Time & Motion Study Organization: NCC Trip- 2 Date: 16th November 1997

Vehicle No. KUL989 Loading Capacity: 7880kg Researcher's name: Jullie Etsabo

No. of Crew: 8 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	111424		12 : 35			From Dandora dumping site
Loading-1	in	111438	14,000	13 : 3	28		Lusaka Rd, Shell Petrol
	out			13 : 5		2	station Industrial Area
Loading-2	in	111440	2,000	13 : 13	8		Nairobi west
	out			13 : 14		1	
Loading-3	in	111442	2,000	13 : 34	20		South C shopping centre
	out			14 : 20		46	Rugunga Lane
Loading-4	in	111443	1,000	14 : 25	5		South C Kabiyet Rd
	out	111445		14 : 45		20	
Dumping site	in	111459	16,000	15 : 20	35		Dandora
Start dumping		111459	0	15 : 23	3		
Finish dumping		111459	0	15 : 45		22	
Dumping site	out	111460	1,000	15 : 50	5		
Reach to workshop	in	111469	9,000	16 : 15	25		
Total			45,000		129	91	Total min.: 220 min.
Collection			5,000		33	69	
Transportation			39,000		88		
Inside the dumping site			1,000		8	22	Dumping time.: 30 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 17th November 1997

Vehicle No. KUL989 Loading Capacity: 7880kg Researcher's name: Jullie Etsabo

No. of Crew: 8 Estimated Volume: $4.5m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	111481		9 : 45			Jogoo-Landhies-Eastleigh
Loading-1	in	111485	4,000	9 : 55	10		Pumwani Maternity Hospital
	out			10 : 15		20	Eastleigh
Loading-2	in	111487	2,000	10 : 23	8		Madina nursing home
	out			10 : 35		12	Eastleigh
Loading-3	in	111487	0	10 : 38	3		Mecca medical clinic
	out			10 : 45		7	Eastleigh
Loading-4	in	111488	1,000	10 : 50	5		Marie Stopes clinic
	out			11 : 15		25	Eastleigh
Loading-5	in	111489	1,000	11 : 20	5		Radiant Health clinic
	out			11 : 27		7	
Loading-6	in	111494	5,000	11 : 40	13		Huruma nursing home
	out			11 : 50		10	
Loading-7	in	111496	2,000	12 : 0	10		Alice nursing home
	out			12 : 0		0	Kariobangi No loading
Loading-8	in	111507	11,000	12 : 20	20		Mpaka Rd Veterinary clinic
	out			12 : 30		10	
Loading-9	in	111508	1,000	12 : 35	5		Chiromo veterinary clinic
	out			12 : 40		5	westland. No Loading
Loading-10	in	111512	4,000	12 : 50	10		Guru Nanak Hospital
	out			13 : 5		15	
Loading-11	in	111522	10,000	13 : 18	13		Mkunga Health services
	out			13 : 30		12	Kairobangi
Loading-12	in	111525	3,000	13 : 45	15		Dandora medical centre
	out			13 : 55		10	
Dumping site	in	111526	1,000	14 : 0	5		Dandora then returned bins
Start dumping		111526	0	14 : 0	0		to Pumwani Maternity
Finish dumping		111526	0	14 : 20		20	Hospital Outering Jogoo
Dumping site	out	111526.2	200	14 : 22	2		
Reach to workshop	in	111541	14,800	15 : 48	86		
Total			60,000		210	153	Total min.: 363 min.
Collection			40,000		107	133	
Transportation			19,800		101		
Inside the dumping site			200		2	20	Dumping time.: 22 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 18th November 1997

Vehicle No. KUL989 Loading Capacity: 7880kg Researcher's name: Jullie Etsabo

No. of Crew: 6 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	111608		9 : 30			Jogoo Rd-Lusaka-Langata Rd
Loading-1	in	111620	12,000	9 : 50	20		Mbagathi-Ngong Rd
	out			14 : 20		270	Dagoretti depot off-loading
							a truck which had a
							mechanical problem the
							previous day .
Dumping site	in	111642	22,000	15 : 15	55		Dandora But no dumping
Start dumping		111642	0	15 : 18	3		was done as it was raining
Finish dumping		111642	0	15 : 22		4	and the off loaders were
Dumping site	out	111642.1	100	15 : 45	23		nowhere to be found.
Reach to workshop	in	111651	8,900	16 : 10	25		dumping half way done
Total			43,000		126	274	Total min.: 400 min.
Collection			0		0	270	
Transportation			42,900		100		
Inside the dumping site			100		26	4	Dumping time.: 30 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 19th November 1997

Vehicle No. KAH006Y Loading Capacity: 7TON Researcher's name: Jullie Etsabo

No. of Crew: Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	16249		10 : 0			Dandora dumping site
Loading-1	in	16270	21,000	11 : 10	70		Mathare Sub-depot
	out			11 : 20		10	
Loading-2	in	16273	3,000	11 : 45	25		Marie Stopes Clinic
	out			11 : 50		5	Pangani
Loading-3	in	16278	5,000	12 : 0	10		Shell Petrol Station
	out			12 : 20		20	Thika Rd
Loading-4	in	16281	3,000	12 : 30	10		Kenya Utawi college
	out			14 : 30		120	Thika Rd
Dumping site	in	16295	14,000	15 : 30	60		Dandora
Start dumping		16295	0	15 : 35	5		10:32-1035 Dandora
Finish dumping		16295	0	15 : 37		2	the tipper had a mechanical
Dumping site	out	16297	2,000	15 : 45	8		problem. 3mins idling
Reach to workshop	in	16306	9,000	16 : 10	25		
Total			57,000		213	157	Total min.: 370 min.
Collection			11,000		45	155	
Transportation			44,000		152		
Inside the dumping site			2,000		13	2	Dumping time.: 15 min.
Idling time					3		

Time & Motion Study Organization: NCC Trip- 1 Date: 12th November 1997

Vehicle No. KWE075 Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 8 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	167293		12 : 35			Jogoo Rd, Langata Rd
Loading-1	in	167296	3,000	13 : 10	35		Muhoho Ave
	out			14 : 20		70	Langata Rd
Loading-2	in	167297	1,000	14 : 40	20		Barico Rd
	out			15 : 25		45	Lusaka Rd
Dumping site	in	167305	8,000	16 : 32	67		Dandora dumping site
Start dumping		167305.1	100	16 : 40	8		Dandora dumping site
Finish dumping		167305.1	0	17 : 10		30	Dandora Rd dumping site
Dumping site	out	167305.2	100	17 : 15	5		Dandora dumping site Rd
Reach to workshop	in	167311	5,800	18 : 0	45		Outering Rd, Jogoo Rd
							Workshop
Total			18,000		180	145	Total min.: 325 min.
Collection			1,000		20	115	
Transportation			16,800		147		
Inside the dumping site			200		13	30	Dumping time.: 43 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 13th November 1997

Vehicle No. KUL994 Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 1 Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	173996		10 : 10			Jogoo Rd office
Loading-1	in	173997	1,000	10 : 20	10		Lomu Rd
	out			10 : 35		15	Pumwani Rd
Loading-2	in	173998	1,000	10 : 50	15		Pumwani Rd
	out			11 : 10		20	Jogoo Rd
Loading-3	in	173999	1,000	11 : 20	10		Makandara depot
	out			:			where there were no loading
							crew
Dumping site	in			:			
Start dumping				:			
Finish dumping				:			
Dumping site	out			:			Jogoo Rd
Reach to workshop	in	174001	2,000	:			No loading crew Workshop
Total			5,000		35	35	Total min.: 70 min.
Collection			2,000		25	35	
Transportation			3,000		10		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 14th November 1997

Vehicle No. KWE082 Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 9 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	229516		9 : 40			Jogoo Rd, Lusaka Rd
Loading-1	in	229519	3,000	10 : 20	40		Enterprise Rd
	out			10 : 30		10	Chuka Rd
Loading-2	in	229523	4,000	11 : 0	30		Enterprise Rd
	out			11 : 10		10	Mombasa Rd
Dumping site	in	229539	16,000	12 : 10	60		Outering Rd, Dandora Rd
Start dumping		229539.1	100	12 : 20	10		Dumping site
Finish dumping		229539.1	0	12 : 30		10	Dumping site
Dumping site	out	229539.2	100	12 : 45	15		Juja Rd
Reach to workshop	in			:			
Total			23,200		155	30	Total min.: 185 min.
Collection			4,000		30	20	
Transportation			19,000		100		
Inside the dumping site			200		25	10	Dumping time.: 35 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 14th November 1997

Vehicle No. KWE082 Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 9 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	229539		12 : 45			Dumping site thro Juja Rd
Loading-1	in	229550	11,000	13 : 30	45		Juja Rd
	out			13 : 55		25	Landhies Rd
Loading-2	in	229550.1	100	14 : 0	5		Retail market
	out			14 : 5		5	Mombasa Rd
Loading-3	in	229561	10,900	15 : 0	55		Enterprise Rd
	out			15 : 10		10	Lunga Lunga Rd
Loading-4	in	229564	3,000	16 : 5	55		Outering Rd
	out			16 : 10		5	Dandora Rd
Dumping site	in	229574	10,000	16 : 45	35		Dumping site
Start dumping		229574.1	100	16 : 47	2		Dumping site
Finish dumping		229574.1	0	16 : 50		3	Dandora dumping site out
Dumping site	out	229574.2	100	17 : 2	12		Dumping site out
Reach to workshop	in	229582	7,800	17 : 30	28		Outering Rd, Jogoo Rd,
							Workshop
Total			43,000		237	48	Total min.: 285 min.
Collection			14,000		115	45	
Transportation			28,800		108		
Inside the dumping site			200		14	3	Dumping time.: 17 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 15th November 1997

Vehicle No. KWE082 Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 7 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	229661		10 : 50			Jogoo Rd-Umoja II office
Loading-1	in	229664	3,000	11 : 10	20		Umoja 1 Estate
	out			11 : 11		1	Umoja Q. Area
Loading-2	in	229664	0	11 : 20	9		Umoja Estate
	out			11 : 22		2	Umoja Q. Area
Loading-3	in	229665	1,000	11 : 45	23		Umoja Estate
	out			11 : 55		10	Umoja Q. Area
Loading-4	in	229666	1,000	12 : 30	35		Umoja Estate
	out			12 : 40		10	Umoja P. Area
Loading-5	in	229667	1,000	14 : 0	80		Umoja Estate
	out			14 : 30		30	Umoja P. Area
Loading-6	in	229668	1,000	14 : 55	25		Umoja Estate
	out			15 : 0		5	Umoja N.Area
Dumping site	in	229674	6,000	15 : 30	30		Dandora dumping site
Start dumping		229674.1	100	15 : 35	5		Dumping site
Finish dumping		229674.1	0	15 : 40		5	Dumping site
Dumping site	out	229674.2	100	16 : 0	20		Dandora dumping site out
Reach to workshop	in	229681	6,800	16 : 35	35		Outering Rd, Jogoo Rd
							Workshop
Total			20,000		282	63	Total min.: 345 min.
Collection			4,000		172	58	
Transportation			15,800		85		
Inside the dumping site			200		25	5	Dumping time.: 30 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 16th November 1997

Vehicle No. KWE082 Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 7 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	229747		9 : 15			Jogoo Rd, Umoja II office
Loading-1	in	229748	1,000	9 : 25	10		Umoja II Rd
	out			9 : 27		2	Umoja II Estate
Loading-2	in	229749	1,000	9 : 40	13		Umoja II court 1
	out			10 : 10		30	Umoja II court 2
Loading-3	in	229750	1,000	10 : 22	12		Umoja II court 3
	out			10 : 35		13	Umoja II court 4
Loading-4	in	229751	1,000	10 : 50	15		Umoja II court 5
	out			10 : 55		5	Umoja II court 6
Loading-5	in	229752	1,000	11 : 0	5		Umoja II court 7
	out			11 : 20		20	Umoja II court 8
Loading-6	in	229752.2	200	11 : 25	5		Umoja II court 9
	out			11 : 27		2	Umoja II court 10
Loading-7	in	229753	800	11 : 35	8		Umoja II court 11
	out			11 : 45		10	Umoja II court 12
Dumping site	in	229760	7,000	12 : 40	55		Outering Rd Dandora
Start dumping		229760.1	100	12 : 45	5		Dandora dumping site
Finish dumping		229760.1	0	12 : 50		5	Dumping site
Dumping site	out	229760.2	100	13 : 0	10		Dumping site out
Reach to workshop	in	229771	10,800	13 : 55	55		Jogoo Rd - Workshop
Total			24,000		193	87	Total min.: 280 min.
Collection			5,000		58	82	
Transportation			18,800		120		
Inside the dumping site			200		15	5	Dumping time.: 20 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 17th November 1997

Vehicle No. KAH019Y Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 8 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	2327		11 : 20			Jogoo Rd, Umoja II office
Loading-1	in	2332	5,000	11 : 45	25		Kariobangi south Estate
	out			12 : 0		15	Court A
Loading-2	in	2333	1,000	12 : 10	10		Court B
	out			12 : 35		25	Court C
Loading-3	in	2334	1,000	12 : 40	5		Court D
	out			12 : 50		10	Court E
Dumping site	in	2337	3,000	13 : 0	10		Dandora dumping site
Start dumping		2337.5	500	13 : 5	5		Dumping site
Finish dumping				13 : 10		5	Finish dumping
Dumping site	out	2338	500	13 : 10	0		Dumping site out
Reach to workshop	in			:			
Total			11,000		55	55	Total min.: 110 min.
Collection			2,000		15	50	
Transportation			8,000		35		
Inside the dumping site			1,000		5	5	Dumping time.: 10 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 17th November 1997

Vehicle No. KAH019Y Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 8 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
dx	out	2337		13 : 10			
Loading-1	in	2340	3,000	13 : 10	0		Kariobangi south
	out			13 : 20		10	
Loading-2	in	2341	1,000	13 : 39	19		Dandora phase I
	out			13 : 40		1	
Loading-3	in	2342	1,000	13 : 57	17		Dandora phase I
	out			14 : 5		8	
Loading-4	in	2343	1,000	14 : 10	5		Dandora phase I
	out			14 : 35		25	
Dumping site	in	2345	2,000	14 : 45	10		Dandora dumping site in
Start dumping		2345.5	500	14 : 50	5		Dumping start
Finish dumping		2345.5	0	14 : 55		5	Dumping finished
Dumping site	out	2346	500	15 : 0	5		Dandora dumping site out
Reach to workshop	in	2353	7,000	15 : 50	50		Outer ring rd.-Jogoo rd.-
							Work shop
Total			16,000		111	49	Total min.: 160 min.
Collection			3,000		41	44	
Transportation			12,000		60		
Inside the dumping site			1,000		10	5	Dumping time.: 15 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 19th November 1997

Vehicle No. KAH019Y Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 7 Estimated Volume: 6m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	2494		10 : 40			Jogoo Rd, Makandara depot
Loading-1	in	2498	4,000	11 : 15	35		B.A.T village
	out			11 : 30		15	B.A.T village
Loading-2	in	2498.5	500	11 : 35	5		Shauri Moyo Police station
	out			12 : 0		25	YMCA Shaurimoyo
Loading-3	in	2499	500	12 : 15	15		YMCA Shaurimoyo
	out			12 : 30		15	Jogoo Rd
Dumping site	in	2512	13,000	13 : 10	40		Kamutarakwa Rd
Start dumping		2512.5	500	13 : 11	1		Dandora dumping site
Finish dumping		2512.5	0	13 : 12		1	Dumping site site out
Dumping site	out	2513	500	13 : 15	3		Kamutarakwa Rd
Reach to workshop	in			:			
Total			19,000		99	56	Total min.: 155 min.
Collection			1,000		20	55	
Transportation			17,000		75		
Inside the dumping site			1,000		4	1	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 19th November 1997

Vehicle No. KAH019Y Loading Capacity: 7TON Researcher's name: Martin Waraka

No. of Crew: 7 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	2512		13 : 15			Dandora dumping site out
Loading-1	in	2520	8,000	13 : 32	17		Buru Buru phase 4
	out			13 : 50		18	Rajeta court
Loading-2	in	2521	1,000	13 : 53	3		Buru Buru phase 4
	out			14 : 5		12	Legorinyo court
Loading-3	in	2521.5	500	14 : 10	5		Buru Buru phase 4
	out			14 : 28		18	Amasya court
Loading-4	in	2522	500	14 : 30	2		Buru Buru court
	out			14 : 40		10	Gakindu court
Dumping site	in	2529	7,000	15 : 5	25		Kamutarakwa Rd
Start dumping		2529.2	200	15 : 10	5		Dandora dumping site
Finish dumping		2529.2	0	15 : 11		1	Dumping site out
Dumping site	out	2529.4	200	15 : 20	9		Kamutarakwa Rd
Reach to workshop	in	2537	7,600	15 : 55	35		Outering Rd, Jogoo Rd
Total			25,000		101	59	Total min.: 160 min.
Collection			2,000		10	58	
Transportation			22,600		77		
Inside the dumping site			400		14	1	Dumping time.: 15 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 12th November 1997

Vehicle No. KAB389Q Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 6 Estimated Volume: $5m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	21901		11 : 7			To KPC through Jogoo Rd
Loading-1	in	21907	6,000	11 : 31	24		Likoni Rd, Lunga Lunga Rd
	out			12 : 15		44	
Dumping site	in	21916	9,000	12 : 42	27		To Dandora through
Start dumping		21917	1,000	12 : 46	4		Lunga Lunga Rd
Finish dumping				12 : 47		1	Outering Rd
Dumping site	out	21918	1,000	12 : 52	5		Mutarakwa Rd
Reach to workshop	in			:			
Total			17,000		60	45	Total min.: 105 min.
Collection			0		0	44	
Transportation			15,000		51		
Inside the dumping site			2,000		9	1	Dumping time.: 10 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 12th November 1997

