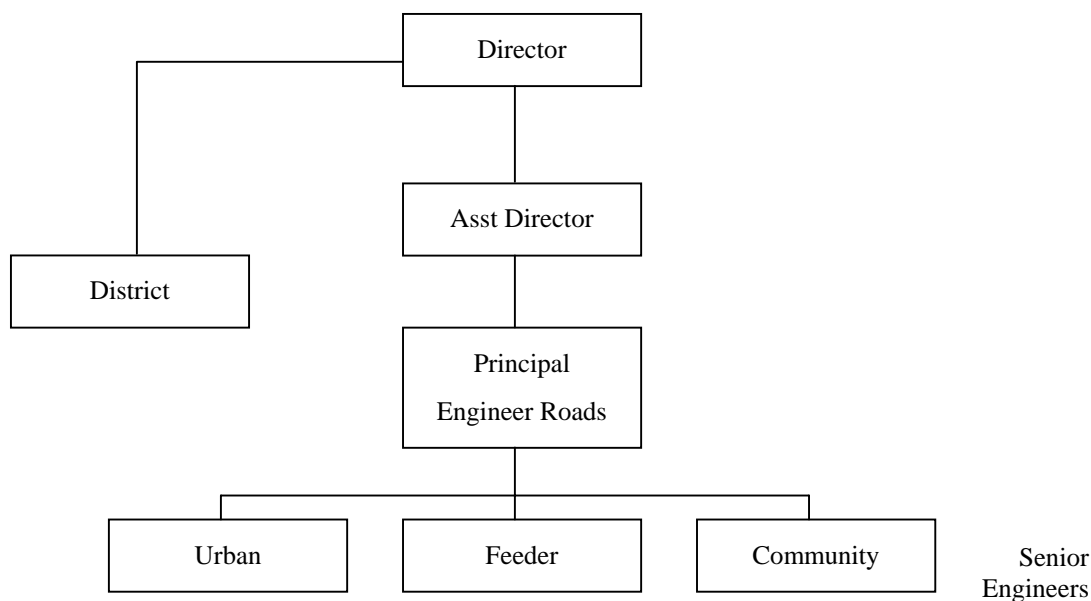


Figure A6.2 Organisation Chart for the Department of Infrastructure Services

Figure A6.3 shows the District organisation which varies from large to small districts.

The District Councils prepare the proposed Work Programme (WP) and submit them to HQ which reviews and coordinates the WPs and submits them to NRB for funding approval.

Donors are funding some Technical Assistance and consultants are reviewing the Maintenance System for Urban Roads. They have developed a standard contract for small works and are now developing manuals and guidelines for preparation of Work Programmes, contract administration and Works.

There is also a Community Based Maintenance Programme. If the local community can raise 50% of the cost of the works, NRB will raise the other 50%. This gives the opportunity to address some local priorities that would be excluded from nationally approved Work Programmes. Some projects have been carried out but it is difficult for some poorer areas to raise the money.

171km of rehabilitation works were done in Lusaka City and these are now under maintenance. 1-year performance contracts were let to a number of small/medium contractors mainly for off-road and inspection duties. If this is successful, they may extend it to other cities.

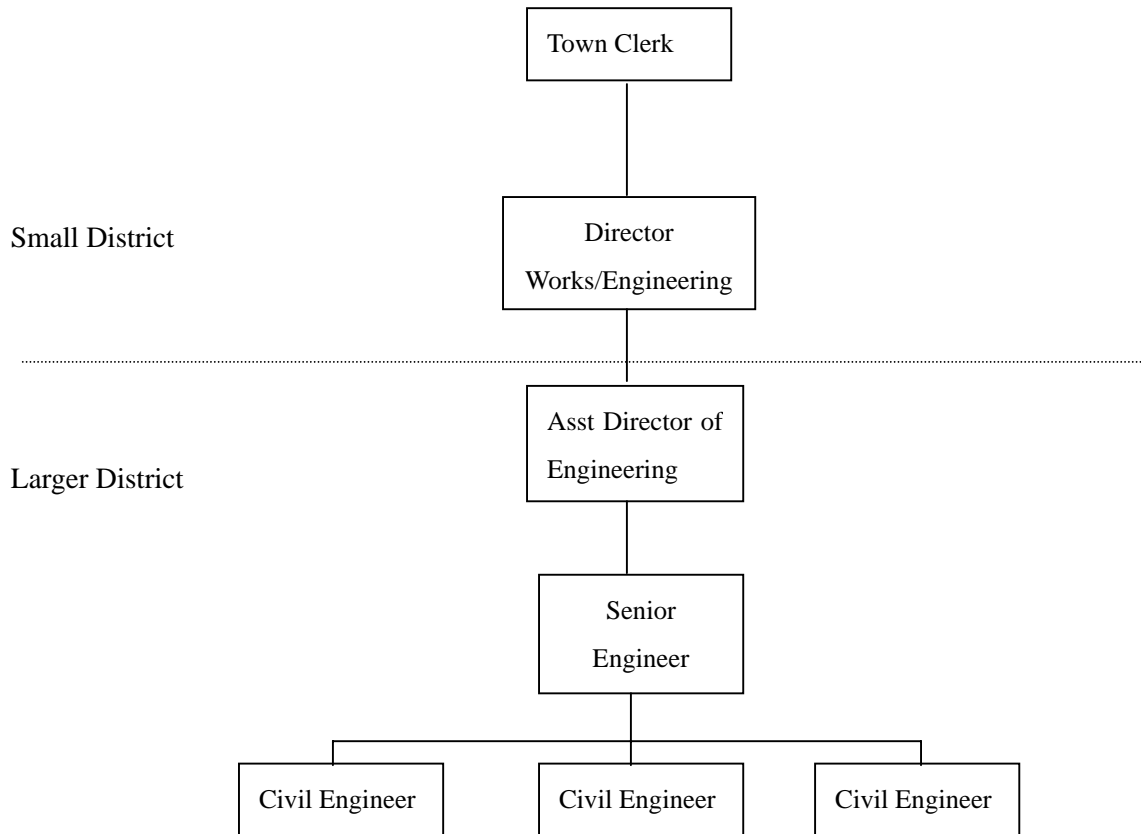


Figure A6.3 District Organisation Chart for the Department of Infrastructure Services

Ministry of Tourism

MOT through the Zambian Wildlife Authority (ZWA) has responsibility for roads in the National Parks. All park roads are earth roads. For some strategic roads through the parks, funds are allocated from the NRB.

Only 1 of the parks has an office, staff and equipment but only very limited equipment is available. This park will do some Force Account and some contract work. All other work is done by contract to RD, MOLG or the private sector whoever is available at the time.

They contract out all grading and any large maintenance works. They always need private sector help after the wet season. The private sector contractors with equipment are quite good.

They plan to contract 100% of their maintenance work rather than keep staff and equipment when they may not have any funds for them to do any work.

* Some sections of this annex are extracted from the World Bank document ‘Roads and Road Financing: Annex 10.’