PART IV

ECONOMIC FEASIBILITY STUDY

Part IV Economic Feasibility Study

Chapter1 Existing Traffic Flow Patterns

1.1 Introduction

This chapter aims to analyze traffic flow patterns on the Study Road based on various information in order to conduct the appropriate traffic demand forecast.

This information is sourced by a) historical traffic data of ANE, b) statistical data for traffic in Niassa Province, c) traffic survey results conducted in this Study (e.g. traffic volume and origin-destination (OD) survey) and d) interview survey results to traffic related stakeholders and users.

From results of above information, current and potential traffic volume of passengers and freight traffic on Cuamba ~ Mandimba ~ Lichinga, and possible future traffic demands (generated traffic) are discussed in this chapter.

1.2 Previous Traffic Data Counted by ANE

1.2.1 Existing Traffic Data

For the purpose of the planning of road development, traffic management and road maintenance, the traffic counting survey has been conducted throughout Mozambique according to the "DNEP Traffic Counting System" established in 1996. The contracted consultant under the management of ANE provincial office operates the counting survey according to the schedule and locations prepared by ANE headquarters.

There are 74 road links including the national and provincial road and 25 counting posts in Niassa Province. 10 roads and four counting posts are located on the Project Road, R13, from Lichinga to Cuamba. The counting survey has been carried out every month based on the schedule, but the counting on seven consecutive days for 16 hours from 5a.m. to 10p.m. is conducted only at one point selected. On the other points, it is counted on one day per every three months on average. The method of counting is that the surveyor on the road edge counts the traffic number for two directions together per each categorized vehicle type manually, except motorbikes. After the survey, the original counting sheets are sent to ANE headquarters to input into the database.

During the site survey by the Study Team, the monthly traffic count data in Niassa for 2004 and average annual daily traffic (AADT) on Nacala Corridor, Montepuezu Corridor, Beira Corridor and Quilimane Corridor for 2002 to 2007 were provided from ANE.

The road link map in Niassa Province and the list of road links on the Project Road are shown as follows.

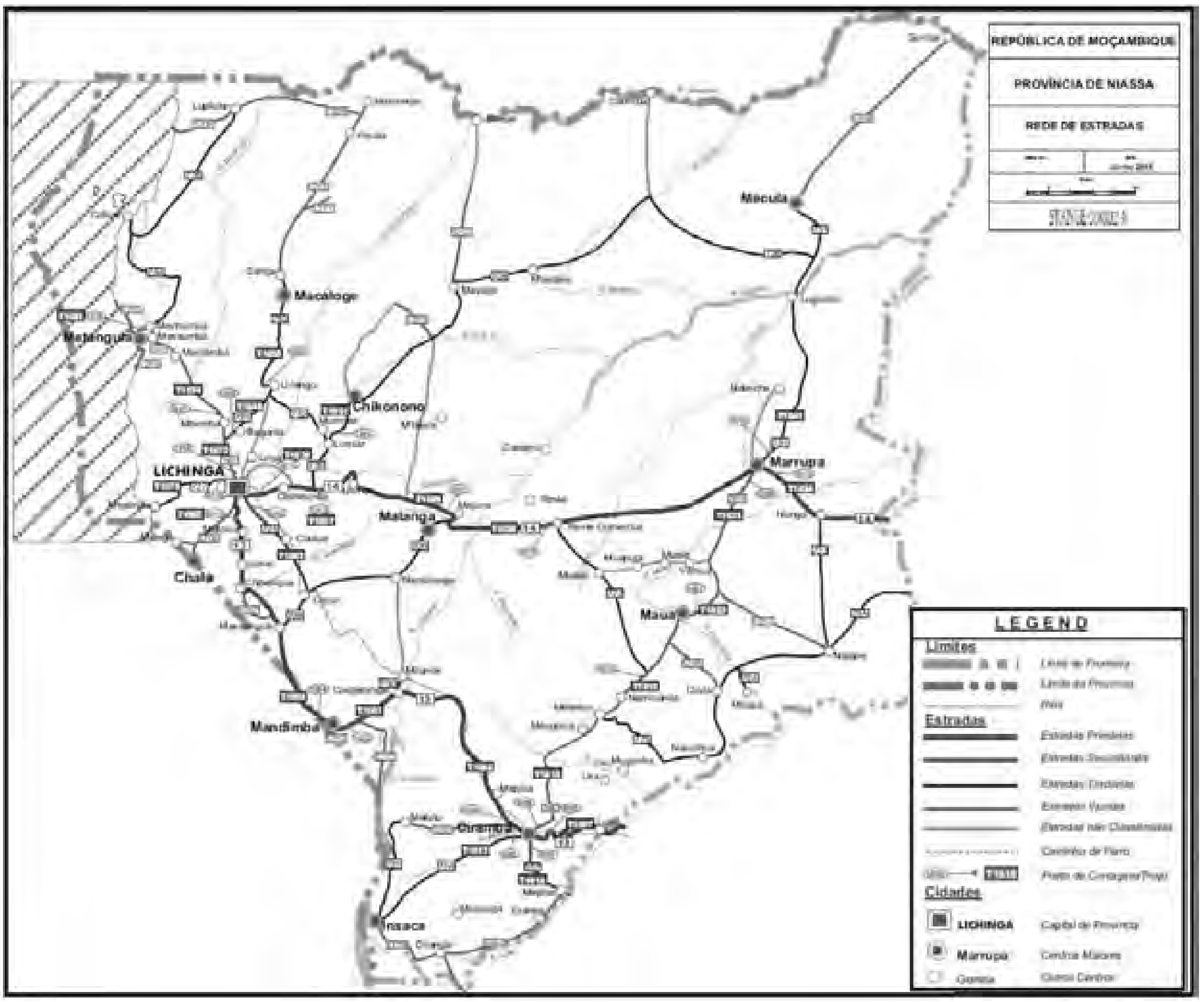


Figure 1.2.1 Road Link Map in Niassa Province

Table 1.2.1 List of Road Link from Lichinga to Cuamba

Section	Start	End	Distance (km)	Count Post	Location
T1068	Lichinga	Lumbe	12.6		
T1067	Lumbe	Fr.Ngauma	37.5	1015	19km from Chinengue
T1066	Fr.Ngauma	Massangulo	34.2		
T1065	Massangulo	Fr.Mandimba	19.4		
T1064	Fr.Mandimba	Mandimba	35.6	1024	17km from Mandimba
T1008	Fr.Malawi	Mandimba	4.2		
T1001	Mandimba	Muita	15.9	1023	8km from Muita
T1002	Muita	Congerene	18.7		
T1003	Congerene	Mississe	53.6		
T1004	Mississe	Cuamba	56.5	1004	9km from Cuamba