Vehicle No. KAB389Q Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 6 Estimated Volume: 4.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	21918		12 : 52			
Loading-1	in	21927	9,000	13 : 14	22		To KPE Estate thro'
	out			14 : 0		46	Mutarakwa Rd, Outering Rd
Dumping site	in	21936	9,000	14 : 22	22		To Dandora through
Start dumping		21937	1,000	14 : 25	3		Outering Rd, Mutarakwa Rd
Finish dumping				14 : 26		1	Left truck in Industrial Area
Dumping site	out	21938	1,000	14 : 31	5		
Reach to workshop	in			:			
Total			20,000		52	47	Total min.: 99 min.
Collection			0		0	46	
Transportation			18,000		44		
Inside the dumping site			2,000		8	1	Dumping time.: 9 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 13th November 1997

Vehicle No. KWE082 Loading Capacity: 8TON Researcher's name: Claudia Dzuya

No. of Crew: 7 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	229445		8 : 41			To Umoja depot through
Loading-1	in	229459	14,000	9 : 22	41		Jogoo Rd, Outering Rd,
	out			10 : 5		43	Kangundo Rd, Kayole Rd,
Loading-2	in	229460	1,000	10 : 9	4		To Komorock Estate
	out			10 : 46		37	through Kayole Rd,
Loading-3	in	229461	1,000	10 : 50	4		Kangundo Rd
	out			11 : 10		20	
Loading-4	in	229462	1,000	11 : 14	4		
	out			11 : 27		13	
Dumping site	in	229470	8,000	12 : 1	34		Dandora through Kangundo
Start dumping		229471	1,000	12 : 4	3		Outering Rd, Mutarakwa Rd
Finish dumping				:			
Dumping site	out	229472	1,000	12 : 5	1		
Reach to workshop	in			:			
Total			27,000		91	113	Total min.: 204 min.
Collection			3,000		12	113	
Transportation			22,000		75		
Inside the dumping site			2,000		4	0	Dumping time.: 4 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 13th November 1997

Vehicle No. KWE082 Loading Capacity: 8TON Researcher's name: Claudia Dzuya

No. of Crew: 7 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	229472		12 : 5			
Loading-1	in	229479	7,000	12 : 36	31		From Dandora to Komorock
	out			13 : 10		34	Estate through Mutara kwa
Loading-2	in	229480	1,000	13 : 14	4		Rd, Outering Rd, Kangundo
	out			13 : 18		4	Rd
Loading-3	in	229481	1,000	13 : 20	2		
	out			13 : 24		4	
Loading-4	in	229482	1,000	13 : 30	6		
	out			13 : 45		15	
Loading-5	in	229484	2,000	13 : 50	5		
	out			14 : 2		12	
Loading-6	in	229485	1,000	14 : 11	9		
	out			14 : 15		4	
Loading-7	in	229487	2,000	14 : 23	8		
	out			14 : 40		17	
Loading-8	in	229488	1,000	14 : 43	3		
	out			:			
Dumping site	in	229498	10,000	15 : 20	37		Kangundo Rd,
Start dumping		229499	1,000	15 : 24	4		Outering Rd,
Finish dumping				15 : 26		2	Mutarakwa Rd
Dumping site	out	229500	1,000	15 : 31	5		
Reach to workshop	in	229514	14,000	16 : 22	51		
Total			42,000		165	92	Total min.: 257 min.
Collection			9,000		37	90	
Transportation			31,000		119		
Inside the dumping site			2,000		9	2	Dumping time.: 11 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 14th November 1997

Vehicle No. Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 2 Estimated Volume: 5.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	27704		11 : 33			To Embakasi Division thro
Loading-1	in	27715	11,000	11 : 49	16		Jogoo Rd, Outering Rd,
	out			11 : 52		3	Kangundo Rd, Kayole Rd
Dumping site	in	27721	6,000	12 : 4	12		To Dandora through
Start dumping		27722	1,000	12 : 10	6		Kayole Rd, Kangundo Rd,
Finish dumping				12 : 11		1	Outering Rd, Mutarakwa Rd
Dumping site	out	27723	1,000	12 : 15	4		
Reach to workshop	in			:			
Total			19,000		38	4	Total min.: 42 min.
Collection			0		0	3	
Transportation			17,000		28		
Inside the dumping site			2,000		10	1	Dumping time.: 11 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 14th November 1997

Vehicle No. Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 2 Estimated Volume: 5.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	27723		12 : 15			From Dandora to Embakasi
Loading-1	in	27729	6,000	12 : 38	23		division through Mutarakwa
	out			:			Rd, Outering Rd, Kangundo
							Rd, Kayole Rd
Dumping site	in	27736	7,000	12 : 52	14		Back to Dandora through
Start dumping		27737	1,000	12 : 57	5		Kayole Rd, Kangundo,
Finish dumping				12 : 58		1	Outering Rd, Mutarakwa Rd
Dumping site	out	27739	2,000	13 : 4	6		
Reach to workshop	in			:			
Total			16,000		48	1	Total min.: 49 min.
Collection			0		0	0	
Transportation			13,000		37		
Inside the dumping site			3,000		11	1	Dumping time.: 12 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 3 Date: 14th November 1997

Vehicle No. Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 2 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	27739		13 : 4			
Loading-1	in	27746	7,000	13 : 28	24		Mutarakwa Rd, Outering Rd,
	out			:			Kangundo Rd, Kayole Rd, to
							Embakasi division
Dumping site	in	27751	5,000	13 : 39	11		Back to Dandora through
Start dumping		27752	1,000	13 : 44	5		Kayole Rd, Kangundo Rd,
Finish dumping				13 : 45		1	Mutarakwa Rd
Dumping site	out	27753	1,000	13 : 48	3		Mechanical problems
Reach to workshop	in			:			had to be trasported by
							other means.
Total			14,000		43	1	Total min.: 44 min.
Collection			0		0	0	
Transportation			12,000		35		
Inside the dumping site			2,000		8	1	Dumping time.: 9 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 15th November 1997

Vehicle No. KAB391Q Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 2 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	27840		10 : 30			To Komorock Estate
Loading-1	in	27853	13,000	11 : 47	77		through Jogoo Rd,
	out			11 : 50		3	Outering Rd, Kangundo Rd,
							Kayole Rd
Dumping site	in	27862	9,000	12 : 14	24		To Dandora through Kayole
Start dumping				12 : 19	5		Rd, Kangundo Rd, Outering
Finish dumping				12 : 20		1	Rd, Mutarakwa Rd
Dumping site	out	27863	1,000	12 : 23	3		
Reach to workshop	in			:			
Total			23,000		109	4	Total min.: 113 min.
Collection			0		0	3	
Transportation			22,000		101		
Inside the dumping site			1,000		8	1	Dumping time.: 9 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 15th November 1997

Vehicle No. KAB391Q Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 2 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	27863		12 : 23			
Loading-1	in	27873	10,000	13 : 0	37		From Dandora through
	out			13 : 8		8	Mutarakwa Rd, Outering Rd,
							Kangundo Rd, Kayole Rd to
							Komorock Estate
							To workshop through
							Outering Rd, Jogoo Rd
							Clean up un Komorock
							Estate was takeing place so
							we had to delay for
							assingments.
Dumping site	in	27881	8,000	13 : 27	19		
Start dumping		27882	1,000	13 : 29	2		
Finish dumping				13 : 30		1	
Dumping site	out	27882	0	13 : 35	5		
Reach to workshop	in	27902	20,000	15 : 20	105		
Total			39,000		168	9	Total min.: 177 min.
Collection			0		0	8	
Transportation			38,000		161		
Inside the dumping site			1,000		7	1	Dumping time.: 8 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 16th November 1997

Vehicle No. KAB391Q Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 7 Estimated Volume: 5.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	27926		9 : 26			Idling time as we wait for
Loading-1	in	27951	25,000	11 : 9	103		the tractor (?mins)
	out			12 : 20		71	
							To Ushirika high rise Estate
							routes unknown
							To dumping site through
							Kipanga Dthumani street,
							Juja Rd, Ring Rd, Ngara
							Muranga Rd, Kiambu Rd,
							Thika Rd, Outering Rd,
							Komorock Rd
Dumping site	in	27963	12,000	12 : 51	31		
Start dumping				12 : 54	3		
Finish dumping				12 : 55		1	
Dumping site	out	27964	1,000	13 : 0	5		
Reach to workshop	in			:			
Total			38,000		142	72	Total min.: 214 min.
Collection			0		0	71	
Transportation			37,000		134		
Inside the dumping site			1,000		8	1	Dumping time.: 9 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 16th November 1997

Vehicle No. KAB391Q Loading Capacity: 6950kg Researcher's name: Claudia Dzuya

No. of Crew: 7 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	27964		13 : 0			
Loading-1	in	27975	11,000	13 : 45	45		To Eastleigh Route
	out			15 : 30		105	Unknown
							To dumping through Juja Rd,
							Ring Rd, Ngara, Muranga Rd
							Kiambu Rd, Thika Rd,
							Outering Rd, Komorock Rd,
Dumping site	in	27981	6,000	16 : 43	73		
Start dumping		27982	1,000	16 : 47	4		
Finish dumping				16 : 47		0	
Dumping site	out	27982	0	16 : 51	4		Dropped at BuruBuru
Reach to workshop	in			:			Did not go to W/shop
Total			18,000		126	105	Total min.: 231 min.
Collection			0		0	105	
Transportation			17,000		118		
Inside the dumping site			1,000		8	0	Dumping time.: 8 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 18th November 1997

Vehicle No. KWE081 Loading Capacity: 8TON Researcher's name: Claudia Dzuya

No. of Crew: 7 Estimated Volume: 6.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	192211		9 : 22			To Umoja depot for
Loading-1	in	192231	20,000	10 : 46	84		assignment through Jogoo
	out			10 : 57		11	Rd, Outering Rd, Kangundo
Loading-2	in	192232	1,000	11 : 0	3		Rd, Kayole Rd, to
	out			11 : 33		33	Dandora Estate
Loading-3	in	192233	1,000	11 : 34	1		
	out			12 : 4		30	
Loading-4	in	192237	4,000	12 : 20	16		
	out			12 : 29		9	
Loading-5	in	192238	1,000	12 : 43	14		Unwell alighted at mutarakwa
	out			13 : 0		17	at Umoja
Loading-6	in						
	out						
Loading-7	in						
	out						
Loading-8	in						
	out						
Loading-9	in						
	out						
Loading-10	in						
	out						
Loading-11	in						
	out						
Loading-12	in						
	out						
Loading-13	in						
	out						
Loading-14	in						
	out						
Loading-15	in						
	out						
Dumping site	in		0	:	0		
Start dumping			0	:	0		
Finish dumping			0	:		0	
Dumping site	out		0	:	0		
Reach to workshop	in		0	:	0		
Total			27,000		118	100	Total min.: 218 min.
Collection			7,000		34	100	
Transportation			20,000		84		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 19th November 1997

Vehicle No. KWE073 Loading Capacity: 7770kg Researcher's name: Claudia Dzuya

No. of Crew: 6 Estimated Volume: 6.5m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	167966		11 : 33			To Dagoretti check on truck
							Back to Kaloleni W/shop
							(13:50pm)
							To Ngara depot through
							Landhies Rd, Pumwani Rd,
							Ngara Rd
							To dumping site through
							Ngara Rd, Muranga Rd,
							Kiambu Rd, Thika Rd,
							Outering Rd, Komorock Rd
							To workshop through
							Komorock Rd, Mutarakwa
							Rd, Outering Rd, Mumias Rd,
							Jogoo Rd
Dumping site	in	168003	37,000	15 : 14	221		
Start dumping		168004	1,000	15 : 16	2		
Finish dumping				:			
Dumping site	out	168005	1,000	15 : 20	4		
Reach to workshop	in	168015	10,000	16 : 30	70		
Total			49,000		297	0	Total min.: 297 min.
Collection			0		0	0	
Transportation			47,000		291		
Inside the dumping site			2,000		6	0	Dumping time.: 6 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 13th November 1997

Vehicle No. KAH013Y Loading Capacity: 6820kg Researcher's name: Eston Kairu

No. of Crew: 8 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	1611		11 : 52			Ngong Rd depot-Ragati Rd-
Loading-1	in	1617	6,000	12 : 7	15		haile Selassie Ave
	out			12 : 45		38	1. Nairobi club
Loading-2	in	1626	9,000	13 : 3	18		Ngong Rd-Mbagathi Way
	out			13 : 48		45	Kenya police- Langata Rd-
							Karen Rd-Ngong Rd-James
							Gichuru-Waiyaki way-
							Forest Rd-Ring Rd-Ngara-
							Eastleigh-Mumias Rd-
							Outering Rd
Dumping site	in	1667	41,000	14 : 55	67		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	1668	1,000	14 : 57	2		
Reach to workshop	in			:			
Total			57,000		102	83	Total min.: 185 min.
Collection			9,000		18	63	
Transportation			47,000		82		
Inside the dumping site			1,000		2	0	Dumping time.: 2 min.
Idling time						20	20mins lunch break

Time & Motion Study Organization: NCC Trip- 1 Date: 14th November 1997

Vehicle No. KWE073 Loading Capacity: 7770kg Researcher's name: Eston Kairu

No. of Crew: 8 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	167486		9 : 35			Kaloleni to Ngong Rd depot
Loading-1	in	167500	14,000	10 : 41	66		Wheel restaurant
	out			10 : 49		8	
Loading-2	in	167503	3,000	10 : 58	9		Silver spring hotel
	out			11 : 33		35	7min tea break
Loading-3	in	167512	9,000	11 : 52	19		Riverside dirve
	out			11 : 54		2	
Loading-4	in	167512.5	500	11 : 56	2		Mugumo Rd
	out			11 : 56		0	
Loading-5	in	167513	500	12 : 3	7		Mugumo Rd
	out			12 : 4		1	
Loading-6	in	167513	25	12 : 4	0		Mugumo Rd
	out			12 : 5		1	
Loading-7	in	167513.2	200	12 : 6	1		Mugumo Rd
	out			12 : 7		1	
Loading-8	in	167514	775	12 : 9	2		Naseby Rd
	out			12 : 16		7	
Loading-9	in	167515	1,000	12 : 22	6		Ratna Apartments (Vanga Rd)
	out			12 : 27		5	
Loading-10	in	167516	1,000	12 : 30	3		Mbaazi Ave
	out			12 : 32		2	
Loading-11	in	167519	3,000	12 : 41	9		Argwings Khodek Rd
	out			12 : 50		9	
Loading-12	in	167528	9,000	13 : 12	22		Khungu Karumba Rd
	out			14 : 14		62	(12mins Idling)
Dumping site	in	167549	21,000	14 : 55	41		Dandora
Start dumping				15 : 1	6		
Finish dumping				15 : 31		30	
Dumping site	out	167551	2,000	15 : 38	7		
Reach to workshop	in			:			
Total			65,000		200	163	Total min.: 363 min.
Collection			28,000		80	114	
Transportation			35,000		107		
Inside the dumping site			2,000		13	30	Dumping time.: 43 min.
Idling time						19	

Time & Motion Study Organization: NCC Trip- 1 Date: 15th November 1997

Vehicle No. KWE073 Loading Capacity: 7770kg Researcher's name: Eston Kairu

No. of Crew: 10 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	167588		7 : 55			Kaloleni
Loading-1	in	167615	27,000	9 : 7	72		Kirichiwa Rd
	out			9 : 14		7	
Loading-2	in	167616	1,000	9 : 18	4		NAB Rd Apartments on
	out			9 : 27		9	Ring Rd, Kirumani
Loading-3	in	167616.5	500	9 : 30	3		Ring Rd, Kirumani
	out			9 : 40		10	
Loading-4	in	167618	1,500	9 : 47	7		Silver Springs Hotel on
	out			10 : 7		20	Argwings Khodek Rd
Loading-5	in	167624	6,000	10 : 18	11		Westlands Apartments on
	out			10 : 21		3	Rhapta Rd
Loading-6	in	167624.20	200	10 : 23	2		Rhapta Rd
	out			10 : 26		3	
Loading-7	in	167624.60	400	10 : 28	2		Kenya continental hotel
	out			10 : 37		9	Rhapta Rd
Loading-8	in	167624.63	25	10 : 40	3		Rhapta Rd
	out			10 : 40		0	
Loading-9	in	167624.65	25	10 : 41	1		Rhapta Rd
	out			10 : 41		0	
Loading-10	in	167624.95	300	10 : 43	2		Rhapta Rd
	out			10 : 44		1	
Loading-11	in	167625.00	50	10 : 45	1		Rhapta Rd
	out			10 : 47		2	
Loading-12	in	167625.30	300	10 : 50	3		Rhapta Rd
	out			10 : 52		2	
Loading-13	in	167625.33	30	10 : 52	0		Rhapta Rd
	out			10 : 53		1	
Loading-14	in	167625.35	20	10 : 54	1		Rhapta Rd
	out			10 : 55		1	
Loading-15	in	167625.85	500	10 : 57	2		Terrace close
	out			11 : 0		3	
Loading-16	in	167626.00	150	11 : 3	3		Terrace close
	out			11 : 6		3	
Loading-17	in	167626.10	100	11 : 9	3		Belle Vista Apartments
	out			11 : 10		1	
Loading-18	in	167626.20	100	11 : 12	2		
	out			11 : 13		1	
Loading-19	in	167626.25	50	11 : 14	1		Saint Marys school
	out			11 : 20		6	4mins Idling
Loading-20	in	167626.65	400	11 : 27	7		ST Michael Rd
	out			11 : 29		2	
Loading-21	in	167626.75	100	11 : 30	1		ST Michael Rd
	out			11 : 31		1	
Loading-22	in	167627	250	11 : 35	4		Waiyaki way
	out			11 : 37		2	

Time & Motion Study Organization: NCC Trip- 1 Date: 15th November 1997

Vehicle No. KWE073 Loading Capacity: 7770kg Researcher's name: Eston Kairu

No. of Crew: 10 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Dumping site	in	167663	36,000	14 : 2	145		Dandora
Start dumping				14 : 6	4		
Finish dumping				15 : 0		54	
Dumping site	out			15 : 5	5		
Reach to workshop	in			:			
Total			75,000		289	141	Total min.: 430 min.
Collection			12,000		63	83	
Transportation			63,000		217		
Inside the dumping site			0		9	54	Dumping time.: 63 min.
Idling time						4	

Time & Motion Stud Organization: NCC Trip- 1 Date: 16th November 1997

Vehicle No. KWE073 Loading Capacity: 7770kg Researcher's name: Eston Kairu

No. of Crew: 9 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	167707		8 : 37			Kaloleni to Dagoretti depot
Loading-1	in	167720	13,000	9 : 26	49		Argwings Kodhek Rd
	out			9 : 56		30	18mins teaa break
Loading-2	in	167729	9,000	10 : 4	8		Kirichiwa Rd
	out			10 : 24		20	
Loading-3	in	167731	2,000	10 : 29	5		Argwings Kodhek Rd
	out			10 : 50		21	
Loading-4	in	167731	400	10 : 53	3		Argwings Kodhek Rd
	out			11 : 5		12	
Loading-5	in	167733	1,600	11 : 11	6		Fifth Ngong Ave
	out			11 : 16		5	
Loading-6	in	167734	500	11 : 18	2		3rd Ngong Ave
	out			11 : 27		9	
Loading-7	in	167734	500	11 : 30	3		Upper Hill Rd
	out			11 : 45		15	
Loading-8	in	167736	2,000	11 : 51	6		Heron court hotel on
	out			12 : 16		25	Milimani Rd
Loading-9	in	167737	1,000	12 : 19	3		Hotel Salama on Milimani
	out			12 : 23		4	
Loading-10	in	167737	200	12 : 25	2		Ralph Bunch Rd
	out			12 : 31		6	
Loading-11	in	167741	3,800	12 : 46	15		Nairobi club on Chyulu Rd
	out			13 : 39		53	
							Haile selassie Ave -
							Uhuru highway - Bunyala Rd
							Commercial St - Enterprise Rd
							To garage due to lack of fuel
Dumping site	in			:			
Start dumping				:			
Finish dumping				:			
Dumping site	out			:			
Reach to workshop	in			:			
Total			34,000		102	200	Total min.: 302 min.
Collection			21,000		53	200	
Transportation			13,000		49		
Inside the dumping			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 17th November 1997

Vehicle No. KAH006Y Loading Capacity: 7TON Researcher's name: Eston Kairu

No. of Crew: 8 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	16126		10 : 17			Kaloleni - Lusaka Rd
Loading-1	in	16128	2,000	10 : 23	6		Lusaka Rd
	out			10 : 37		14	
Loading-2	in	16129	1,000	10 : 53	16		Lusaka Rd
	out			11 : 21		28	
Loading-3	in	16133	4,000	11 : 36	15		Likoni Rd (Mbotela Estate)
	out			12 : 16		40	
							Jogoo Rd - Rabai Rd -
							Mumias Rd - Mutarakwa Rd -
							Komorock Rd to Dandora
Dumping site	in	16144	11,000	12 : 47	31		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			12 : 49	2		
Reach to workshop	in			:			
Total			18,000		70	82	Total min.: 152 min.
Collection			5,000		31	82	
Transportation			13,000		37		
Inside the dumping site			0		2	0	Dumping time.: 2 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 17th November 1997

Vehicle No. KAH006Y Loading Capacity: 7TON Researcher's name: Eston Kairu

No. of Crew: 8 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	16144		12 : 49			From Dandora to Likoni Rd
Loading-1	in	16160	16,000	13 : 38	49		Mbotega Estate
	out			14 : 53		75	8mins Idling
							Jogoo Rd - Rabai Rd -
							Outering Rd - Mutarakwea
							Rd - Komorock Rd to
							Dandora
Dumping site	in	16171	11,000	15 : 23	30		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			15 : 26	3		
Reach to workshop	in			:			
Total			27,000		82	75	Total min.: 157 min.
Collection			0		0	75	
Transportation			27,000		71		
Inside the dumping site			0		3	0	Dumping time.: 3 min.
Idling time					8		

Time & Motion Study Organization: NCC Trip- 1 Date: 18th November 1997

Vehicle No. KAB391Q Loading Capacity: 6.82ton Researcher's name: Eston Kairu

No. of Crew: 2 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	28131		9 : 56			Kaloleni to Ngong Rd depot
Loading-1	in	28154	23,000	11 : 48	112		(32mins Idling) via Majengo
	out			11 : 52		4	community on Ngong Rd
							Ngong Rd - Ragati Rd - Haile
							Selassie Ave - Ring Rd -
							Ngara - Muranga Rd - Thika
							Rd - Outering Rd -
							Komorock Rd to Dandora
Dumping site	in	28170	16,000	12 : 32	40		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			12 : 41	9		
Reach to workshop	in			:			
Total			39,000		161	4	Total min.: 165 min.
Collection			0		0	4	
Transportation			39,000		120		
Inside the dumping site			0		9	0	Dumping time.: 9 min.
Idling time					32		

Time & Motion Study Organization: NCC Trip- 2 Date: 18th November 1997

Vehicle No. KAB391Q Loading Capacity: 6.82ton Researcher's name: Eston Kairu

No. of Crew: 2 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	28170		12 : 41			From Dandora back to
Loading-1	in	28189	19,000	13 : 20	39		Ngong Rd
	out			13 : 27		7	Community on Ngong Rd
							Ngong Rd -
							Hale selassie Ave -
							Landhies Rd - Jogoo Rd -
							Rabai Rd - Mumias Rd -
							Outering Rd - Mutarakwa Rd
							Komorock Rd to Dandora
Dumping site	in	28207	18,000	14 : 0	33		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			14 : 5	5		
Reach to workshop	in			:			
Total			37,000		77	7	Total min.: 84 min.
Collection			0		0	7	
Transportation			37,000		72		
Inside the dumping site			0		5	0	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 19th November 1997

Vehicle No. KAB391Q Loading Capacity: 6.82ton Researcher's name: Eston Kairu

No. of Crew: 2 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	28292		10 : 0			Kaloleni to Embakasi via
Loading-1	in	28326	34,000	11 : 43	103		Ngara and Umoja II depot
	out			13 : 3		80	Nyayo Estate at Airport
							North Rd, Outering Rd,
							Mutarakwa Rd, Komorock
							Rd to Dandora
Dumping site	in	28339	13,000	13 : 32	29		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			13 : 39	7		
Reach to workshop	in			:			
Total			47,000		139	80	Total min.: 219 min.
Collection			0		0	80	
Transportation			47,000		132		
Inside the dumping site			0		7	0	Dumping time.: 7 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 12th November 1997

Vehicle No. KUL961 Loading Capacity: Researcher's name: Valerie

No. of Crew: 7 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	116098		10 : 0			Makadora sub depot Rd
Loading-1	in		2,000	10 : 5	5		Jogoo Rd
	out			10 : 20		15	
Loading-2	in		1,000	10 : 30	10		Shauri Moyo - B.A.T village
	out			10 : 55		25	Shauri Moyo Police station
Loading-3	in		500	11 : 0	5		Y.M.C.A Shauri Moyo
	out			11 : 50		50	
Loading-4	in		500	11 : 55	5		
	out			12 : 35		40	
Dumping site	in		7,000	13 : 0	25		Dandora D/site
Start dumping				:			
Finish dumping				:		0	
Dumping site	out		0	13 : 5	5		
Reach to workshop	in			:			
Total			11,000		55	130	Total min.: 185 min.
Collection			2,000		20	130	
Transportation			9,000		30		
Inside the dumping site			0		5	0	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 12th November 1997

Vehicle No. KUL961 Loading Capacity: Researcher's name: Valerie

No. of Crew: 7 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out			13 : 5			From dumping site to
Loading-1	in		7,000	13 : 20	15		Buru Buru phase 4
	out			13 : 35		15	
Loading-2	in		500	13 : 40	5		
	out			13 : 50		10	
Loading-3	in		500	13 : 55	5		
	out			14 : 5		10	Buru Buru phase 4
Loading-4	in		500	14 : 10	5		
	out			14 : 45		35	
Dumping site	in		26,500	15 : 15	30		Dandora D/site
Start dumping				:			
Finish dumping				:		0	
Dumping site	out		0	15 : 20	5		
Reach to workshop	in			:			
Total			35,000		65	70	Total min.: 135 min.
Collection			1,500		15	70	
Transportation			33,500		45		
Inside the dumping site			0		5	0	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 20th November 1997

Vehicle No. KUL994 Loading Capacity: 7780kg Researcher's name: Raymond Njunge

No. of Crew: 8 Estimated Volume: $8m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	174670.6		8 : 54			Kaloleni depot to Makadara
Loading-1	in	174681.1	10,500	10 : 15	81		depot then to Mariakani &
	out			13 : 55		220	Madaraka depot
							Madaraka MF10&11?
Dumping site	in	174696.3	15,200	14 : 47	52		Dandora site
Start dumping				14 : 49	2		
Finish dumping				14 : 57		8	
Dumping site	out	174696.5	200	14 : 59	2		went to sign up at site's
Reach to workshop	in	174711.7	15,200	15 : 34	35		office Kaloleni
Total			41,100		172	228	Total min.: 400 min.
Collection			0		0	220	
Transportation			40,900		168		
Inside the dumping site			200		4	8	Dumping time.: 12 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 21th November 1997

Vehicle No. KAH006Y Loading Capacity: 6950kg Researcher's name: Raymond Njunge

No. of Crew: 5 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	16388		9 : 50			Kaloleni - Ngara depot -
Loading-1	in	16402.5	14,500	12 : 18	148		Makadara depot
	out			12 : 19		1	Buru Buru phase 5
Loading-2	in	16403.6	1,100	12 : 21	2		Buru Buru phase 4
	out			12 : 29		8	
Loading-3	in	16403.9	300	12 : 31	2		Buru Buru phase 4
	out			12 : 43		12	Quarell between loaders,
Loading-4	in	16404	100	12 : 45	2		went back to Makadara
	out			12 : 47		2	depot
Loading-5	in	16410	6,000	13 : 8	21		Buru Buru Phase 4
	out			13 : 17		9	
Loading-6	in	16410.6	600	13 : 17	0		Buru Buru Phase 4
	out			13 : 20		3	
Loading-7	in	16410.8	200	13 : 21	1		Buru Buru Phase 4
	out			13 : 30		9	
Loading-8	in	16411	200	13 : 31	1		Buru Buru Phase 4
	out			13 : 41		10	
Loading-9	in	16411.4	400	13 : 43	2		Buru Buru Phase 4
	out			13 : 51		8	
Loading-10	in	16411.8	400	13 : 52	1		Buru Buru Phase 4
	out			14 : 0		8	
Loading-11	in	16412.3	500	14 : 3	3		Buru Buru Phase 4
	out			14 : 20		17	
Dumping site	in	16419.9	7,600	14 : 50	30		Dandora site
Start dumping		16420.3	400	14 : 51	1		
Finish dumping				14 : 59		8	
Dumping site	out	16420.9	600	15 : 1	2		went to sign up at office
Reach to workshop	in	16437.1	16,200	15 : 36	35		vehicle went to garage
Total			49,100		251	95	Total min.: 346 min.
Collection			9,800		35	87	
Transportation			38,300		213		
Inside the dumping site			1,000		3	8	Dumping time.: 11 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 22nd November 1997

Vehicle No. KAH006Y Loading Capacity: 6.9Ton Researcher's name: Raymond Njunge

No. of Crew: 7 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	16435.8		9 : 37			
Loading-1	in	16437.8	2,000	9 : 41	4		Dunga Rd
	out			:			
Loading-2	in	16440.2	2,400	10 : 7	26		South C
	out			10 : 9		2	
Loading-3	in	16441.3	1,100	10 : 15	6		Mugoya 4 Estate
	out			10 : 45		30	
Dumping site	in	16461.4	20,100	11 : 30	45		via Mombasa Rd to Dandora
Start dumping		16462	600	11 : 35	5		dumping site then sign up
Finish dumping				11 : 37		2	at the sites office
Dumping site	out	16462.6	600	11 : 40	3		
Reach to workshop	in			:			
Total			26,800		89	34	Total min.: 123 min.
Collection			3,500		32	32	
Transportation			22,100		49		
Inside the dumping site			1,200		8	2	Dumping time.: 10 min.
Idling time							

Time & Motion Study Organization: NCC Date: 22nd November 1997

Vehicle No. KAH006Y Loading Capacity: 6.9Ton Researcher's name: Raymond Njunge

No. of Crew: 7 Estimated Volume: 7.2m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	16462.6		11 : 40			From dumping site
Loading-1	in	16477	14,400	12 : 23	43		Durga Rd at Kenya
	out			13 : 10		47	Sweets Ltd
Loading-2	in	16478.8	1,800	13 : 17	7		Lusaka Rd
	out			13 : 23		6	
Loading-3	in	16484.2	5,400	13 : 38	15		Eastleigh
	out			13 : 51		13	
Dumping site	in	16490.4	6,200	14 : 15	24		Dandora site
Start dumping		16491.1	700	14 : 19	4		
Finish dumping				14 : 20		1	sign up at office
Dumping site	out	16491.7	600	14 : 25	5		
Reach to workshop	in	16506	14,300	14 : 54	29		Kaloleni depot
Total			43,400		127	67	Total min.: 194 min.
Collection			7,200		22	66	
Transportation			34,900		96		
Inside the dumping site			1,300		9	1	Dumping time.: 10 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 23rd November 1997

Vehicle No. KAH006Y Loading Capacity: 6.9Ton Researcher's name: Raymond Njunge

No. of Crew: 3 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	16508.4		8 : 50			From 8:54-9:02
Loading-1	in	16512.2	3,800	9 : 11	21		Kaloleni depot to Majengo
	out			9 : 17		6	depot N.C.C Retail market
Dumping site	in	16526.5	14,300	9 : 45	28		Dandora site
Start dumping		16527.3	800	9 : 50	5		
Finish dumping				9 : 52		2	
Dumping site	out	16528	700	9 : 57	5		Dandora sites office
Reach to workshop	in			:			
Total			19,600		59	8	Total min.: 67 min.
Collection			0		0	6	
Transportation			18,100		41		
Inside the dumping site			1,500		10	2	Dumping time.: 12 min.
Idling time					8		

Time & Motion Study Organization: NCC Trip- 2 Date: 23rd November 1997

Vehicle No. KAH006Y Loading Capacity: 6.9Ton Researcher's name: Raymond Njunge

No. of Crew: 3 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	16528		9 : 57			From dumping site
Loading-1	in	16542.2	14,200	10 : 16	19		NCC Retail market
	out			10 : 24		8	
Dumping site	in	16556.5	14,300	10 : 48	24		Dandora site
Start dumping		16557.3	800	10 : 52	4		
Finish dumping				10 : 53		1	
Dumping site	out	16558	700	10 : 57	4		Dandora sites office
Reach to workshop	in			:			
Total			30,000		51	9	Total min.: 60 min.
Collection			0		0	8	
Transportation			28,500		43		
Inside the dumping site			1,500		8	1	Dumping time.: 9 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 3 Date: 23rd November 1997

Vehicle No. KAH006Y Loading Capacity: 6.9Ton Researcher's name: Raymond Njunge

No. of Crew: 3 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	16558		10 : 57			From dumping site
Loading-1	in	16572.2	14,200	11 : 16	19		N.C.C Retail market
	out			11 : 22		6	
Dumping site	in	16586.5	14,300	11 : 45	23		Dandora site
Start dumping		16587.4	900	11 : 50	5		
Finish dumping				:			Dandora site office
Dumping site	out	16590	2,600	11 : 54	4		
Reach to workshop	in	16603.9	13,900	12 : 23	29		Kaloleni depot
Total			45,900		80	6	Total min.: 86 min.
Collection			0		0	6	
Transportation			42,400		71		
Inside the dumping site			3,500		9	0	Dumping time.: 9 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 24th November 1997

Vehicle No. KAB388Q Loading Capacity: 6.9Ton Researcher's name: Raymond Njunge

No. of Crew: 3 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	31168.3		11 : 8			From Kaloleni to
Loading-1	in	31181.5	13,200	12 : 9	61		City Engineers depot
	out			12 : 11		2	(Muranga Rd) then to
Loading-2	in	31183	1,500	12 : 16	5		Makadara depot
	out			12 : 27		11	L-1 Jogoo Rd
							L-2 Makadara
							Went to City Engineering
							depot for weight to be
							measured
Dumping site	in	31195.7	12,700	13 : 19	52		Dnadora site
Start dumping		31196.4	700	13 : 20	1		Signed up at Dandora
Finish dumping				13 : 21		1	
Dumping site	out	31197.2	800	13 : 24	3		
Reach to workshop	in			:			
Total			28,900		122	14	Total min.: 136 min.
Collection			1,500		5	13	
Transportation			25,900		113		
Inside the dumping site			1,500		4	1	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 24th November 1997

Vehicle No. KAB388Q Loading Capacity: 6.9Ton Researcher's name: Raymond Njunge

No. of Crew: 2 Estimated Volume: 7.2m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	31197.2		13 : 24			From dumping site
Loading-1	in	31209.2	12,000	13 : 50	26		Makadara
	out			13 : 58		8	
							Went to City Engineering
							depot (Ngong Rd)
							Mileage 31210.8,
							Time 14:09 and left 14:14
Dumping site	in	31221.8	12,600	14 : 35	37		Dandora dumping site then
Start dumping		31222.8	1,000	14 : 40	5		signed up at site office
Finish dumping				14 : 42		2	
Dumping site	out	31223.3	500	14 : 44	2		
Reach to workshop	in	31237.4	14,100	15 : 15	31		Kaloleni Depot
Total			40,200		101	10	Total min.: 111 min.
Collection			0		0	8	
Transportation			38,700		89		
Inside the dumping site			1,500		7	2	Dumping time.: 9 min.
Idling time					5		