1.2.2 Average Annual Daily Traffic (AADT)

Average annual daily traffic (AADT) is estimated by Access Database, which was established in 1996, based on the traffic volume counted on site. According to AADT data, the range of traffic volume from 2002 to 2006 is from 80 to 120 vehicles per day on the Project Road, while the traffic volume around Lichinga is over 100 up to 170. In 2007, it increased on the entire section. The AADT and the large vehicle rate at Lichinga south from 2002 to 2007 on the Project Road is as follows.

Table 1.2.2 AADT for between Cuamba and Lichinga from 2002-2007

Section	Start	End	02	03	04	05	06	07
T1068	Lichinga	Lumbe	178	152	156	163	93	261
T1067	Lumbe	Fr.Ngauma	125	119	120	117	86	190
T1066	Fr.Ngauma	Massangulo	130	104	107	86	89	134
T1065	Massangulo	Fr.Mandimba	139	86	87	86	89	134
T1064	Fr.Mandimba	Mandimba	125	71	74	96	104	128
T1008	Fr.Malawi	Mandimba	67	74	78	96	116	136
T1001	Mandimba	Muita	48	78	90	102	123	143
T1002	Muita	Congerene		80	86	91	85	236
T1003	Congerene	Mississe	47	79	82	25	28	83
T1004	Mississe	Cuamba		80	80	86	96	275

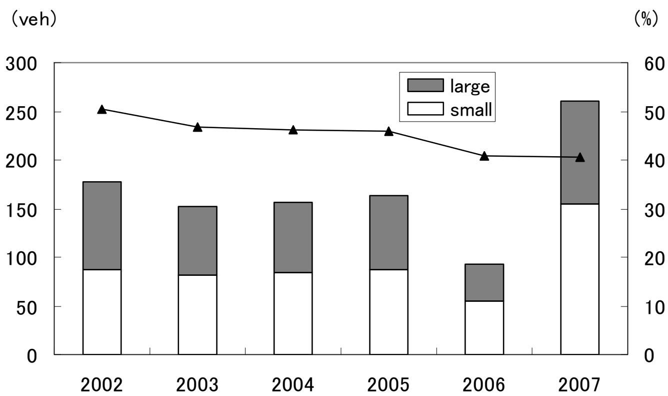


Figure 1.2.2 Large Vehicle Rate at Lichinga South (T1068)

Next, the figure below shows the traffic volume from Malawi borders to the port in Mozambique on relevant corridors. The traffic volume on Nacala Corridor is less than other corridors such as Beira Corridor and Quilimane Corridor.

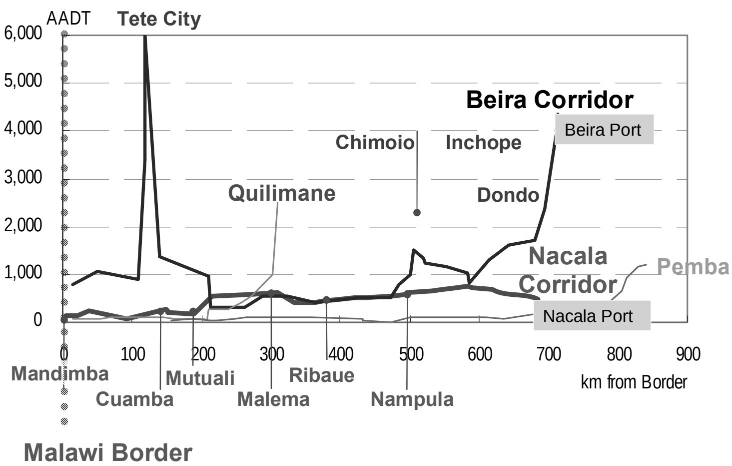


Figure 1.2.3 Traffic Volume on each Corridor

1.2.3 Analysis of Traffic Data

In 2004, the monthly traffic count survey was carried out at count post No. 1015. This data is analyzed on various aspects such as weekly and monthly variation and large vehicle rate. However, the data for March are missing.

There is not much difference on the weekly variation but the volume on Sunday tends to be lower than other days. For the monthly variation, the traffic seems to be concentrated in the dry season, July to September. The rate of large traffic is higher around the end of year.

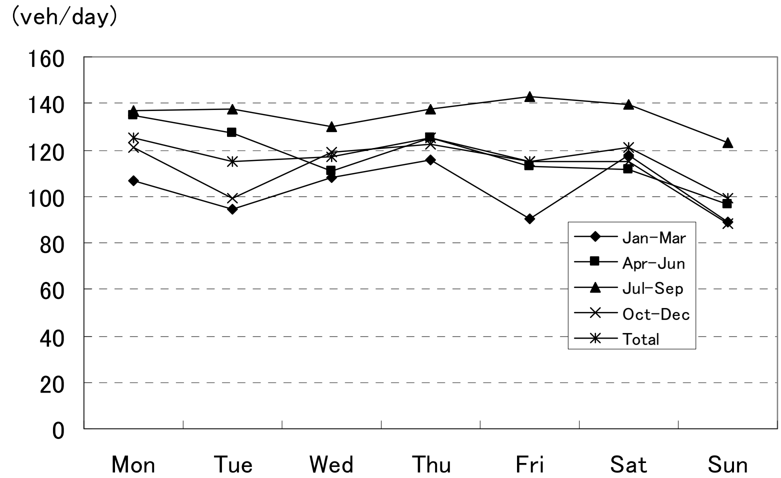


Figure 1.2.4 Weekly Variation for Traffic Volume

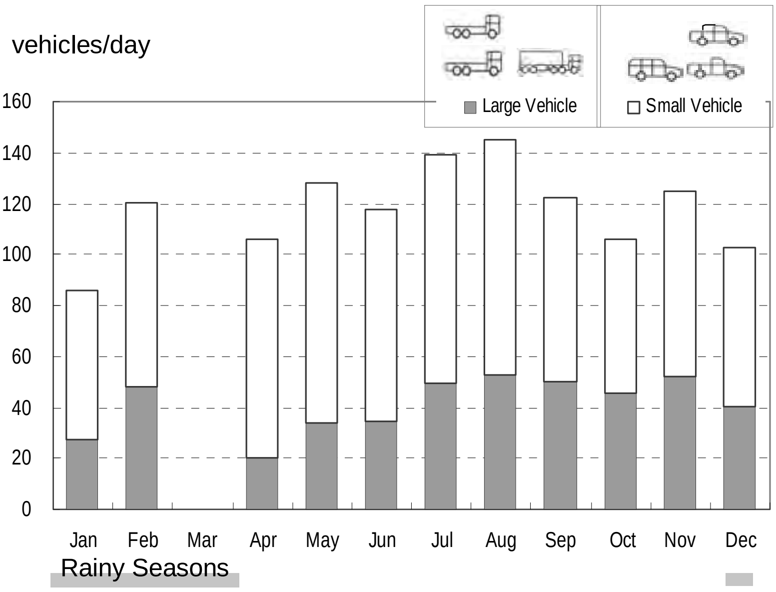


Figure 1.2.5 Monthly Variation for Traffic Volume (T1067, 2004)

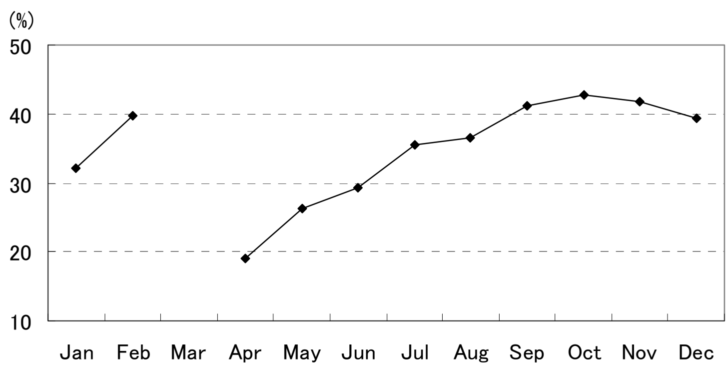


Figure 1.2.6 Monthly Rate for Large Vehicles

1.3 Traffic Related Statistics in Niassa Province

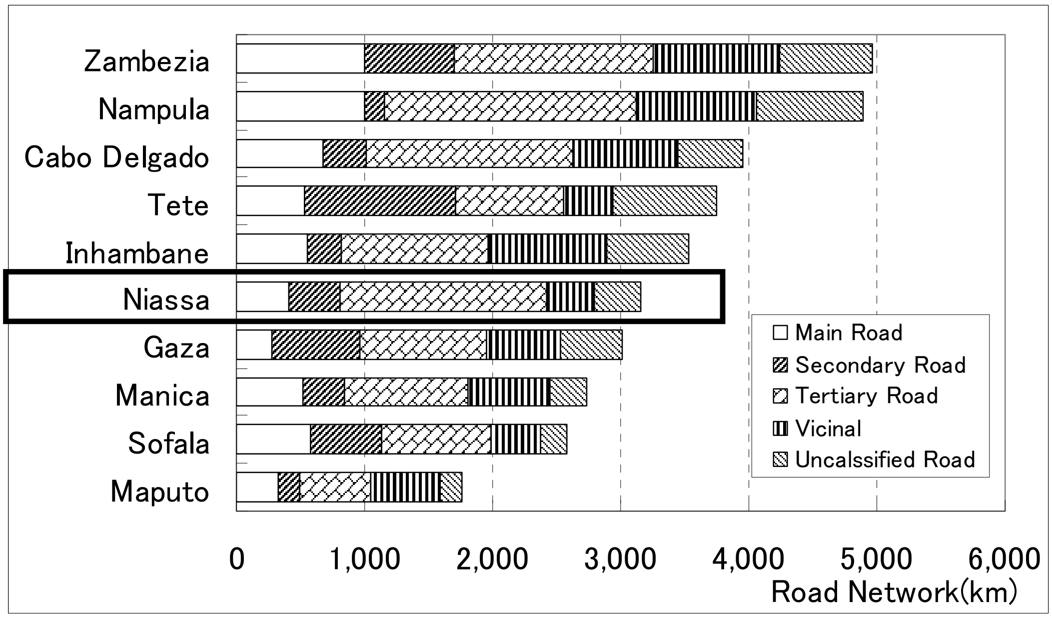
1.3.1 Introduction

Following section shows the results of literature review for provincial level statistics for traffic related data in order to identify the characteristics of Niassa Province compared by other province.

1.3.2 Characteristics of Niassa Province

(1) Road Network

Mozambique has a road network of about 34,000km as all classes, with about 5,870km road classified as primary road. According to the length of all class roads, Zambezia has longest network, Nampula has the next longest network. Both Zambezia and Nampula have road networks of more than 5,000km. Niassa has a road network of about 3,150km, the sixth longest province in Mozambique. Niassa has a primary road network of about 414km.