Time & Motion Study Organization: NCC Trip- 1 Date: 25th November 1997

Vehicle No. KAH019Y Loading Capacity: 7.5Ton Researcher's name: Raymond Njunge

No. of Crew: 1 Estimated Volume: 7.2m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	3045.7		10 : 27			Kaloleni depot
Loading-1	in	3049	3,300	10 : 34	7		Makadara area
	out			10 : 39		5	Went to Nanyuki Rd at the
							weighing bridge
							Mileage - 3053.4
							Time 10:52-10:55(3mins)
							Idling
Dumping site	in	3061.3	12,300	11 : 25	46		Dandora dumping site
Start dumping		3062.1	800	11 : 30	5		
Finish dumping				11 : 32		2	
Dumping site	out	3062.8	700	11 : 34	2		Signed up at office
Reach to workshop	in			:			
Total			17,100		60	7	Total min.: 67 min.
Collection			0		0	5	
Transportation			15,600		50		
Inside the dumping site			1,500		7	2	Dumping time.: 9 min.
Idling time					3		

Time & Motion Study Organization: NCC Trip- 2 Date: 25th November 1997

Vehicle No. KAH019Y Loading Capacity: 7.5Ton Researcher's name: Raymond Njunge

No. of Crew: 1 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	3062.8		11 : 34			From dumping site
Loading-1	in	3072.4	9,600	12 : 7	33		Jericho - Lumuba
	out			12 : 25		18	shopping centre
							went to sign up at the
							weighing bridge at Nanyuki
							Rd
							Mileage 3076.3
							Time 12:45-12:53(8mins)
Dumping site	in	3085.2	12,800	13 : 27	62		Dandora site
Start dumping		3090	4,800	13 : 33	6		
Finish dumping				13 : 34		1	
Dumping site	out	3090.7	700	13 : 38	4		Signed up at site's office
Reach to workshop	in			:			
Total			27,900		105	19	Total min.: 124 min.
Collection			0		0	18	
Transportation			22,400		87		
Inside the dumping site			5,500		10	1	Dumping time.: 11 min.
Idling time					8		

Time & Motion Study Organization: NCC Trip- 3 Date: 25th November 1997

Vehicle No. KAH019Y Loading Capacity: 7.5Ton Researcher's name: Raymond Njunge

No. of Crew: 1 Estimated Volume: $9m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	3090.7		13 : 38			From dumping site
Loading-1	in	3098.8	8,100	13 : 56	18		Jericho - Lumomba
	out			14 : 3		7	shopping centre
							Went to sign up at the
							weighing bridge at Nanyuki
							Rd
							Mileage 03102.7
							Time ?
Dumping site	in	3108.5	9,700	14 : 38	35		Dandora site
Start dumping		3109.3	800	14 : 43	5		
Finish dumping				14 : 44		1	
Dumping site	out	3110	11,200	14 : 48	4		Signed up at site's office
Reach to workshop	in	3124.2	14,200	15 : 18	30		depot
Total			44,000		92	8	Total min.: 100 min.
Collection			0		0	7	
Transportation			32,000		83		
Inside the dumping site			12,000		9	1	Dumping time.: 10 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 26th November 1997

Vehicle No. KAB388Q Loading Capacity: 7.5Ton Researcher's name: Raymond Njunge

No. of Crew: 1 Estimated Volume: ?m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	31328.5		11 : 27			Vehicle went to row down
Loading-1	in			:			another vehicle which
	out			:			had broken down
Loading-2	in			:			- vehicle reallocated to do
	out			:			other job
Loading-3	in			:			
	out			:			
Loading-4	in			:			
	out			:			
Loading-5	in			:			
	out			:			
Loading-6	in			:			
	out			:			
Loading-7	in			:			
	out			:			
Loading-8	in			:			
	out			:			
Loading-9	in			:			
	out			:			
Loading-10	in			:			
	out			:			
Loading-11	in			:			
	out			:			
Loading-12	in			:			
	out			:			
Loading-13	in						
	out						
Loading-14	in						
	out						
Loading-15	in						
	out						
Dumping site	in			:			No garbage collection
Start dumping				:			done on 26/11/96
Finish dumping				:			
Dumping site	out			:			
Reach to workshop	in			:			
Total							Total min.: min.
Collection							
Transportation							
Inside the dumping site							Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 20th November 1997

Vehicle No. KAB286Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 7 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			9 : 40			
Loading-1	in		4,000	10 : 0	20		Ngara depot
	out			10 : 10		10	Uhuru highway
Loading-2	in		4,500	10 : 40	30		Vehicle breakdown
	out			:			No collection for the day
Loading-3	in			:			
	out			:			Milege problem
Loading-4	in			:			
	out			:			
Loading-5	in			:			
	out			:			
Loading-6	in			:			
	out			:			
Loading-7	in			:			
	out			:			
Loading-8	in			:			
	out			:			
Loading-9	in			:			
	out			:			
Loading-10	in			:			
	out			:			
Loading-11	in			:			
	out			:			
Loading-12	in			:			
	out			:			
Loading-13	in						
	out						
Loading-14	in						
	out						
Loading-15	in						
	out						
Dumping site	in			:			No collection
Start dumping				:			
Finish dumping				:			
Dumping site	out			:			
Reach to workshop	in			:			
Total			8,500		50	10	Total min.: 60 min.
Collection			4,500		30	10	
Transportation			4,000		20		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 21st November 1997

Vehicle No. KUL993 Loading Capacity: 6.9ton Researcher's name: Ruth Kanau

No. of Crew: 7 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	192797		9 : 25			Left depot NCC
Loading-1	in	192802	5,000	9 : 35	10		Ngara depot
	out			9 : 50		15	
Loading-2	in	192802.1	100	9 : 55	5		Chambers Rd
	out			10 : 40		45	
Loading-3	in	192804	1,900	10 : 45	5		
	out			11 : 0		15	Shilingi Rd
Dumping site	in	192817	13,000	11 : 20	20		Dandora
Start dumping		192817	0	11 : 30	10		
Finish dumping		192817	0	11 : 50		20	
Dumping site	out	192819	2,000	11 : 55	5		
Reach to workshop	in			:			
Total			22,000		55	95	Total min.: 150 min.
Collection			2,000		10	75	
Transportation			18,000		30		
Inside the dumping site			2,000		15	20	Dumping time.: 35 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 21st November 1997

Vehicle No. KUL993 Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 7 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	2819		11 : 55			From Dandora Ngara depot
Loading-1	in	2831	12,000	12 : 30	35		
	out			12 : 35		5	Newlane
Loading-2	in	2834	3,000	13 : 0	25		Kolobot Rd
	out			13 : 5		5	
Loading-3	in	2835	1,000	13 : 15	10		Ngara Rd
	out			13 : 30		15	
Loading-4	in	2836	1,000	13 : 35	5		Muranga Rd
	out			13 : 45		10	
Loading-5	in	2837	1,000	13 : 50	5		Ngara depot
	out			13 : 55		5	
Loading-6	in	2839	2,000	14 : 0	5		Wangaruva flats
	out			14 : 15		15	
Loading-7	in	2840	1,000	15 : 20	65		City market
	out			15 : 30		10	Ngara depot
Dumping site	in			:			Did not go to the dumping
Start dumping				:			site because they went to
Finish dumping				:			shoot a documentary
Dumping site	out			:			
Reach to workshop	in			:			
Total			21,000		150	65	Total min.: 215 min.
Collection			9,000		115	65	
Transportation			12,000		35		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 22nd November 1997

Vehicle No. KAB389Q Loading Capacity: 6TON Researcher's name: Ruth Kamau

No. of Crew: 2 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22829		9 : 45			NCC depot
Loading-1	in	22838	9,000	10 : 15	30		Embakasi depot
	out			10 : 30		15	Umoja estate
Loading-2	in	22840	2,000	10 : 50	20		Umoja estate
	out			11 : 35		45	
Dumping site	in	22849	9,000	12 : 0	25		Dandora
Start dumping				12 : 5	5		
Finish dumping				12 : 5		0	
Dumping site	out	22850	1,000	12 : 8	3		
Reach to workshop	in	22870	20,000	13 : 0	52		NCC depot
Total			41,000		135	60	Total min.: 195 min.
Collection			2,000		20	60	
Transportation			38,000		107		
Inside the dumping site			1,000		8	0	Dumping time.: 8 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 23rd November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 2 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22913		8 : 50			NCC depot
Loading-1	in	22914	1,000	8 : 55	5		Pumwani depot
	out			9 : 2		7	
Loading-2	in	22917	3,000	9 : 10	8		Retail Market
	out			9 : 15		5	
Dumping site	in	22931	14,000	9 : 42	27		Dandora
Start dumping				9 : 43	1		
Finish dumping				9 : 44		1	
Dumping site	out	22931.9	900	9 : 45	1		
Reach to workshop	in			:			
Total			18,900		42	13	Total min.: 55 min.
Collection			3,000		8	12	
Transportation			15,000		32		
Inside the dumping site			900		2	1	Dumping time.: 3 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 23rd November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 2 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	22931		9 : 45			Dumping site
Loading-1	in	22945	14,000	10 : 13	28		Retail Market
	out			10 : 18		5	
Dumping site	in	22959	14,000	10 : 46	28		Dandora
Start dumping		22960	1,000	10 : 47	1		
Finish dumping				10 : 47		0	
Dumping site	out	22960.5	500	10 : 48	1		
Reach to workshop	in	22974	13,500	11 : 20	32		
Total			43,000		90	5	Total min.: 95 min.
Collection			0		0	5	
Transportation			41,500		88		
Inside the dumping site			1,500		2	0	Dumping time.: 2 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 24th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 1 Estimated Volume: $8m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	23084		11 : 40			NCC depot
Loading-1	in	23088	4,000	11 : 50	10		City Hall
	out			11 : 54		4	
Loading-2	in	23094	6,000	12 : 10	16		Makadara depot
	out			12 : 15		5	
Loading-3	in	23095	1,000	12 : 18	3		Makadara depot
	out			12 : 27		9	
Loading-4	in	23102	7,000	12 : 49	22		Weighing bay
	out			13 : 4		15	
Dumping site	in	23110	8,000	13 : 45	41		Dandora
Start dumping		23110	0	13 : 46	1		
Finish dumping		23110	0	13 : 46		0	
Dumping site	out	23111	1,000	13 : 47	1		
Reach to workshop	in			:			
Total			27,000		94	33	Total min.: 127 min.
Collection			14,000		41	33	
Transportation			12,000		51		
Inside the dumping site			1,000		2	0	Dumping time.: 2 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 24th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 1 Estimated Volume: $8m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	23111		14 : 0			Makadara
Loading-1	in	23121	10,000	14 : 7	7		(Idling 14:00-14:07 7mins)
	out			14 : 24		17	
Loading-2	in	23124	3,000	14 : 37	13		Weighing bay
	out			14 : 40		3	
Loading-3	in	23126	2,000	15 : 0	20		Vehicle breakdown
	out			:			
Dumping site	in			:			No dumping due to vehicle
Start dumping				:			breakdown
Finish dumping				:			
Dumping site	out			:			
Reach to workshop	in			:			
Total			15,000		40	20	Total min.: 60 min.
Collection			5,000		33	20	
Transportation			10,000		0		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time					7		

Time & Motion Study Organization: NCC Trip- 1 Date: 25th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 2 Estimated Volume: $8m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	23138		9 : 19			NCC depot
Loading-1	in	23140	2,000	9 : 25	6		Mworsto depot
	out			9 : 33		8	
Loading-2	in	23141	1,000	9 : 43	10		NCC depot
	out			9 : 44		1	
Loading-3	in	23144	3,000	9 : 52	8		NCC garage
	out			9 : 53		1	
Loading-4	in	23150	6,000	10 : 17	24		Makadara depot
	out			10 : 20		3	
Loading-5	in	23151	1,000	10 : 20	0		Makadara Ave
	out			10 : 24		4	
Loading-6	in	23155	4,000	10 : 41	17		Weighing Bay
	out			10 : 47		6	
Dumping site	in	23164	9,000	11 : 19	32		Dandora
Start dumping				11 : 20	1		
Finish dumping				11 : 20		0	
Dumping site	out	23165	1,000	11 : 21	1		
Reach to workshop	in			:			
Total			27,000		99	23	Total min.: 122 min.
Collection			15,000		33	6	
Transportation			11,000		38		
Inside the dumping site			1,000		2	0	Dumping time.: 2 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 25th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 1 Estimated Volume: $6.6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	23165		11 : 21			From Dandora
Loading-1	in	23170	5,000	11 : 49	28		Jericho Lumumba
	out			11 : 50		1	
Loading-2	in	23176	6,000	12 : 5	15		Weighing Bay
	out			:			
Dumping site	in	23185	9,000	12 : 56	51		Dandora
Start dumping				12 : 57	1		
Finish dumping				12 : 57		0	
Dumping site	out	23186	1,000	12 : 59	2		
Reach to workshop	in			:			
Total			21,000		97	1	Total min.: 98 min.
Collection			6,000		15	1	
Transportation			14,000		79		
Inside the dumping site			1,000		3	0	Dumping time.: 3 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 3 Date: 25th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 1 Estimated Volume: 6.6m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	23186		12 : 59			From Dandora
Loading-1	in	23194	8,000	13 : 23	24		Jericho Lumumba
	out			13 : 27		4	
Loading-2	in	23198	4,000	13 : 42	15		Weighing Bay
	out			13 : 43		1	
Dumping site	in	23207	9,000	14 : 9	26		Dnadora
Start dumping				14 : 11	2		
Finish dumping				14 : 11		0	
Dumping site	out	23208	1,000	14 : 16	5		
Reach to workshop	in			:			
Total			22,000		72	5	Total min.: 77 min.
Collection			4,000		15	5	
Transportation			17,000		50		
Inside the dumping site			1,000		7	0	Dumping time.: 7 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 4 Date: 25th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 1 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	23208		14 : 16			From Dandora
Loading-1	in	23215	7,000	14 : 37	21		Jericho Lumumbo
	out			14 : 40		3	
Dumping site	in	23224	9,000	15 : 0	20		Dandora
Start dumping		23224	0	15 : 1	1		
Finish dumping		23224	0	15 : 1		0	
Dumping site	out	23225	1,000	15 : 6	5		
Reach to workshop	in			:			
Total			17,000		47	3	Total min.: 50 min.
Collection			0		0	3	
Transportation			16,000		41		
Inside the dumping site			1,000		6	0	Dumping time.: 6 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 26th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 2 Estimated Volume: 4.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	23263		9 : 39			NCC depot
Loading-1	in	23272	9,000	10 : 25	46		Lunga Lunga Rd
	out			10 : 30		5	
Loading-2	in	23274	2,000	10 : 34	4		Weighing Bay
	out			10 : 34		0	
Loading-3	in	23277	3,000	10 : 55	21		Makadara depot
	out			11 : 0		5	
Loading-4	in	23278	1,000	11 : 4	4		Makadara Area
	out			11 : 8		4	
Dumping site	in	23286	8,000	11 : 35	27		Dandora
Start dumping				11 : 36	1		
Finish dumping				11 : 36		0	
Dumping site	out	23287	1,000	11 : 40	4		
Reach to workshop	in			:			
Total			24,000		107	14	Total min.: 121 min.
Collection			6,000		29	14	
Transportation			17,000		73		
Inside the dumping site			1,000		5	0	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 2 Date: 26th November 1997

Vehicle No. KAB389Q Loading Capacity: 7TON Researcher's name: Ruth Kamau

No. of Crew: 1 Estimated Volume: 4.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	23287		11 : 40			From Dandora
Loading-1	in	23296	9,000	12 : 9	29		Jericho Lumumba
	out			12 : 13		4	
Loading-2	in	23300	4,000	12 : 30	17		Wieghing Bay
	out			:			
Dumping site	in	23308	8,000	13 : 0	30		Dandora
Start dumping				13 : 3	3		
Finish dumping				13 : 3		0	
Dumping site	out	23309	1,000	13 : 5	2		
Reach to workshop	in			:			
Total			22,000		81	4	Total min.: 85 min.
Collection			4,000		17	4	
Transportation			17,000		59		
Inside the dumping site			1,000		5	0	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 20th November 1997

Vehicle No. KWE073 Loading Capacity: 8TON Researcher's name: Judy Nyanbura

No. of Crew: 8 Estimated Volume: $5m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	68085.4		9 : 30			Ngong Rd, Mbagathi Rd,
Loading-1	in	68094.6	9,200	9 : 50	20		Makadara estate
	out			10 : 54		64	Truck got stuck - Makadara
Loading-2	in	68095.1	500	11 : 41	47		Makadara
	out			15 : 0		199	back to depot
Dumping site	in			:			No dumping of garbage
Start dumping				:			
Finish dumping				:			
Dumping site	out			:			
Reach to workshop	in	68097.3	2,200	15 : 10	10		
Total			11,900		77	263	Total min.: 340 min.
Collection			500		47	263	
Transportation			11,400		30		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 21st November 1997

Vehicle No. KUL961 Loading Capacity: Researcher's name: J.T

No. of Crew: 3 Estimated Volume: m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			11 : 45			Jogoo Rd
Loading-1	in		0	11 : 50	5		No catarpillars so no
	out			:			collection of working area
							Mileage breakdown
Dumping site	in			:			No dumping : back to
Start dumping				:			workshop
Finish dumping				:			
Dumping site	out			:			
Reach to workshop	in			:			
Total			0		5	0	Total min.: 5 min.
Collection			0		0	0	
Transportation			0		5		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 22nd November 1997

Vehicle No. KAB391Q Loading Capacity: 6TON Researcher's name: Judy Nyanbura

No. of Crew: 6 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	28628.2		10 : 55			Forest Rd, Ojijo Rd,
Loading-1	in	28632	3,800	11 : 6	11		Parklands Rd, Parklands
	out			11 : 17		11	Parklands
Loading-2	in	28632.9	900	11 : 24	7		Parklands
	out			11 : 27		3	Masari Rd, Limuru Rd
Loading-3	in	28633.6	700	11 : 35	8		Limuru Rd
	out			12 : 40		65	Limuru Rd
Loading-4	in	28634.3	700	12 : 53	13		Limuru Rd
	out			12 : 58		5	Limuru Rd
Loading-5	in	28634.8	500	13 : 0	2		Gigiri
	out			13 : 15		15	Muthaiga Rd, Thika Rd
Dumping site	in	28636.4	1,600	13 : 51	36		Dandora dumping site
Start dumping				14 : 1	10		
Finish dumping				14 : 1		0	
Dumping site	out	28636.7	300	14 : 3	2		
Reach to workshop	in	28647.9	11,200	14 : 30	27		
Total			19,700		116	99	Total min.: 215 min.
Collection			2,800		30	99	
Transportation			16,600		74		
Inside the dumping site			300		12	0	Dumping time.: 12 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 23rd November 1997

Vehicle No. KUL993 Loading Capacity: 7.8ton Researcher's name: Judy Nyanbura

No. of Crew: 9 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	92993.3		9 : 30			Kaloleni depot
Loading-1	in	92994.5	1,200	9 : 40	10		Lusaka Rd
	out			9 : 55		15	
Loading-2	in	92994.8	300	10 : 15	20		South C
	out			10 : 20		5	
Loading-3	in	92995	200	10 : 30	10		South C
	out			11 : 0		30	Mugoya
Loading-4	in	92995.5	500	11 : 15	15		Mugoya
	out			11 : 45		30	Mugoya
Loading-5	in	92995.9	400	12 : 10	25		South B
	out			12 : 25		15	
Loading-6	in	92996.1	200	12 : 30	5		South B
	out			12 : 36		6	
Dumping site	in	93015.4	19,300	13 : 5	29		Dandora dumping site
Start dumping		93015.9	500	13 : 11	6		
Finish dumping				13 : 12		1	
Dumping site	out	93016.5	600	13 : 17	5		
Reach to workshop	in	93030.6	14,100	13 : 49	32		Kaloleni depot
Total			37,300		157	102	Total min.: 259 min.
Collection			1,600		75	101	
Transportation			34,600		71		
Inside the dumping site			1,100		11	1	Dumping time.: 12 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 24th November 1997

Vehicle No. KAH019Y Loading Capacity: 7.5ton Researcher's name: Judy Nyanbura

No. of Crew: 5 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	2977.8		10 : 45			Eastleigh
Loading-1	in	2980	2,200	11 : 0	15		Eastleigh
	out			11 : 22		22	Eastleigh
Loading-2	in	2980.1	100	11 : 23	1		Eastleigh
	out			11 : 28		5	Eastleigh
Loading-3	in	2980.2	100	11 : 31	3		Truck on reverse - mileage
	out			11 : 34		3	Eastleigh
Loading-4	in	2980.3	100	11 : 41	7		Eastleigh
	out			12 : 49		68	Eastleigh
Loading-5	in	2981.2	900	12 : 54	5		Eastleigh
	out			12 : 56		2	Eastleigh
Loading-6	in	2981.4	200	12 : 59	3		Eastleigh
	out			13 : 21		22	
Dumping site	in	2998.4	17,000	14 : 22	61		Dandora
Start dumping				14 : 28	6		
Finish dumping				14 : 30		2	
Dumping site	out	3000.1	1,700	14 : 32	2		
Reach to workshop	in	3015.7	15,600	15 : 45	73		Jogoo Rd
Total			37,900		176	124	Total min.: 300 min.
Collection			1,400		19	122	
Transportation			34,800		149		
Inside the dumping site			1,700		8	2	Dumping time.: 10 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 25th November 1997

Vehicle No. KAH013Y Loading Capacity: 6.5ton Researcher's name: Judy Nyanbura

No. of Crew: 2 Estimated Volume: 3.5m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	2690.9		10 : 4			Jogoo Rd
Loading-1	in	2691.1	200	10 : 4	0		Makada Rd
	out			10 : 11		7	
							Weighing 10:25-10:45
							Outering Rd
Dumping site	in	2702.4	11,300	11 : 1	50		Dumping site
Start dumping				11 : 7	6		
Finish dumping				11 : 8		1	
Dumping site	out	2704	1,600	11 : 11	3		
Reach to workshop	in			:			
Total			13,100		59	8	Total min.: 67 min.
Collection			0		0	7	
Transportation			11,500		30		
Inside the dumping site			1,600		9	1	Dumping time.: 10 min.
Idling time					20		

Time & Motion Study Organization: NCC Trip- 2 Date: 25th November 1997

Vehicle No. KAH013Y Loading Capacity: 5TON Researcher's name: Judy Nyanbura

No. of Crew: 2 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	2711		11 : 11			
Loading-1	in	2715.2	4,200	11 : 44	33		Makadara
	out			11 : 48		4	Weighing 12:04-12:08 4mins
							Nanyuki Rd
Dumping site	in	2727.3	12,100	12 : 25	41		Dumping site
Start dumping		2727.3	0	12 : 33	8		
Finish dumping		2727.3	0	12 : 35		2	
Dumping site	out	2728	700	12 : 45	10		
Reach to workshop	in			:			
Total			17,000		92	6	Total min.: 98 min.
Collection			0		0	4	
Transportation			16,300		70		
Inside the dumping site			700		18	2	Dumping time.: 20 min.
Idling time					4		

Time & Motion Study Organization: NCC Trip- 3 Date: 25th November 1997

Vehicle No. KAH013Y Loading Capacity: 5TON Researcher's name: Judy Nyanbura

No. of Crew: 2 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	2728		12 : 45			
Loading-1	in	2734.7	6,700	13 : 3	18		Makadara
	out			13 : 6		3	Makadara
							Nanyuki Rd
							Weighing 13:22-13:23 1min
Dumping site	in	2747	12,300	13 : 43	37		Dandora
Start dumping		2747	0	13 : 53	10		
Finish dumping		2747	0	13 : 55		2	
Dumping site	out	2747.8	800	13 : 58	3		
Reach to workshop	in			:			
Total			19,800		68	5	Total min.: 73 min.
Collection			0		0	3	
Transportation			19,000		54		
Inside the dumping site			800		13	2	Dumping time.: 15 min.
Idling time					1		

Time & Motion Study Organization: NCC Trip- 4 Date: 25th November 1997

Vehicle No. KAH013Y Loading Capacity: TON Researcher's name: Judy Nyanbura

No. of Crew: 2 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	2747.8		13 : 58			
Loading-1	in	2755.1	7,300	14 : 28	30		Makadara
	out			14 : 34		6	
Dumping site	in	2762.2	7,100	14 : 50	16		Dandora
Start dumping				14 : 50	0		
Finish dumping				14 : 50		0	
Dumping site	out	2762.8	600	14 : 55	5		
Reach to workshop	in			:			
Total			15,000		51	6	Total min.: 57 min.
Collection			0		0	6	
Transportation			14,400		46		
Inside the dumping site			600		5	0	Dumping time.: 5 min.
Idling time							

Time & Motion Study Organization: NCC Trip- 1 Date: 26th November 1997

Vehicle No. KAH013Y Loading Capacity: 6.5TON Researcher's name: Judy Nyanbura

No. of Crew: 2 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	2781.2		:			
Loading-1	in	2806.6	25,400	11 : 57			Jericho (Lumumba)
	out			12 : 2		5	
							Idling 5mins (12:17-12:22)
							Weighing
Dumping site	in	2818	11,400	12 : 45	43		Outering Rd
Start dumping				:			Dandora dumping
Finish dumping				:		0	
Dumping site	out	2819.6	1,600	12 : 50	5		
Reach to workshop	in			:			
Total			38,400		48	5	Total min.: 53 min.
Collection			0		0	5	
Transportation			36,800		38		
Inside the dumping site			1,600		5	0	Dumping time.: 5 min.
Idling time					5		

Time & Motion Study Organization: NCC Trip- 2 Date: 26th November 1997

Vehicle No. KAH013Y Loading Capacity: 6.5TON Researcher's name: Judy Nyanbura

No. of Crew: 2 Estimated Volume: $2m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	2819.6		12 : 50			
Loading-1	in	2826.2	6,600	13 : 15	25		Jericho - Lumumba
	out			13 : 20		5	
							Idle time - weighing 10mins
							13:20-13:30
Dumping site	in	2837.7	11,500	13 : 53	33		Dandora dumping site
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	2838.2	500	13 : 57	4		
Reach to workshop	in			:			
Total			18,600		62	5	Total min.: 67 min.
Collection			0		0	5	
Transportation			18,100		48		
Inside the dumping site			500		4	0	Dumping time.: 4 min.
Idling time					10		

Time & Motion Study Organization: NCC Trip- 3 Date: 26th November 1997

Vehicle No. KAH013Y Loading Capacity: 6.5TON Researcher's name: Judy Nyanbura

No. of Crew: 2 Estimated Volume: $4m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	2838.2		13 : 57			
Loading-1	in	2845.5	7,300	14 : 17	20		Jericho Lumumba
	out			14 : 30		13	
Dumping site	in	2852.2	6,700	14 : 44	14		Dandora dumping site
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			14 : 48	4		
Reach to workshop	in			:			
Total			14,000		38	13	Total min.: 51 min.
Collection			0		0	13	
Transportation			14,000		34		
Inside the dumping site			0		4	0	Dumping time.: 4 min.
Idling time							

BINS (NAIROBI) SERVICES LTD

Time & Motion Study Organization: BINS Trip- 1 Date: 12th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 9			
Loading-1	in		1,000	8 : 25	16		Hill Park
	out			9 : 20		55	
Loading-2	in		2,000	10 : 43	83		Beach & Bush
	out			10 : 46		3	
Loading-3	in		7	10 : 51	5		Raken supermarket
	out			10 : 53		2	
Loading-4	in		8	10 : 55	2		Torsem LTD
	out			11 : 0		5	Rhino Kenya
Loading-5	in		5	11 : 5	5		Stanbic Bank
	out			11 : 7		2	
Loading-6	in		8	11 : 8	1		Karen Country Club
	out			11 : 52		44	
Loading-7	in		6	11 : 58	6		Karen Blixen
	out			12 : 0		2	Coffee Garden
Loading-8	in		8	12 : 2	2		(270) Elsnab N
	out			12 : 2		0	
Loading-9	in		8	12 : 3	1		(254)Milne J. H. D
	out			12 : 3		0	
Loading-10	in		8	12 : 5	2		(53) Scott H
	out			12 : 5		0	
Loading-11	in		8	12 : 5	0		(40) Bush D.P
	out			12 : 5		0	
Loading-12	in		4	12 : 8	3		(89)
	out			12 : 8		0	
Loading-13	in		8	12 : 8	0		(98)
	out			12 : 8		0	
Loading-14	in		8	12 : 10	2		(146)
	out			12 : 10		0	
Loading-15	in		8	12 : 11	1		(43) Silvester
	out			12 : 11		0	
Loading-16	in		8	12 : 13	2		(70)A
	out			12 : 13		0	
Loading-17	in		8	12 : 14	1		(70)B
	out			12 : 14		0	
Loading-18	in		8	12 : 16	2		Culborn LTD
	out			12 : 19		3	
Loading-19	in		8	12 : 21	2		(90) Pelizz Oli E.C
	out			12 : 21		0	
Loading-20	in		8	12 : 23	2		(60) Gleno Cottar
	out			12 : 23		0	Safaris
Loading-21	in		8	12 : 23	0		(58)
	out			12 : 23		0	
Loading-22	in		8	12 : 24	1		(70) Derrick Dames
	out			12 : 24		0	
Loading-23	in		8	12 : 25	1		Stone R
	out			12 : 25		0	
Loading-24	in		4	12 : 30	5		Seex JE (182)1
	out			12 : 30		0	
Loading-25	in		8	12 : 33	3		Jacob
	out			12 : 33		0	

Time & Motion Study Organization: BINS Trip- 1 Date: 12th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-26	in		8	12 : 35	2		(15) Silverstone
	out			12 : 35		0	M.D
Loading-27	in		4	12 : 40	5		Tyack B (481)
	out			12 : 41		1	
Loading-28	in		6	12 : 50	9		Iiako J (13)
	out			12 : 52		2	
Loading-29	in		8	12 : 53	1		Nyamobi. E
	out			12 : 53		0	
Loading-30	in		8	12 : 55	2		Karen Memorial Gardens
	out			12 : 56		1	(19)
Loading-31	in		8	13 : 2	6		Simojoki MRS (1)
	out			13 : 4		2	
Loading-32	in		8	13 : 5	1		Kopwe E (3)
	out			13 : 5		0	
Loading-33	in		4	13 : 10	5		Kellum B
	out			13 : 10		0	
Loading-34	in		4	13 : 15	5		Kenya Post Authority
	out			13 : 15		0	
Loading-35	in		8	13 : 15	0		Wagaiyu C.K
	out			13 : 15		0	
Loading-36	in		4	13 : 21	6		BBC Station
	out			13 : 24		3	
Loading-37	in		8	13 : 25	1		Double Dragon
	out			13 : 30		5	Chinese Restaurant
Loading-38	in		4	13 : 36	6		Westing
	out			13 : 39		3	
Loading-39	in		5	13 : 45	6		Boyd - Moss D
	out			13 : 45		0	
Loading-40	in		5	13 : 49	4		PD Thomas
	out			13 : 50		1	
Loading-41	in		8	13 : 53	3		Dr Sean Avery
	out			13 : 53		0	
Loading-42	in		8	13 : 54	1		Larry J
	out			13 : 54		0	
Loading-43	in		6	14 : 0	6		Kings Cliff Stud
	out			14 : 1		1	
Loading-44	in		4	14 : 5	4		Else M
	out			14 : 5		0	
Loading-45	in		4	14 : 10	5		A.F.G (166)
	out			14 : 10		0	
Loading-46	in		7	14 : 20	10		Thoemes J.
	out			14 : 20		0	
Loading-47	in		4	14 : 20	0		Out of Africa
	out			14 : 20		0	
Loading-48	in		4	14 : 22	2		Hennessy P.A
	out			14 : 22		0	

Time & Motion Study Organization: BINS Trip- 1 Date: 12th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-49	in		8	14 : 23	1		Kisa J.J
	out			14 : 23		0	
Loading-50	in		8	14 : 25	2		(15) Payne R
	out			14 : 25		0	
Loading-51	in		7	14 : 35	10		Lonrhd Africa
	out			14 : 40		5	(37)
Loading-52	in		4	14 : 45	5		Beardmore M.
	out			14 : 45		0	(31)
Loading-53	in		8	14 : 46	1		Keeble D.C
	out			14 : 47		1	(30)
Loading-54	in		8	14 : 47	0		Rosberg P
	out			14 : 47		0	(28)
Loading-55	in		8	14 : 48	1		Muitichoice
	out			14 : 48		0	(23)
Loading-56	in		8	14 : 49	1		Thammo Holdings Ltd
	out			14 : 49		0	(16)
Loading-57	in		8	14 : 50	1		Andrews R
	out			14 : 50		0	(15)
Loading-58	in		8	14 : 50	0		Keith J.C
	out			14 : 50		0	(11)
Loading-59	in		8	14 : 52	2		Frank PE
	out			14 : 52		0	(23)
Loading-60	in		8	15 : 0	8		Super Properties Ltd
	out			15 : 0		0	(34)
Loading-61	in		8	15 : 0	0		Dr. Schluiter
	out			15 : 0		0	(124)
Loading-62	in		4	15 : 4	4		Williams D
	out			15 : 4		0	
Loading-63	in		8	15 : 5	1		Hannay R
	out			15 : 6		1	
Loading-64	in		8	15 : 7	1		Saddler F
	out			15 : 7		0	
Loading-65	in		8	15 : 8	1		MRS Davis
	out			15 : 9		1	Mwenda
Loading-66	in		8	15 : 11	2		(145)
	out			15 : 11		0	
Loading-67	in		8	15 : 13	2		Beslee PT
	out			15 : 13		0	
Loading-68	in		8	15 : 15	2		(51) B L.F von
	out			15 : 15		0	Kafmann
Loading-69	in		4	15 : 20	5		(42) Rosenstok
	out			15 : 20		0	
Loading-70	in		8	15 : 22	2		Harney
	out			15 : 22		0	
Loading-71	in		8	15 : 22	0		(196) Oriole Holdings Ltd
	out			15 : 22		0	
Loading-72	in		8	15 : 24	2		Crafter
	out			15 : 24		0	