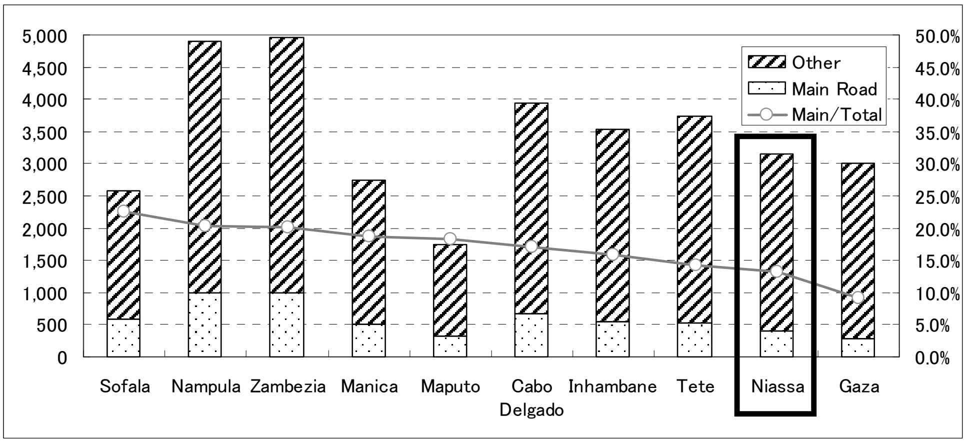


	Main Road	Secondary Road	Tertiary Road	Vicinal	Uncalssified Road	Total
Zambezia	1,001	698	1,552	995	718	4,964
Nampula	996	165	1,965	934	832	4,892
Cabo Delgado	675	337	1,609	824	502	3,947
Tete	530	1,186	833	392	803	3,744
Inhambane	558	265	1,140	930	642	3,535
Niassa	414	392	1,620	371	355	3,152
Gaza	276	690	988	573	491	3,018
Manica	513	336	960	635	294	2,738
Sofala	584	554	847	389	206	2,580
Maputo	323	169	557	547	162	1,758
Total	5,870	4,792	12,071	6,590	5,005	34,328

Source: Ministry of Transport and Communication, Dir. of Planning, 2007

Figure 1.3.1 Road Network Status for each Classification in Province

The ratio of primary road length is about 10 to 20% in all provinces, and the average ratio in all Mozambique is about 17%. The ratio of Niassa is about 13%, the lowest province next to Gaza in Mozambique.

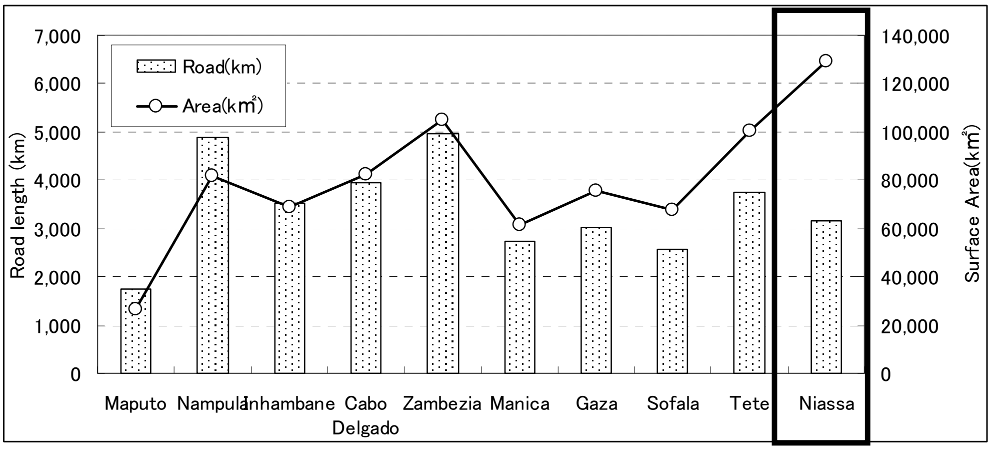


	Main Road	Other	Total	Main/Total
Sofala	584	1,996	2,580	22.6%
Nampula	996	3,896	4,892	20.4%
Zambezia	1,001	3,963	4,964	20.2%
Manica	513	2,225	2,738	18.7%
Maputo	323	1,435	1,758	18.4%
Cabo Delgado	675	3,272	3,947	17.1%
Inhambane	558	2,977	3,535	15.8%
Tete	530	3,214	3,744	14.2%
Niassa	414	2,738	3,152	13.1%
Gaza	276	2,742	3,018	9.1%
Total	5,870	28,458	34,328	17.1%

Source: Ministry of Transport and Communication, Dir. of Planning, 2007

Figure 1.3.2 Ratio of Primary Road Length in each Province

Although, Niassa has the largest area in Mozambique, the length of road network is short comparing other provinces. According to average road length per 1km square, the length of all Mozambique is about 430m, but the length of Niassa is 240m. It is almost half of all Mozambique's length, and the length of Niassa is shortest compared to other provinces.



	Road (km)	Area (km²)	Road in square KM
Maputo	1,758	26,358	0.067
Nampula	4,892	81,606	0.060
Inhambane	3,535	68,615	0.052
Cabo Delgado	3,947	82,625	0.048
Zambezia	4,964	105,008	0.047
Manica	2,738	61,656	0.044
Gaza	3,018	75,709	0.040
Sofala	2,580	68,018	0.038
Tete	3,744	100,724	0.037
Niassa	3,152	129,061	0.024
Total	34,328	799,380	0.043

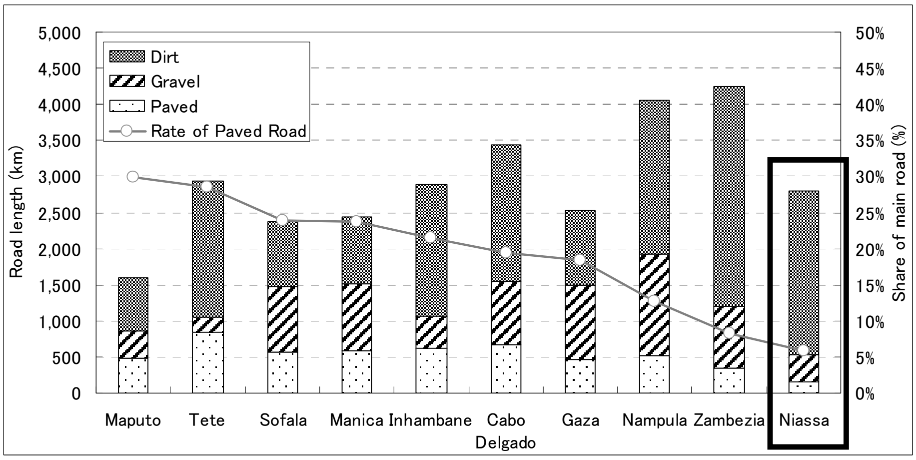
Source: Statistical Hand Book 2007, Ministry of Transport and Communication, Dir. of Planning, 2007