Time & Motion Study Organization: BINS Trip- 1 Date: 12th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-73	in		4	15 : 28	4		Hellbach M
	out			15 : 31		3	
Loading-74	in		8	15 : 31	0		(52) Delorie C
	out			15 : 34		3	
Loading-75	in		8	15 : 34	0		(131) Burns & Blanes
	out			15 : 35		1	Engineering
Loading-76	in		8	15 : 35	0		Sherwin P
	out			15 : 36		1	
Loading-77	in		8	15 : 36	0		Sherwin P
	out			15 : 42		6	
Loading-78	in		8	15 : 43	1		(21) Evans.M
	out			15 : 46		3	
Loading-79	in		8	15 : 46	0		Zech. R. MRS
	out			16 : 5		19	
Loading-80	in		8	16 : 7	2		(30) Paul Bailey
	out			16 : 10		3	
Loading-81	in		8	16 : 11	1		MC Allister
	out			16 : 13		2	No (227)
Loading-82	in		8	16 : 13	0		St Lawrence
	out			16 : 15		2	
Loading-83	in		8	16 : 16	1		Heinz Arnold
	out			16 : 19		3	
Loading-84	in		8	16 : 19	0		(23) Nyagah J.W. N
	out			16 : 20		1	
Loading-85	in		8	16 : 20	0		Besby K2
	out			16 : 22		2	
Loading-86	in		8	16 : 22	0		Fox T K3
	out			16 : 22		0	
Loading-87	in		8	16 : 22	0		Mathews T
	out			16 : 23		1	
Loading-88	in		8	16 : 23	0		(257) Fuller A.J
	out			16 : 23		0	
Loading-89	in		8	16 : 23	0		(258) David
	out			16 : 25		2	Simpson
Loading-90	in		8	16 : 25	0		P. Molinard (40)
	out			16 : 26		1	
Loading-91	in		4	16 : 30	4		(70) Kuria E
	out			16 : 30		0	Gathibimu
Loading-92	in		8	16 : 30	0		(82) Pike TM
	out			16 : 30		0	
Loading-93	in		8	16 : 30	0		Ashley K84
	out			16 : 32		2	
Loading-94	in		8	16 : 33	1		Lady Cecil (69)
	out			16 : 35		2	
Loading-95	in		5	16 : 37	2		P. Morris
	out			16 : 40		3	
Loading-96	in		8	16 : 40	0		Mutua
	out			16 : 42		2	

Time & Motion Study Organization: BINS Trip- 1 Date: 12th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-97	in		8	16 : 42	0		L.W.F
	out			16 : 44		2	
Loading-98	in		8	16 : 44	0		(37)
	out			16 : 46		2	
Loading-99	in		4	16 : 50	4		(118) Curthbert N
	out			16 : 55		5	
Loading-100	in		8	16 : 55	0		Church N (8)
	out			17 : 5		10	Watatu
Loading-101	in		8	17 : 5	0		(91) Kungu M.S
	out			17 : 7		2	
Loading-102	in		8	17 : 7	0		Seth Smith 3rd
	out			17 : 10		3	HSE RHS
Loading-103	in		8	17 : 11	1		Jones N.B
	out			17 : 15		4	
Loading-104	in		8	17 : 15	0		Foster Suzzane
	out			17 : 15		0	
Loading-105	in		8	17 : 17	2		Harrison C.J
	out			17 : 20		3	
Loading-106	in		8	17 : 20	0		Dixson
	out			17 : 21		1	
Loading-107	in		8	17 : 22	1		(97) Ansell
	out			17 : 23		1	
Loading-108	in		8	17 : 23	0		(114) C Fletcher
	out			17 : 24		1	
Dumping site	in			:			Did not go to dump
Start dumping				:			
Finish dumping				:			
Dumping site	out			:			
Reach to workshop	in		20,000	18 : 0	36		
Total			23,759		352	239	Total min.: 591 min.
Collection			2,759		300	239	
Transportation			21,000		52		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 13th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 17			
Loading-1	in		250	8 : 22	5		Petrol and had a tyre problem
	out			10 : 1		99	Dumping site in Dandora
Loading-2	in		9,000	10 : 33	32		Start to dump
	out			10 : 37		4	finish to dump
Loading-3	in		20	11 : 13	36		Out of dumping site
	out			11 : 15		2	
Loading-4	in		20,000	11 : 43	28		Bertle T Behan
	out			11 : 45		2	
Loading-5	in		4	11 : 46	1		Mazumder Bijay
	out			11 : 46		0	
Loading-6	in		4	11 : 46	0		Khan Imitiaz
	out			11 : 46		0	
Loading-7	in		4	11 : 46	0		Grace Mukami
	out			11 : 46		0	
Loading-8	in		4	11 : 46	0		R. C Choudrie
	out			11 : 48		2	
Loading-9	in		4	11 : 48	0		Wainaina Real Estate
	out			11 : 48		0	
Loading-10	in		4	11 : 48	0		Cannon Assurance
	out			11 : 48		0	
Loading-11	in		4	11 : 48	0		Concord Insurance Ltd
	out			11 : 48		0	
Loading-12	in		4	11 : 48	0		Criyastaya Insurance
	out			11 : 48		0	
Loading-13	in		4	11 : 48	0		Graphics and Allied
	out			11 : 48		0	
Loading-14	in		4	11 : 48	0		Aristocrat Insurance
	out			11 : 48		0	
Loading-15	in		8	11 : 51	3		Youth for Christ INT
	out			11 : 51		0	
Loading-16	in		8	11 : 51	0		H.P Teja
	out			11 : 52		1	
Loading-17	in		8	11 : 55	3		Kadija MRA (20)
	out			11 : 55		0	
Loading-18	in		8	11 : 55	0		Avenue Service station
	out			11 : 56		1	
Loading-19	in		8	11 : 57	1		Dashmi Ltd
	out			11 : 57		0	
Loading-20	in		8	11 : 59	2		Murundu Close Flats
	out			12 : 0		1	
Loading-21	in		8	12 : 0	0		Rodriquez Flavia
	out			12 : 2		2	
Loading-22	in		8	12 : 3	1		S Johanputra
	out			12 : 3		0	
Loading-23	in		8	12 : 3	0		T.H. Peshavaria
	out			12 : 3		0	
Loading-24	in		8	12 : 5	2		S.A Shah
	out			12 : 5		0	
Loading-25	in		8	12 : 6	1		J.D Patel
	out			12 : 6		0	

Time & Motion Study Organization: BINS Trip- 1 Date: 13th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-26	in		8	12 : 7	1		Amani Communications
	out			12 : 7		0	
Loading-27	in		8	12 : 8	1		Franco Investment Ltd
	out			12 : 8		0	
Loading-28	in		8	12 : 13	5		Hamed Hiadara
	out			12 : 13		0	
Loading-29	in		8	12 : 24	11		Rahim Galib
	out			12 : 24		0	
Loading-30	in		8	12 : 24	0		J.R Katta
	out			12 : 24		0	
Loading-31	in		8	12 : 25	1		Amin Manji
	out			12 : 28		3	
Loading-32	in		8	12 : 30	2		Dren Adamali
	out			12 : 31		1	
Loading-33	in		8	12 : 33	2		Embassy of Yugoslavia
	out			12 : 33		0	
Loading-34	in		8	12 : 35	2		T.R. Chauhan
	out			12 : 35		0	(41)
Loading-35	in		8	12 : 35	0		Nairobi Academy
	out			12 : 35		0	Kindergarten
Loading-36	in		8	12 : 42	7		Abdul Haq Mullick
	out			12 : 43		1	
Loading-37	in		8	12 : 45	2		Pine Wood Grove
	out			12 : 55		10	
Loading-38	in		8	12 : 57	2		Mahesh Bughani
	out			12 : 58		1	
Loading-39	in		8	13 : 0	2		Saitok Viyndall
	out			13 : 0		0	
Loading-40	in		8	13 : 0	0		Mark
	out			13 : 0		0	
Loading-41	in		8	13 : 0	0		Vinary K. Shah
	out			13 : 0		0	
Loading-42	in		8	13 : 0	0		Davel L.G
	out			13 : 0		0	
Loading-43	in		8	13 : 2	2		Ramesh Chand KHDI
	out			13 : 2		0	
Loading-44	in		8	13 : 3	1		Jitendra S
	out			13 : 3		0	DODHIA
Loading-45	in		8	13 : 5	2		Howard 8 Sonia
	out			13 : 7		2	
Loading-46	in		8	13 : 9	2		Baptist Area Office
	out			13 : 10		1	
Loading-47	in		8	13 : 16	6		Trezeux Guy
	out			13 : 17		1	
Loading-48	in		8	13 : 18	1		Azmina Kurji
	out			13 : 18		0	

Time & Motion Study Organization: BINS Trip- 1 Date: 13th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-49	in		8	13 : 25	7		H. Bokhari
	out			13 : 25		0	
Loading-50	in		8	13 : 25	0		V.K Adjavon
	out			13 : 25		0	
Loading-51	in		8	13 : 30	5		R.D Munrd
	out			13 : 30		0	
Loading-52	in		8	13 : 34	4		Sohanpar B
	out			13 : 35		1	
Loading-53	in		8	13 : 37	2		Patrick Lumumba
	out			13 : 38		1	
Loading-54	in		8	13 : 38	0		Cybercoll Ltd
	out			13 : 40		2	
Loading-55	in		8	13 : 44	4		T.S Bar
	out			13 : 44		0	
Loading-56	in		8	13 : 45	1		Madelene
	out			13 : 45		0	
Loading-57	in		8	13 : 45	0		Govani
	out			13 : 45		0	
Loading-58	in		8	13 : 45	0		Turgut Alp
	out			13 : 45		0	Coaldgiu?
Loading-59	in		8	13 : 47	2		(139)
	out			13 : 47		0	
Loading-60	in		8	13 : 48	1		Dhami
	out			13 : 48		0	
Loading-61	in		8	13 : 49	1		Ruth and Heinz
	out			13 : 49		0	
Loading-62	in		8	13 : 50	1		Rose and Teresa
	out			13 : 50		0	
Loading-63	in		8	13 : 50	0		Mr Pittaway
	out			13 : 50		0	
Loading-64	in		8	13 : 50	0		J.D Gothard
	out			13 : 50		0	
Loading-65	in		8	13 : 50	0		Mr B Scott
	out			13 : 50		0	
Loading-66	in		8	13 : 50	0		I.A. Davidson
	out			13 : 50		0	
Loading-67	in		8	13 : 51	1		Dr. R. Hansell
	out			13 : 51		0	
Loading-68	in		8	13 : 52	1		DUNLDP
	out			13 : 52		0	
Loading-69	in		8	13 : 55	3		LDNG JOHN
	out			13 : 55		0	
Loading-70	in		8	14 : 0	5		(58)
	out			14 : 0		0	
Loading-71	in		8	14 : 5	5		Hucht
	out			14 : 5		0	
Loading-72	in		8	14 : 13	8		Mr Halci
	out			14 : 13		0	

Time & Motion Study Organization: BINS Trip- 1 Date: 13th November 1997

Vehicle No. KAE386R Loading Capacity: 4TON Researcher's name: Ann J. Wangu

No. of Crew: 4 Estimated Volume: $3m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-73	in		8	14 : 15	2		Happy Valley
	out			14 : 15		0	
Loading-74	in		8	14 : 16	1		(219)
	out			14 : 16		0	
Loading-75	in		8	14 : 17	1		Twiga House
	out			14 : 17		0	
Loading-76	in		8	14 : 18	1		Ayton
	out			14 : 18		0	
Loading-77	in		8	14 : 22	4		(98)
	out			14 : 22		0	
Loading-78	in		8	14 : 25	3		(95)
	out			14 : 25		0	
Loading-79	in		8	14 : 26	1		(94)
	out			14 : 26		0	
Loading-80	in		8	14 : 26	0		(93)
	out			14 : 26		0	
Loading-81	in		8	14 : 27	1		Alonso Mariller
	out			14 : 27		0	
Loading-82	in		8	14 : 32	5		Nasoor Vertee
	out			14 : 35		3	
Loading-83	in		8	14 : 37	2		Ramesh R Vaya
	out			14 : 37		0	
Loading-84	in		8	14 : 38	1		Hill View Estate
	out			14 : 40		2	
Loading-85	in		8	14 : 43	3		Hill View Rise
	out			14 : 47		4	
Loading-86	in		6	15 : 0	13		Lake view
	out			15 : 0		0	
Loading-87	in		8	15 : 0	0		Dharna
	out			15 : 0		0	
Loading-88	in		8	15 : 1	1		Magadi close
	out			15 : 5		4	
Loading-89	in		8	15 : 8	3		Bogoria
	out			15 : 10		2	
Loading-90	in		8	15 : 10	0		Baringo Drive
	out			15 : 20		10	
Dumping site	in		20,000	16 : 45	85		Dandora
Start dumping				16 : 45	0		
Finish dumping				17 : 0		15	
Dumping site	out		20	17 : 15	15		
Reach to workshop	in		20,000	18 : 0	45		
Total			69,936		405	178	Total min.: 583 min.
Collection			29,666		255	163	
Transportation			40,250		135		
Inside the dumping site			20		15	15	Dumping time.: 30 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 14th November 1997

Vehicle No. KQY636 Loading Capacity: 7TON Researcher's name: Ann J. Wangu

No. of Crew: 6 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 5			
Loading-1	in		250	8 : 12	7		Petrol is put
	out			8 : 15		3	
Loading-2	in		500	8 : 33	18		Thomas Barnado
	out			8 : 36		3	
Loading-3	in		500	8 : 46	10		Serbastian
	out			8 : 57		11	
Loading-4	in		500	9 : 7	10		Carnivdre
	out			10 : 33		86	
Loading-5	in		3,500	10 : 40	7		Splash
	out			11 : 0		20	
Loading-6	in		3,500	11 : 10	10		Aunt Julies
	out			11 : 19		9	
Loading-7	in		3,500	11 : 23	4		Serena Lodge
	out			11 : 25		2	
Loading-8	in			11 : 35	10		International Homes
	out			11 : 50		15	
Dumping site	in		9,000	12 : 30	40		Dandora D/site
Start dumping				12 : 30	0		
Finish dumping				14 : 0		90	
Dumping site	out		20	14 : 0	0		
Reach to workshop	in		20,000	15 : 10	70		
Total			41,270		186	239	Total min.: 425 min.
Collection			12,000		69	149	
Transportation			29,250		117		
Inside the dumping site			20		0	90	Dumping time.: 90 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 15th November 1997

Vehicle No. KQY636 Loading Capacity: 7TON Researcher's name: Ann J. Wangu

No. of Crew: 6 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 51			
Loading-1	in		3,000	9 : 15	24		Vinodeep Towers
	out			9 : 15		0	
Loading-2	in		3,000	9 : 25	10		Panafric Insurance
	out			12 : 13		168	Hurlinghum
Loading-3	in		250	12 : 15	2		Corncord Motors
	out			12 : 40		25	
Dumping site	in		10,000	14 : 0	80		Dandora
Start dumping				14 : 0	0		
Finish dumping				15 : 30		90	
Dumping site	out		20	15 : 30	0		
Reach to workshop	in		20,000	16 : 0	30		
Total			36,270		146	283	Total min.: 429 min.
Collection			3,250		12	193	
Transportation			33,000		134		
Inside the dumping site			20		0	90	Dumping time.: 90 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 17th November 1997

Vehicle No. KQY636 Loading Capacity: 7TON Researcher's name: Ann J. Wangu

No. of Crew: 6 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 15			
Loading-1	in		5,000	8 : 35	20		CMS Baby shop
	out			9 : 12		37	
Loading-2	in		15	9 : 17	5		IBS Mechanical Engineers
	out			9 : 20		3	
Loading-3	in		7	9 : 22	2		Space Sellers
	out			9 : 25		3	
Loading-4	in		5	9 : 25	0		CMC VWU
	out			9 : 35		10	
Loading-5	in		5	9 : 35	0		Central Receiving Department
	out			10 : 33		58	
Loading-6	in		10	10 : 39	6		CMC Mazda
	out			11 : 10		31	
Loading-7	in		20	11 : 14	4		Land Rover
	out			12 : 32		78	
Dumping site	in		20,000	13 : 0	28		Dandora
Start dumping				13 : 5	5		
Finish dumping				14 : 30		85	
Dumping site	out		20	14 : 30	0		
Reach to workshop	in		20,000	15 : 30	60		
Total			45,082		130	305	Total min.: 435 min.
Collection			62		17	220	
Transportation			45,000		108		
Inside the dumping site			20		5	85	Dumping time.: 90 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 18th November 1997

Vehicle No. KQY636 Loading Capacity: 7TON Researcher's name: Ann J. Wangu

No. of Crew: 6 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 0			
Loading-1	in		30,000	8 : 40	40		Meteorological Department
	out			9 : 43		63	
Loading-2	in		200	10 : 0	17		Concord Motors
	out			10 : 2		2	
Loading-3	in		50	10 : 15	13		Sedul Garden
	out			10 : 15		0	
Loading-4	in		70	10 : 30	15		Wilson Airport
	out			12 : 55		145	Water Company
Loading-5	in		20	13 : 0	5		Minilink Investments
	out			13 : 15		15	
Loading-6	in		40	13 : 30	15		Sweet Center
	out			13 : 40		10	
Dumping site	in		40,000	14 : 0	20		Dandora D/site
Start dumping				14 : 5	5		
Finish dumping				15 : 0		55	
Dumping site	out		20	15 : 5	5		
Reach to workshop	in		20,000	15 : 50	45		
Total			90,400		180	290	Total min.: 470 min.
Collection			380		65	235	
Transportation			90,000		105		
Inside the dumping site			20		10	55	Dumping time.: 65 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 19th November 1997

Vehicle No. KQY636 Loading Capacity: 7TON Researcher's name: Ann J. Wangu

No. of Crew: 6 Estimated Volume: $6m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 39			
Loading-1	in		300	8 : 55	16		Carousel
	out			9 : 55		60	
Loading-2	in		500	10 : 5	10		High Rise
	out			13 : 7		182	
Dumping site	in		100	13 : 30	23		Dandora D/site
Start dumping				13 : 30	0		
Finish dumping				15 : 0		90	
Dumping site	out		20	15 : 5	5		
Reach to workshop	in		20,000	16 : 30	85		
Total			20,920		139	332	Total min.: 471 min.
Collection			500		10	242	
Transportation			20,400		124		
Inside the dumping site			20		5	90	Dumping time.: 95 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 15th November 1997

Vehicle No. KAE341U Loading Capacity: 2.69TON Researcher's name: Thomas Makunda

No. of Crew: 4 Estimated Volume: $8m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			9 : 49			Bins depot
Loading-1	in		15,000	10 : 10	21		High Rise Estate
	out			11 : 41		91	
							went straight to dumping site
Dumping site	in		17,000	12 : 30	49		Dandora D/site
Start dumping				12 : 34	4		
Finish dumping				12 : 53		19	Vehicle got stuck
Dumping site	out			14 : 49	116		(12:54 - 14:49)115mins
Reach to workshop	in		17,000	15 : 30	41		
Total			49,000		231	110	Total min.: 341 min.
Collection			0		0	91	
Transportation			49,000		111		
Inside the dumping site			0		5	19	Dumping time.: 24 min.
Idling time					115		

Time & Motion Study Organization: BINS Trip- 1 Date: 17th November 1997

Vehicle No. KZV006 Loading Capacity: 2.22TON Researcher's name: Thomas Makunda

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	606.4		14 : 55			Bins Depot
							Went direct to D/site
							Delays(Idling) due to repairs
							Slow speed due to braking
							problem
							Stop at Likoni Rd to fix wheel.
							Idling time 15:03-15:30 (27mir
							Delays ; when?
Dumping site	in	618	11,600	16 : 10	75		Dandora D/site
Start dumping				16 : 15	5		
Finish dumping				16 : 30		15	
Dumping site	out			:			
Reach to workshop	in			17 : 30	60		
Total			11,600		140	15	Total min.: 155 min.
Collection			0		0	0	
Transportation			11,600		108		
Inside the dumping site			0		5	15	Dumping time.: 20 min.
Idling time					27		

Time & Motion Study Organization: BINS Trip- 1 Date: 18th November 1997

Vehicle No. KZV006 Loading Capacity: 2.22TON Researcher's name: Thomas Makunda

No. of Crew: 5 Estimated Volume: 16m3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	635.4		8 : 55			Bins depot
Loading-1	in	636.2	800	9 : 8	13		IFRC (Red Cross) Off
	out			9 : 12		4	Enterprise Rd
Loading-2	in	636.6	400	9 : 18	6		Enterprise Rd
	out			9 : 21		3	
Loading-3	in	637.8	1,200	9 : 27	6		T Rd
	out			9 : 29		2	
Loading-4	in	637.9	100	9 : 30	1		T Rd
	out			9 : 31		1	
Loading-5	in	638	100	9 : 32	1		T Rd
	out			9 : 34		2	
Loading-6	in	638.1	100	9 : 37	3		T Rd
	out			9 : 38		1	
Loading-7	in	639.4	1,300	9 : 48	10		Enterprise Rd (Meds)
	out			9 : 50		2	
Loading-8	in	640.3	900	9 : 57	7		Rd A Delays due to companies not
	out			10 : 3		6	delivering their garbage for collection
Loading-9	in	644.1	3,800	10 : 26	23		Enterprise Rd
	out			10 : 31		5	
Loading-10	in	644.9	800	10 : 36	5		Dar-es-salaam Rd
	out			10 : 39		3	
Loading-11	in	645.4	500	10 : 44	5		Dar-es-salaam Rd
	out			10 : 54		10	
Loading-12	in	646.1	700	11 : 0	6		Moter Hospital
	out			11 : 24		24	
Loading-13	in	646.8	700	11 : 37	13		Dunga Rd
	out			11 : 39		2	
Loading-14	in	647.4	600	11 : 42	3		Manchester/Interlink Solar
	out			12 : 1		19	Off Dunga Rd
Loading-15	in	647.5	100	12 : 5	4		E.A. Fire Appliances off
	out			12 : 24		19	Dunga Rd
Loading-16	in	649	1,500	12 : 38	14		Hombe Rd
	out			12 : 52		14	
Dumping site	in	664	15,000	14 : 15	83		Dumping site Dandora
Start dumping				14 : 20	5		Delays due to lunch hour
Finish dumping				14 : 45		25	
Dumping site	out			14 : 52	7		Low speed due to mechanical
Reach to workshop	in	681.3	17,300	17 : 45	173		problems and heavy rain
Total			45,900		388	142	Total min.: 530 min.
Collection			12,800		107	117	
Transportation			33,100		269		
Inside the dumping site			0		12	25	Dumping time.: 37 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 19th November 1997

Vehicle No. KZV006 Loading Capacity: 2.22TON Researcher's name: Thomas Makunda

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	681.3		8 : 45			Developed mechanical problems
Loading-1	in			:			when leaving workshop and had
	out			:		0	to wait for spare parts to be
Loading-2	in		0	:	0		purchased
	out			:		0	
Loading-3	in		0	:	0		
	out			:		0	
Loading-4	in		0	:	0		
	out			:		0	
Loading-5	in		0	:	0		
	out			:		0	
Loading-6	in		0	:	0		
	out			:		0	
Loading-7	in		0	:	0		
	out			:		0	
Loading-8	in		0	:	0		
	out			:		0	
Loading-9	in		0	:	0		
	out			:		0	
Loading-10	in		0	:	0		
	out			:		0	
Loading-11	in		0	:	0		
	out			:		0	
Loading-12	in		0	:	0		
	out			:		0	
Loading-13	in		0		0		
	out					0	
Loading-14	in		0		0		
	out					0	
Loading-15	in		0		0		
	out					0	
Dumping site	in		0	:	0		
Start dumping			0	:	0		
Finish dumping			0	:		0	
Dumping site	out		0	:	0		
Reach to workshop	in		0	:	0		
Total			0		0	0	Total min.: min.
Collection			0		0	0	
Transportation			0		0		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 20th November 1997

Vehicle No. KZV006 Loading Capacity: 2.22TON Researcher's name: Thomas Makunda

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	728.7		8 : 34			Bins depot Industrial Area
Loading-1	in	742.6	13,900	10 : 20	106		Enterprise Rd
	out			10 : 28		8	
Loading-2	in	744.3	1,700	10 : 36	8		Kitui Rd
	out			10 : 42		6	
Loading-3	in	747.6	3,300	10 : 53	11		Lusaka Rd
	out			10 : 58		5	
Loading-4	in	748.4	800	11 : 9	11		Beth Health Care
	out			12 : 3		54	Dunga Rd
							Direct to Dandora dump site
							Delays between w/shop and
							Loading pt.1 due to 2 puncture
							and repairs
Dumping site	in	760.5	12,100	12 : 45	42		Return to other collections which
Start dumping				12 : 48	3		remain in the w/shop
Finish dumping				13 : 5		17	Return to w/shop for repairs
Dumping site	out			13 : 10	5		
Reach to workshop	in	793.6	33,100	17 : 30	260		
Total			64,900		446	90	Total min.: 536 min.
Collection			5,800		30	73	
Transportation			59,100		408		
Inside the dumping site			0		8	17	Dumping time.: 25 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 21st November 1997

Vehicle No. KZV006 Loading Capacity: 2.22TON Researcher's name: Thomas Makunda

No. of Crew: 4 Estimated Volume: 16m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	152794		8 : 17			Bins depot to petrol station
Loading-1	in	152798.1	4,100	10 : 1	104		for repairs
	out			10 : 8		7	Kitini Rd
Loading-2	in	152804.9	6,800	10 : 28	20		British H Commision
	out			10 : 38		10	Lower Hill Rd
Loading-3	in	152806.5	1,600	10 : 49	11		Fairview Hotel and Environs
	out			11 : 14		25	on Bishops Rd
Loading-4	in	152809.4	2,900	11 : 28	14		French School Off Ring Rd
	out			11 : 47		19	Kilimani
Loading-5	in	152817.7	8,300	12 : 14	27		UNHCR Office
	out			12 : 39		25	Chiromo Rd
Loading-6	in	152818.8	1,100	12 : 43	4		Jerry Sonelle Min - Intt
	out			12 : 50		7	Raphta Rd
Loading-7	in	152821.5	2,700	12 : 54	4		ABC Place
	out			13 : 10		16	Waiyaki Way
Loading-8	in	152821.6	100	13 : 11	1		ABC Place
	out			13 : 17		6	Waiyaki Way
							Went straight to dump site
							because of puncture on rear
							wheel
							Delays due to puncture traffic
							jam lunch Pot holed roads
							(Juja Rd) and repairs
Dumping site	in	152838	16,400	14 : 30	73		Dandora D/site
Start dumping				14 : 32	2		Returned to other collection
Finish dumping				14 : 49		17	points and then to W/shop
Dumping site	out			14 : 53	4		
Reach to workshop	in	152868.5	30,500	17 : 45	172		
Total			74,500		436	132	Total min.: 568 min.
Collection			23,500		81	115	
Transportation			51,000		349		
Inside the dumping site			0		6	17	Dumping time.: 23 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 22nd November 1997

Vehicle No. KAE953R Loading Capacity: 3.06TON Researcher's name: Thomas Makunda

No. of Crew: 4 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	76184.2		8 : 39			Bins depot
Loading-1	in	76190.5	6,300	9 : 29	50		KCB Staff Quaters
	out			9 : 43		14	Shauri Moyo
Loading-2	in	76196	5,500	10 : 2	19		Professional Center
	out			10 : 14		12	Parliament Rd
Loading-3	in	76196.4	400	10 : 25	11		Continental Hse
	out			10 : 45		20	Parliament Rd
Loading-4	in	76198.7	2,300	11 : 0	15		High court
	out			13 : 14		134	Harambee Avenue
							Direct to D/site via Thika Rd
							Delays due to traffic jam and
							fuelling
Dumping site	in	76213.5	14,800	14 : 30	76		Deandora D/site
Start dumping				14 : 35	5		
Finish dumping				15 : 0		25	
Dumping site	out			15 : 3	3		
Reach to workshop	in	76230.8	17,300	15 : 30	27		
Total			46,600		206	205	Total min.: 411 min.
Collection			8,200		45	180	
Transportation			38,400		153		
Inside the dumping site			0		8	25	Dumping time.: 33 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 15th November 1997

Vehicle No. KAE761R Loading Capacity: 2690kg Researcher's name: Nancy Mwachai

No. of Crew: 6 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	29716		8 : 40			Chiromo Rd
Loading-1	in	29726	10,000	9 : 24	44		(Riverside Park)
	out			14 : 20		296	
Loading-2	in	29729	3,000	14 : 30	10		Westlands Arcade
	out			14 : 45		15	Chiromo Rd
Dumping site	in	29745	16,000	17 : 7	142		
Start dumping				17 : 10	3		Dandora then back to
Finish dumping				18 : 15		65	workshop
Dumping site	out			18 : 17	2		
Reach to workshop	in	29760	15,000	19 : 15	58		
Total			44,000		259	376	Total min.: 635 min.
Collection			3,000		10	311	
Transportation			41,000		244		
Inside the dumping site			0		5	65	Dumping time.: 70 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 17th November 1997

Vehicle No. KAE761R Loading Capacity: 2690kg Researcher's name: Nancy Mwachai

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	29760		8 : 10			Chiromo Rd
Loading-1	in	29771	11,000	8 : 45	35		(Westlands Arcade)
	out			10 : 25		100	
Loading-2	in	29782	11,000	10 : 50	25		New Runda Rd
	out			10 : 52		2	Off Ruaraka Rd
Loading-3	in	29783	1,000	10 : 55	3		
	out			10 : 56		1	
Loading-4	in	29783.05	50	10 : 58	2		
	out			10 : 59		1	
Loading-5	in	29787	3,950	11 : 13	14		Coffee Garden Rd
	out			11 : 15		2	Muthaiga Rd
Loading-6	in	29789	2,000	11 : 20	5		Ridgeway Spring
	out			11 : 21		1	
Loading-7	in	29789.05	50	11 : 24	3		Ridgeway Spring
	out			11 : 25		1	
Loading-8	in	29789.11	60	11 : 26	1		Ridgeway Spring
	out			11 : 27		1	
Loading-9	in	29789.19	80	11 : 28	1		Ridgeway Spring
	out			11 : 29		1	
Loading-10	in	29789.28	90	11 : 30	1		
	out			11 : 31		1	
Loading-11	in	29790	720	11 : 32	1		Breakfast for 5mins
	out			11 : 34		2	
Loading-12	in	29790.05	50	11 : 47	13		
	out			11 : 48		1	
Loading-13	in	29791	950	11 : 49	1		New Runda Drive
	out			11 : 50		1	
Loading-14	in	29791.05	50	11 : 52	2		New Runda Drive
	out			11 : 53		1	
Loading-15	in	29792	950	11 : 54	1		
	out			11 : 55		1	
Loading-16	in	29793	1,000	11 : 56	1		
	out			11 : 57		1	
Loading-17	in	29795	2,000	11 : 58	1		Ridgeways off
	out			11 : 59		1	Ruaraka Rd
Loading-18	in	29795.05	50	12 : 0	1		
	out			12 : 2		2	
Loading-19	in	29796	950	12 : 2	0		
	out			12 : 6		4	
Loading-20	in	29798	2,000	12 : 15	9		Kiambu Rd
	out			12 : 17		2	
Loading-21	in	29802	4,000	12 : 36	19		
	out			12 : 38		2	
Loading-22	in	29807	5,000	12 : 54	16		Kiambu Rd
	out			12 : 55		1	
Loading-23	in	29808	1,000	12 : 56	1		Ridgeway
	out			12 : 58		2	
Loading-24	in	29808.05	50	13 : 0	2		Ridgeway Drive
	out			13 : 7		7	
Loading-25	in	29809	950	13 : 10	3		
	out			13 : 15		5	

Time & Motion Study Organization: BINS Trip- 1 Date: 17th November 1997

Vehicle No. KAE761R Loading Capacity: 2690kg Researcher's name: Nancy Mwachai

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-26	in	29810	1,000	13 : 16	1		Kiqwa lane
	out			13 : 18		2	
Loading-27	in	29811	1,000	13 : 20	2		Garden Estate Rd
	out			13 : 22		2	
Loading-28	in	29812	1,000	13 : 25	3		
	out			13 : 27		2	Garden Estate Rd
Loading-29	in	29813	1,000	13 : 30	3		
	out			13 : 32		2	
Loading-30	in	29814	1,000	13 : 34	2		
	out			13 : 35		1	
Loading-31	in	29815	1,000	13 : 56	21		Garden Estate Rd
	out			13 : 58		2	
Loading-32	in	29817	2,000	14 : 10	12		
	out			14 : 15		5	Ridgeway Spring
Loading-33	in	29817.05	50	14 : 16	1		
	out			14 : 17		1	Ridgeway Spring
Loading-34	in	29817.13	80	14 : 18	1		
	out			14 : 19		1	Ridgeway Spring
Loading-35	in	29818	870	14 : 20	1		
	out			14 : 21		1	
Loading-36	in	29819	1,000	14 : 22	1		
	out			14 : 23		1	
Loading-37	in	29820	1,000	14 : 29	6		Thika Rd
	out			14 : 31		2	(Abulga tra co?)
Loading-38	in	29825	5,000	14 : 40	9		Githurai
	out			14 : 44		4	
Loading-39	in	29831	6,000	14 : 56	12		Kasarani Rd
	out			14 : 58		2	(opp oasis)
Loading-40	in	29834	3,000	15 : 5	7		
	out			15 : 20		15	Kasqrani Rd
Dumping site	in	29844	10,000	17 : 3	103		
Start dumping				17 : 5	2		
Finish dumping				18 : 15		70	
Dumping site	out	29845	1,000	19 : 0	45		Dandora dumping
Reach to workshop	in	29859	14,000	19 : 45	45		
Total			99,000		438	257	Total min.: 695 min.
Collection			63,000		208	187	
Transportation			35,000		178		
Inside the dumping site			1,000		47	70	Dumping time.: 117 min.
Idling time					5		

Time & Motion Study Organization: BINS Trip- 1 Date: 18th November 1997

Vehicle No. KAE761R Loading Capacity: 2690kg Researcher's name: Nancy Mwachai

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	29859		8 : 25			
Loading-1	in	29866	7,000	8 : 55	30		Witu Rd (Industrial Area)
	out			10 : 20		85	
Loading-2	in	29867	1,000	10 : 35	15		
	out			11 : 34		59	Uhuru highway
Loading-3	in	29868	1,000	11 : 40	6		
	out			12 : 11		31	Baricho Rd
Loading-4	in	29869	1,000	12 : 22	11		
	out			12 : 48		26	Lusaka Rd
Loading-5	in	29870	1,000	13 : 20	32		
	out			13 : 49		29	Chogoria Rd
Loading-6	in	29871	1,000	13 : 55	6		
	out			14 : 0		5	Butere Rd
Loading-7	in	29872	1,000	14 : 44	44		Break due to heavy rain for 5n
	out			14 : 45		1	
Loading-8	in	29873	1,000	14 : 50	5		
	out			14 : 53		3	Factory Rd
							Lunch break for 45mins becau
							it continued raining.
Dumping site	in						
Start dumping							Truck went direct to workshop
Finish dumping							so there was no dumping.
Dumping site	out						
Reach to workshop	in	29884	11,000	16 : 50	117		
Total			25,000		266	239	Total min.: 505 min.
Collection			7,000		114	239	
Transportation			18,000		102		
Inside the dumping site			0		0	0	Dumping time.: min.
Idling time					50		