Figure 1.3.3 Road Density for each Province

(2) Pavement Condition

Mozambique has a road network of about 29,300km as classified road, and 5,250km paved road. The ratio of paved road length is about 18%. According to the ratio of paved road length, Maputo is the highest province having 30% paved road.

On the other hand, Niassa has less than 6% paved road, and is the lowest province in Mozambique. Comparing to the national average 18%, Niassa has 1/3 of the national average. It is clear that the process of paving is slower than other provinces in Niassa.



	Paved	Gravel	Dirt	Total	Rate of Paved Road
Maputo	478	378	740	1,596	29.9%
Tete	837	215	1,889	2,941	28.5%
Sofala	567	912	896	2,375	23.9%
Manica	581	924	939	2,444	23.8%
Inhambane	622	450	1,822	2,894	21.5%
Cabo Delgado	668	883	1,893	3,444	19.4%
Gaza	464	1,039	1,024	2,527	18.4%
Nampula	516	1,411	2,133	4,060	12.7%
Zambezia	351	858	3,037	4,246	8.3%
Niassa	161	379	2,257	2,797	5.8%
Total	5,245	7,449	16,630	29,324	17.9%

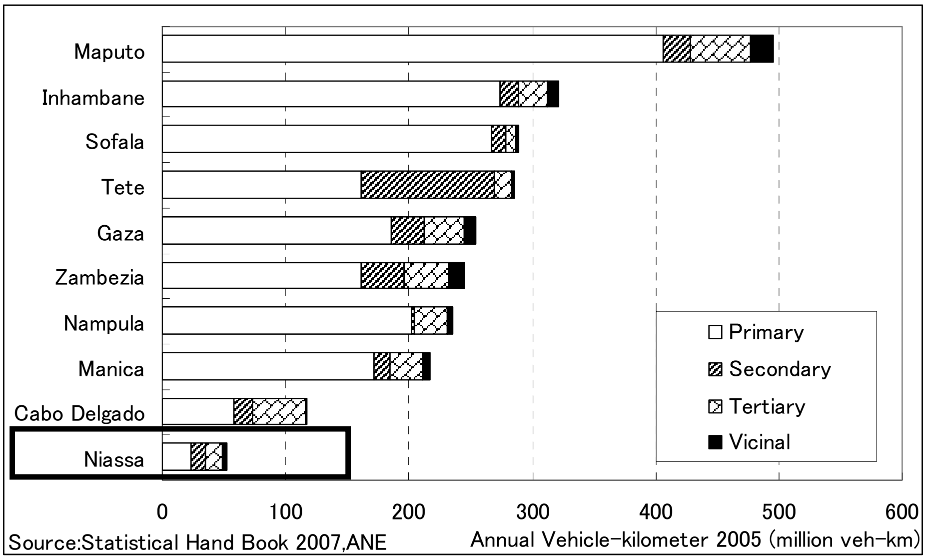
Source: Ministry of Transport and Communication, Dir. of Planning, 2007

Figure 1.3.4 Pavement Condition in each Province

(3) Vehicle-Kilometers

Traffic volume is about 2,513 million vehicle-km per year in 2005 in Mozambique, and traffic of about 1,910 million vehicle-km (76%) goes along primary roads. According to traffic volume, Maputo has the heaviest traffic volume in Mozambique, and Inhambane has the next heaviest traffic. Niassa has the least traffic volume in Mozambique, about 52million vehicle-km (2%).

In the provinces having large cities like Maputo or Sofala or Nampula, the ratio of primary roads is higher than the other class roads, on the other hand, in less developed provinces like Tete or Cabo Delgado or Niassa, the ratio of primary roads is less than in the other provinces.



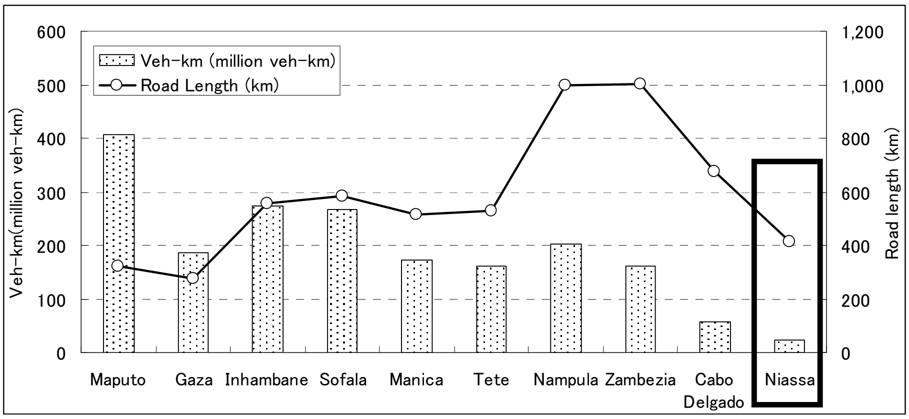
	Annual Vehicle-kilometer(2005 ; million veh-km)					Rate of Total
	Primary	Secondary	Tertiary	Vicinal	Total	
Maputo	406.1	22.7	48.2	18.5	495.5	19.7%
Inhambane	273.5	15.2	23.5	9.3	321.5	12.8%
Sofala	266.9	11.2	8.8	2.5	289.4	11.5%
Tete	161.4	107.3	14.9	2.2	285.8	11.4%
Gaza	185.4	26.5	33	9	253.9	10.1%
Zambezia	161.3	35.2	36.1	12.2	244.8	9.7%
Nampula	202	2.3	26.7	5	236	9.4%
Manica	171.8	13.3	25.9	5.6	216.6	8.6%
Cabo Delgado	57.9	15.5	42.8	1.5	117.7	4.7%
Niassa	23.2	11.9	13.7	3.6	52.4	2.1%
Total	1909.5	261.1	273.6	69.4	2513.6	100.0%

Source : Statistical Hand Book 2007, ANE

Figure 1.3.5 Vehicle-km for each Province

When paying attention to the primary roads, the average traffic volume is about 900 vehicles/day calculated by total traffic (vehicle-km) and total road length. (Calculated by as total traffic (vehicle-km) / road length (km) / 365(days))

Maputo has the heaviest traffic volume in Mozambique, over 3,000 vehicles per day. Niassa has the lightest volume in Mozambique, about 150 vehicles per day, less than 1/5 of the average.



	Veh-km (million veh-km)	Road length (km)	Average vehicle per day
Maputo	406.1	323	3,445
Gaza	185.4	276	1,840
Inhambane	273.5	558	1,343
Sofala	266.9	584	1,252
Manica	171.8	513	918
Tete	161.4	530	834
Nampula	202	996	556
Zambezia	161.3	1,001	441
Cabo Delgado	57.9	675	235
Niassa	23.2	414	154
Total	1909.5	5,870	891

Average vehicle per day is represent as "Veh-km / Road length / 365"

Figure 1.3.6 Vehicle Movement in each Province

(4) Passenger / Freight Traffic Volume in Niassa Province

Based on the provincial statistics collected by provincial government of transport and communications in Niassa, passenger and freight traffic volume is estimated by each traffic mode in the table below.

Table 1.3.1 Amount of Transportation of Cargo and Passengers in 2006

		Total		Niassa		Share of Niassa
		Volume	Share	Volume	Share	
Cargo (10^6TKM)	Rail Way	736	29.5%	0.478	55.7%	0.06%
	Road	1,535	61.5%	0.249	28.9%	0.02%
	Sea	218	8.7%	0.071	8.2%	0.03%
	Airplane	8	0.3%	0.062	7.2%	0.76%
subtotal		2,497	100.0%	0.859	100.0%	0.03%
Passenger (10^6PKM)	Rail Way	320	1.1%	–	–	
	Road	28,770	96.1%	47.047	84.0%	0.16%
	Sea	9	0.0%	5.216	9.3%	55.49%
	Airplane	846	2.8%	3.719	6.6%	0.44%
subtotal		29,944	100.0%	55.983	100.0%	0.19%

Source: Anuario Estatistico Statistical Yearbook 2007
Relatorio da Direccao Provincial dos Transportes e Communicacoes de Niassa (Latest Version)

Regarding freight transport, the mode share of road and railway transport in terms of national average is 62% and 30%, respectively. However, in Niassa Province, railway transportation accounts for 56% (road transport is 29%). This is caused by the operation of railways between Lichinga and Cuamba up to February 2009, and by including the statistics between Cuamba and IntreLagos which forms the international railway operation of Nacala – Nampula to Malawi.

On the other hand, for the passenger transportation, roads account for more than railways. Note that the transportation shares of airplane and sea in Niassa are more than the national average.

The share of traffic volume in Niassa Province against the whole country doesn't come up to as much as 0.2%. It means that the movement of persons and cargo in Niassa is still small.

e) Mini-bus Registration and Operation

All the mini-buses operated in Niassa Province must be registered based on Lichinga or Cuamba origin. The largest number of registrations is 174 vehicles for operation between Lichinga - Cuamba which accounts for more than 80% of the whole. The next largest number of registrations is 10 for between Lichinga - Lago, and the third largest is eight for between Cuamba - Marrupa.

As a result of site investigation in the dry season in May, the operation between Lichinga - was found to be about 20 round trips per day. Therefore, it is assumed that only a part of the number of registered vehicles can be operated. Moreover, there might be some operators registered as Lichinga - Cuamba who run only a part of the section.

Table 1.3.2 Minibus Registration in Niassa Province

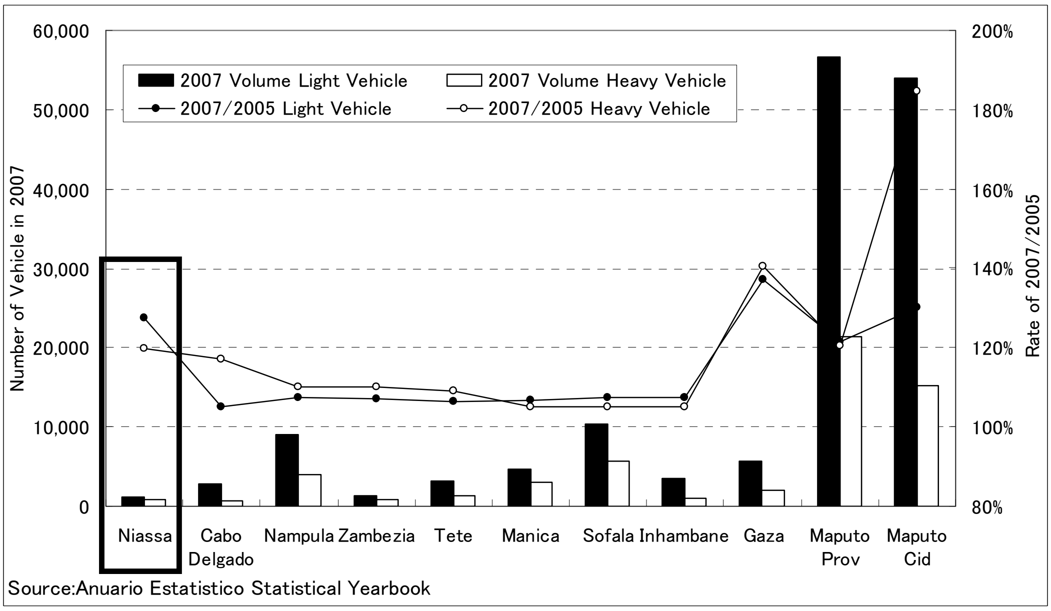
		Numer of Bus	Rate of Total
Lichinga	Cuamba	174	81.7%
	Lago	10	4.7%
	Mavago	2	0.9%
	Marrupa	5	2.3%
	Sanga	3	1.4%
	Majune	5	2.3%
	Matchedje	2	0.9%
Cuamba	Mecanhelas	4	1.9%
	Marrupa	8	3.8%
Total		213	100.0%