Time & Motion Study Organization: BINS Trip- 1 Date: 19th November 1997

Vehicle No. KAE761R Loading Capacity: 2690kg Researcher's name: Nancy Mwachai

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	29884		8 : 30			Muthaiga Rd
Loading-1	in	29892	8,000	9 : 10	40		ie) Truck didn't go direct to
	out			9 : 45		35	dumping but continued with
Loading-2	in	29894	2,000	9 : 55	10		collections)
	out			10 : 6		11	Limuru Rd, Mutahiga, Liara?
Loading-3	in	29899	5,000	10 : 20	14		off Muthaiga Rd, collection
	out			10 : 22		2	was not done
Loading-4	in	29903	4,000	10 : 37	15		Thika Rd,
	out			10 : 40		3	
Loading-5	in	29904	1,000	10 : 45	5		Tanzania, sudan & Ethiopia
	out			10 : 48		3	Rds off Thika Rd
Loading-6	in	29912	8,000	11 : 15	27		Lunch break for 45mins
	out			12 : 20		65	
Loading-7	in	29913	1,000	12 : 27	7		Thika Rd
	out			13 : 30		63	no collection was done
Loading-8	in	29913	0	13 : 35	5		
	out			13 : 55		20	
Loading-9	in	29914	1,000	14 : 15	20		
	out			14 : 56		41	
Loading-10	in	29916	2,000	15 : 5	9		
	out			15 : 7		2	
Dumping site	in	29930	14,000	16 : 55	108		
Start dumping				17 : 0	5		Dandora dumping
Finish dumping				17 : 30		30	
Dumping site	out			17 : 32	2		
Reach to workshop	in	29947	17,000	18 : 55	83		
Total			63,000		350	275	Total min.: 625 min.
Collection			24,000		112	200	
Transportation			39,000		231		
Inside the dumping site			0		7	30	Dumping time.: 37 min.
Idling time						45	

Time & Motion Study Organization: BINS Trip- 1 Date: 20th November 1997

Vehicle No. KAE761R Loading Capacity: 2690kg Researcher's name: Nancy Mwachai

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	29947		9 : 0			
Loading-1	in	29954	7,000	9 : 35	35		Lukose Drive
	out			9 : 37		2	
Loading-2	in	29955	1,000	9 : 47	10		
	out			9 : 50		3	Rough Rd off
Loading-3	in	29957	2,000	10 : 0	10		Mombasa Rd
	out			10 : 10		10	
Loading-4	in	29957.05	50	10 : 15	5		Mombasa Rd
	out			10 : 17		2	
Loading-5	in	29959	1,950	10 : 25	8		Off Mombasa Rd
	out			10 : 30		5	
Loading-6	in	29963	4,000	10 : 40	10		Collection not done
	out			11 : 10		30	Mombasa Rd
Loading-7	in	29965	2,000	11 : 25	15		
	out			11 : 30		5	
Loading-8	in	29967	2,000	11 : 46	16		Argwings Kodhek
	out			12 : 5		19	Wood Avenue
Loading-9	in	29978	11,000	12 : 50	45		
	out			12 : 55		5	James Githuru Rd
Loading-10	in	29979	1,000	12 : 59	4		
	out			13 : 2		3	
Loading-11	in	29979.05	50	13 : 6	4		
	out			13 : 8		2	Elmolo Rd
Loading-12	in	29980	950	13 : 15	7		
	out			13 : 19		4	
Loading-13	in	29980.05	50	13 : 20	1		
	out			13 : 25		5	
Loading-14	in	29982	1,950	13 : 30	5		Muhoyo close
	out			13 : 34		4	Lunch break for 15mins
Loading-15	in	29983	1,000	14 : 5	31		
	out			14 : 10		5	Apple close
Loading-16	in	29984	1,000	14 : 15	5		
	out			14 : 20		5	Apple close
Loading-17	in	29984.05	50	14 : 22	2		James Githuru Rd
	out			14 : 25		3	
Loading-18	in	29984.13	80	14 : 30	5		Isaac Gathanju close
	out			14 : 32		2	
Loading-19	in	29985	870	14 : 35	3		Owashika Rd
	out			14 : 40		5	
Loading-20	in	29986	1,000	14 : 42	2		Isaac Gathanju
	out			14 : 52		10	
Loading-21	in	29987	1,000	14 : 56	4		Chalbi Drive
	out			14 : 59		3	
Loading-22	in	29988	1,000	15 : 10	11		Jumbi Lane
	out			15 : 12		2	
Loading-23	in	29988.05	50	15 : 15	3		Loiyangalani Drive
	out			15 : 25		10	
Loading-24	in	29989	950	15 : 30	5		Convent drive
	out			15 : 35		5	
Loading-25	in	29990	1,000	15 : 40	5		
	out			15 : 45		5	

Time & Motion Study Organization: BINS Trip- 1 Date: 20th November 1997

Vehicle No. KAE761R Loading Capacity: 2690kg Researcher's name: Nancy Mwachai

No. of Crew: 5 Estimated Volume: $16m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-26	in	29991	1,000	15 : 50	5		
	out			15 : 55		5	
Loading-27	in	29992	1,000	16 : 0	5		
	out			16 : 5		5	
Loading-28	in	29994	2,000	16 : 15	10		
	out			16 : 20		5	
Loading-29	in	29997	3,000	16 : 45	25		
	out			16 : 50		5	
Loading-30	in	29999	2,000	17 : 9	19		
	out			17 : 15		6	
Dumping site	in	30019	20,000	18 : 7	52		
Start dumping				18 : 10	3		
Finish dumping				18 : 45		35	Dandora dumping
Dumping site	out			18 : 47	2		
Reach to workshop	in	30036	17,000	19 : 15	28		
Total			89,000		400	215	Total min.: 615 min.
Collection			45,000		280	180	
Transportation			44,000		100		
Inside the dumping site			0		5	35	Dumping time.: 40 min.
Idling time					15		

Time & Motion Study Organization: BINS Trip- 1 Date: 21st November 1997

Vehicle No. KWP600 Loading Capacity: 6700kg Researcher's name: Nancy Mwachai

No. of Crew: 6 Estimated Volume: $24m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	366056		8 : 41			Mombasa Rd
Loading-1	in	366065	9,000	9 : 0	19		Langata Rd
	out			9 : 10		10	
Loading-2	in	366066	1,000	9 : 13	3		Langata Rd
	out			9 : 14		1	no collection was done
Loading-3	in	366069	3,000	9 : 20	6		
	out			11 : 19		119	Off Langata Rd
Loading-4	in	366071	2,000	11 : 22	3		
	out			11 : 30		8	Langata Rd
Loading-5	in	366074	3,000	11 : 35	5		Langata Rd
	out			12 : 0		25	
Loading-6	in	366080	6,000	12 : 17	17		Birongo square
	out			12 : 21		4	
Loading-7	in	366082	2,000	12 : 31	10		Baricho Rd
	out			12 : 35		4	Industrial Area
Loading-8	in	366094	12,000	13 : 15	40		Lunch break for 45mins
	out			13 : 36		21	Pate Rd
Loading-9	in	366103	9,000	14 : 10	34		Muranga Rd
	out			14 : 15		5	Collection was not done
Dumping site	in	366116	13,000	15 : 25	70		Dandora dumping site
Start dumping				15 : 30	5		Dandora
Finish dumping				16 : 13		43	
Dumping site	out			16 : 15	2		
Reach to workshop	in	366137	21,000	17 : 50	95		
Total			81,000		309	240	Total min.: 549 min.
Collection			38,000		118	152	
Transportation			43,000		184		
Inside the dumping site			0		7	43	Dumping time.: 50 min.
Idling time						45	

Time & Motion Study Organization: BINS Trip- 1 Date: 22nd November 1997

Vehicle No. KWP600 Loading Capacity: 6700kg Researcher's name: Nancy Mwachai

No. of Crew: 6 Estimated Volume: $24m^3$

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	366137		9 : 0			Nanyuki Rd
Loading-1	in	366139	2,000	9 : 19	19		
	out			10 : 5		46	
Loading-2	in	366148	9,000	10 : 57	52		Funzi Rd
	out			11 : 0		3	Collection not done
Loading-3	in	366150	2,000	11 : 7	7		Dar-es-salaam Rd
	out			11 : 15		8	
Loading-4	in	366151	1,000	11 : 25	10		No collection done
	out			12 : 10		45	
Loading-5	in	366152	1,000	12 : 15	5		Bandari Rd
	out			12 : 58		43	reapairing of puncture 45min
Loading-6	in	366157	5,000	13 : 10	12		
	out			14 : 5		55	Commercial St
Loading-7	in	366161	4,000	14 : 35	30		Witu Rd
	out			15 : 30		55	Mwanzi Rd
							Ring Rd, Westlands to
							Parklands Rd
Dumping site	in	366178	17,000	16 : 30	60		
Start dumping				16 : 32	2		Dumping at Dandora through
Finish dumping				17 : 20		48	Outering Rd to Dandora Rd
Dumping site	out			17 : 22	2		
Reach to workshop	in	366195	17,000	18 : 19	57		
Total			58,000		256	303	Total min.: 559 min.
Collection			22,000		116	255	
Transportation			36,000		136		
Inside the dumping site			0		4	48	Dumping time.: 52 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 14th November 1997

Vehicle No. KST976 Loading Capacity: 2TON Researcher's name: Eliud M. Kariuki

No. of Crew: 3 Estimated Volume: 2.25m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	109979		8 : 5			Route to loading points
Loading-1	in	109990	11,100	8 : 37	32		Enterprise Rd, Mombasa Rd,
	out			9 : 25		48	Uhuru highway, University way,
Loading-2	in	109991	1,000	9 : 30	5		- Loadings are in city centre
	out			9 : 33		3	major streets being
Loading-3	in	109993	2,000	9 : 37	4		-Biashara, Kijabe, Loita,
	out			9 : 57		20	Standard & Miundi Mbingu
Loading-4	in	109994	1,000	10 : 1	4		
	out			10 : 6		5	Route to Dandora dumping site
Loading-5	in	109995	1,000	10 : 8	2		Muranga Rd, stopped at
	out			10 : 30		22	Muthaiga roundabout from
Loading-6	in	109995.3	300	10 : 35	5		12:45-15:07 changing tyre, then
	out			11 : 1		26	Thika Rd, Stopped again at
Loading-7	in	109996	700	11 : 7	6		Survey with the same problem
	out			11 : 14		7	from 15:10-16:40 then Outering
Loading-8	in	109996.6	600	11 : 15	1		Rd, Komorock Rd, dumping site.
	out			12 : 18		63	
							Route to the workshop - Komo-
							rock Rd, Outering Rd, Mombasa
							Rd, Enterprise Rd, Bin workshop
Dumping site	in	110010.8	14,200	17 : 13	295		
Start dumping				17 : 15	2		
Finish dumping				17 : 29		14	
Dumping site	out	110011	200	17 : 30	1		Dandora
Reach to workshop	in	110027	16,000	18 : 33	63		
Total			48,100		420	208	Total min.: 628 min.
Collection			6,600		27	194	
Transportation			41,300		158		
Inside the dumping site			200		3	14	Dumping time.: 17 min.
Idling time					232		

Time & Motion Study Organization: BINS Trip- 1 Date: 15th November 1997

Vehicle No. KST976 Loading Capacity: 2TON Researcher's name: Eliud M. Kariuki

No. of Crew: 3 Estimated Volume: 2.25m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	110027		8 : 49			Stopped at 8:55 untill 9:14 for
Loading-1	in	110038	11,000	9 : 37	48		fueling and oiling.
	out			9 : 45		8	(Idling 19mins)
Loading-2	in	110040	2,000	9 : 51	6		
	out			10 : 10		19	Route to dumping site;
Loading-3	in	110040.7	700	10 : 13	3		Loadings - Enterprise Rd,
	out			10 : 18		5	Mombasa , Haile selassie,
Loading-4	in	110041	300	10 : 20	2		Major loading streets,
	out			10 : 35		15	- Ronald Ngala, Loita River Rd
Loading-5	in	110041.1	100	10 : 37	2		and Cross Rd
	out			10 : 41		4	
Loading-6	in	110042.5	1,400	10 : 50	9		Route to dumping site
	out			11 : 24		34	- Muranga Rd, Thika Rd,
Loading-7	in	110042.6	100	11 : 25	1		Outering Rd, Komorock Rd,
	out			11 : 28		3	a puncture from12:56-14:30 then
Loading-8	in	110042.8	200	11 : 31	3		dumping site
	out			11 : 36		5	
Loading-9	in	110044.3	1,500	11 : 41	5		Route to workshop
	out			12 : 6		25	Komorock Rd, Outering Rd,
Loading-10	in	110045	700	12 : 8	2		Mombasa , Enterprise Rd,
	out			12 : 21		13	Bins/w/shop
Dumping site	in	110058	13,000	14 : 30	129		
Start dumping				14 : 41	11		
Finish dumping				14 : 45		4	
Dumping site	out	110059	1,000	14 : 55	10		Dandora
Reach to workshop	in	110075	16,000	15 : 15	20		
Total			48,000		251	135	Total min.: 386 min.
Collection			7,000		33	131	
Transportation			40,000		84		
Inside the dumping site			1,000		21	4	Dumping time.: 25 min.
Idling time					113		

Time & Motion Study Organization: BINS Trip- 1 Date: 17th November 1997

Vehicle No. KST976 Loading Capacity: 2TON Researcher's name: Eliud M. Kariuki

No. of Crew: 3 Estimated Volume: 2.25m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	110075		8 : 13			? collections
Loading-1	in	110086	11,000	8 : 43	30		University way, Muindi Mbingu
	out			9 : 24		41	Market street, Loita, Kenyatta
Loading-2	in	110087	1,000	9 : 26	2		Avenue
	out			9 : 30		4	
Loading-3	in	110088	1,000	9 : 34	4		
	out			9 : 36		2	
Loading-4	in	110088.8	800	9 : 37	1		
	out			10 : 22		45	
Loading-5	in	110089	200	10 : 24	2		
	out			10 : 29		5	Loaidng in City Center
Loading-6	in	110089.6	600	10 : 33	4		
	out			10 : 42		9	
Loading-7	in	110089.9	300	10 : 48	6		
	out			10 : 55		7	Route to dumping site
Loading-8	in	110090.1	200	10 : 56	1		Muranga Rd, Thika Rd,
	out			11 : 0		4	Komorock Rd, Dandora
Loading-9	in	110090.9	800	11 : 6	6		dumping site
	out			11 : 15		9	
Loading-10	in	110092	1,100	11 : 25	10		
	out			11 : 29		4	
Loading-11	in	110093.2	1,200	11 : 42	13		
	out			11 : 46		4	
Loading-12	in	110093.4	200	11 : 49	3		
	out			11 : 52		3	
Dumping site	in	110107	13,600	12 : 33	41		Dandora
Start dumping				12 : 35	2		
Finish dumping				12 : 45		10	
Dumping site	out	110108.4	1,400	12 : 48	3		
Reach to workshop	in			:			To the 2nd trip
Total			33,400		128	147	Total min.: 275 min.
Collection			7,400		52	137	
Transportation			24,600		71		
Inside the dumping site			1,400		5	10	Dumping time.: 15 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 2 Date: 17th November 1997

Vehicle No. KST976 Loading Capacity: 2TON Researcher's name: Eliud M. Kariuki

No. of Crew: 3 Estimated Volume: 2.25m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	110108.4		12 : 48			From dumping site heading
Loading-1	in	110123	14,600	13 : 45	57		to town
	out			13 : 52		7	Route from dumping site
Loading-2	in	110124.4	1,400	13 : 58	6		Komorock, Outering, Thika Rd,
	out			14 : 7		9	Muranga Rd, Town Center
Loading-3	in	110126	1,600	14 : 12	5		This trip's loading points are in
	out			14 : 20		8	City center
Loading-4	in	110126.5	500	14 : 22	2		
	out			14 : 28		6	
Loading-5	in	110128	1,500	14 : 30	2		
	out			14 : 36		6	
Loading-6	in	110128.1	100	14 : 37	1		
	out			15 : 13		36	
Loading-7	in	110128.5	400	15 : 19	6		
	out			15 : 24		5	
Loading-8	in	110129.1	600	15 : 27	3		
	out			16 : 0		33	
Dumping site	in	110141.2	12,100	16 : 48	48		Dandora dumping site
Start dumping				16 : 50	2		Route to w/shop
Finish dumping				17 : 0		10	Komorock Rd, Outering Rd,
Dumping site	out	110143.2	2,000	17 : 0	0		Mombasa Rd, Enterprise Rd,
Reach to workshop	in	110159	15,800	17 : 30	30		w/shop
Total			50,600		162	120	Total min.: 282 min.
Collection			6,100		25	110	
Transportation			42,500		135		
Inside the dumping site			2,000		2	10	Dumping time.: 12 min.
Idling time							

Time & Motion Study Organization: BINS Trip- 1 Date: 18th November 1997

Vehicle No. KST976 Loading Capacity: 2TON Researcher's name: Eliud M. Kariuki

No. of Crew: 3 Estimated Volume: 2.25m^3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	110159		12 : 6			The truck started late due to
Loading-1	in	110170	11,000	12 : 44	38		some Mechanical problems.
	out			13 : 0		16	
Loading-2	in	110172	2,000	13 : 3	3		
	out			13 : 40		37	- Route to the loading points.
Loading-3	in	110174.2	2,200	13 : 48	8		- Enterprise Rd, Mombasa Rd,
	out			14 : 0		12	Uhuru highway, Haile selassie
Loading-4	in	110174.8	600	14 : 4	4		
	out			14 : 36		32	Collection done in City Center
Loading-5	in	110175.1	300	14 : 41	5		
	out			15 : 8		27	Route to dumping site was
Loading-6	in	110176	900	15 : 15	7		- Muranga Rd, Thika Rd,
	out			16 : 0		45	Outering Rd, Komorock Rd
Loading-7	in	110177	1,000	16 : 11	11		
	out			:			
Loading-8	in	110177.5	500	16 : 13	2		
	out			16 : 20		7	
Loading-9	in	110178	500	16 : 22	2		
	out			:			
Dumping site	in	110192	14,000	17 : 0	38		Dandora dumping site
Start dumping		110193	1,000	17 : 3	3		Route to w/shop - Komorock R
Finish dumping				17 : 16		13	Outering Rd, Mombasa Rd,
Dumping site	out	110195	2,000	17 : 20	4		Enterprise Rd - w/shop
Reach to workshop	in	110211	16,000	17 : 50	30		
Total			52,000		155	189	Total min.: 344 min.
Collection			8,000		42	176	
Transportation			41,000		106		
Inside the dumping site			3,000		7	13	Dumping time.: 20 min.
Idling time							