Source: Ministry of Transport and Communication in Lichinga

(5) Vehicle Registration

Regarding the number of vehicle registrations in 2007, 153,000 vehicles are registered as light vehicles, and 56,000 as heavy vehicles in Mozambique, and the number has been increased 20 to 30% since 2005.

According to the distribution of the number of vehicle registrations in each province, almost all of them belong to Maputo Province. Niassa Province has the fewest number of vehicle registrations, but the rate of increase between 2005 and 2007 ranks highest next to Maputo and Gaza, such as 27% for light vehicles, and 20% for heavy vehicles.



	2005		2006		2007		2007/2005	
	Light Vehicle	Heavy Vehicle	Light Vehicle	Heavy Vehicle	Light Vehicle	Heavy Vehicle	Light Vehicle	Heavy Vehicle
Niassa	925	728	999	787	1,178	872	1.27	1.20
Cabo Delgado	2,689	500	2,755	549	2,822	585	1.05	1.17
Nampula	8,333	3,598	8,553	3,773	8,946	3,958	1.07	1.10
Zambezia	1,305	757	1,367	798	1,398	833	1.07	1.10
Tete	3,009	1,245	3,068	1,324	3,203	1,358	1.06	1.09
Manica	4,428	2,862	4,499	2,908	4,733	3,009	1.07	1.05
Sofala	9,687	5,471	9,964	5,589	10,394	5,741	1.07	1.05
Inhambane	3,338	920	3,504	955	3,583	968	1.07	1.05
Gaza	4,148	1,418	5,520	1,874	5,689	1,991	1.37	1.40
Maputo Prov	46,716	17,818	50,351	19,075	56,668	21,447	1.21	1.20
Maputo Cid	41,450	8,256	50,593	13,917	53,922	15,248	1.30	1.85
Total	126,028	43,573	141,173	51,549	152,536	56,010	1.21	1.29

Source: Anuario Estatistico Statistical Yearbook 2005-2007

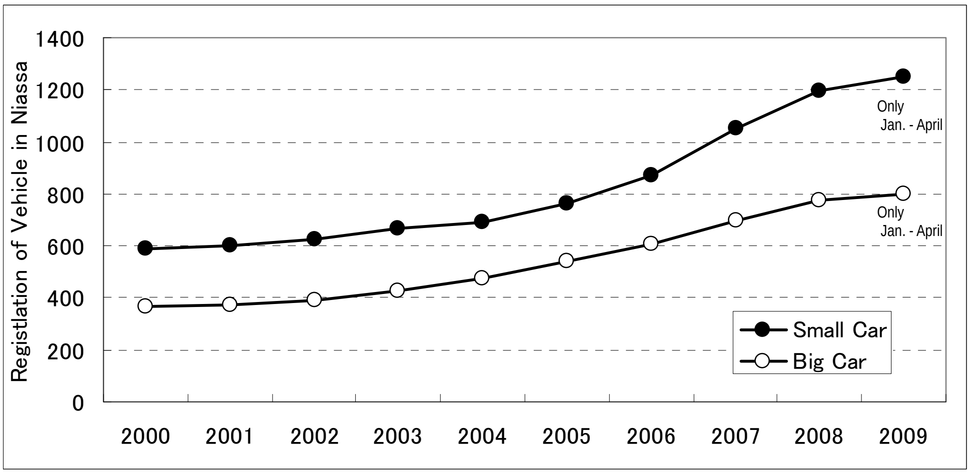
Figure 1.3.7 Vehicle Registration in each Province

Car ownership calculated by number of vehicle registrations and population in 2007 is shown in the table below. It is clear that Niassa Province has not reached national average but is still only 0.17%.

Table 1.3.3 Car Ownership in each Province

	Registration number in 2007		Total	Population in 2007	Vehicle per Population
	Light Vehicle	Heavy Vehicle			
Maputo Cid	53,922	15,248	69,170	1,099,102	6.29%
Maputo Prov	56,668	21,447	78,115	1,259,713	6.20%
Sofala	10,394	5,741	16,135	1,654,163	0.98%
Gaza	5,689	1,991	7,680	1,219,013	0.63%
Manica	4,733	3,009	7,742	1,418,927	0.55%
Inhambane	3,583	968	4,551	1,267,035	0.36%
Nampula	8,946	3,958	12,904	4,076,642	0.32%
Tete	3,203	1,358	4,561	1,832,339	0.25%
Cabo Delgado	2,822	585	3,407	1,632,809	0.21%
Niassa	1,178	872	2,050	1,178,117	0.17%
Zambezia	1,398	833	2,231	3,892,854	0.06%
Total	152,536	56,010	208,546	20,530,714	1.02%

According to the latest number of vehicle registrations in Niassa collected by Study Team interview since 2005, increment of new registrations has increased steadily as shown in the table below. It can be said that it is time the motorization began to progress rapidly.



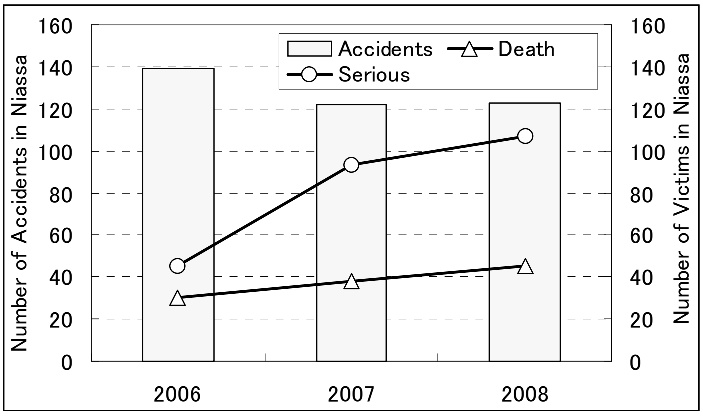
	Small Car		Big Car		Total	
	New Registration	Accumulation	New Registration	Accumulation	New Registration	Accumulation
2000	204	586	85	364	289	950
2001	16	602	7	371	23	973
2002	20	622	17	388	37	1010
2003	43	665	40	428	83	1093
2004	26	691	48	476	74	1167
2005	73	764	64	540	137	1304
2006	105	869	69	609	174	1478
2007	181	1050	89	698	270	1748
2008	144	1194	76	774	220	1968
2009	53	1247	28	802	81	2049

Source: INAV, Data in 2009 is since January to April

Figure 1.3.8 Trend of Car Ownership Increase in Niassa Province

(6) Traffic Accidents

Although the number accidents in Niassa decreased between 2006 and 2007, and was almost same level between 2007 and 2008, the number of deaths and injuries has increased. It means that traffic accidents have become more serious over the past three years. Especially, the number of serious injuries has increased almost three times between 2006 and 2008.



Source: MTC, Anuario Estatistico Statistical Yearbook 2007

Figure 1.3.9 Record of Traffic Accidents in Niassa Province

If we look at the situation of the accidents on national road 13 (N13), about 20% of total provincial accidents, 31% of total provincial deaths and 28% of total provincial serious injuries occurred on N13. This is evidence that N13 has high probability of death and serious injury than other roads. N13 also has a higher number of victims per accident as 1.76, compared with 1.10 on other roads.

Table 1.3.4 Record of Traffic Accidents on National Route No.13 (2008)

	2008			Victims per Accident
	Accidents	Death	Serious	
Niassa	123	45	107	1.24
N13	25	14	30	1.76
Other	98	31	77	1.10
Share of N13	20.3%	31.1%	28.0%	–

Source: MTC

1.4 Traffic Survey

1.4.1 Purpose of Survey

The traffic survey including the traffic count survey and the origin-destination (OD) survey was carried out on the Project Road to recognize the current traffic condition and to forecast the future traffic demand after the Project implementation. The survey was conducted twice in May and August

1.4.2 Survey Location

The location of both surveys was as follows.

Table 1.4.1 Survey Location

Traffic count survey	Total 5 points (10 directions) at 3 locations - Lichinga : 1 km to Mandimba - Mandimba : 0.5km to Lichinga 0.5km to Cuamba 0.3km to Border - Cuamba : 0.5km to Mandimba The survey was conducted at Mandimba border instead of above locations in Mandimba on 2nd survey
OD survey	Total 4 points (8 directions) at 3 locations - Lichinga : 1 km to Mandimba - Mandimba : 0.5km to Lichinga 0.3km to Border - Cuamba : 0.5km to Mandimba The survey was conducted at Mandimba border instead of at the above locations in Mandimba town on 2nd survey

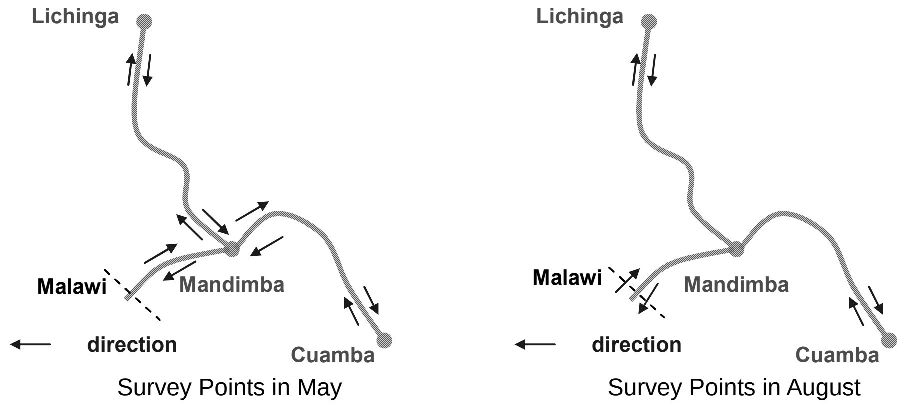


Figure 1.4.1 Traffic Survey Points

1.4.3 Methodology of Survey

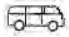
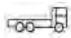
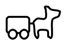
(1) Traffic Count Survey

The contents of the traffic count survey were as follows.

Table 1.4.2 Contents of Traffic Count Survey

Survey Date	(1st) Consecutive seven days from 10th May, Sunday, to 16th May 2009, Saturday (2nd) Consecutive four days from 9th August, Sunday, to 12th August 2009, Wednesday
Survey Hour	- 12 hours from 6:00 a.m. to 6:00 p.m. - 12 hours from 6:00 p.m. to 6:00 a.m. in the next morning only on 13th May, Wednesday
Count Interval	Every one hour
Vehicle Type	12 categories (Vehicle classification is followed by the ANE's classification and AfDB recommendations in table below.)
Survey Method	Manual count by surveyors at the roadside

Table 1.4.3 Vehicle Types

Category	No.	Vehicle Type	Illustration
Passenger Car	1	Medium Passenger Car	
	2	4-Wheel Vehicle	
Bus	3	Minibus/Light Bus (< 20seats)	 
	4	Medum/Large Bus (>20seats)	
Truck	5	Light Goods Vehicle	
	6	Medium Goods Vehicle (2-axles)	
	7	Heavy Goods Vehicle (3-axles Rigid)	
	8	Very Heavy Goods Vehicle (Articulated)	
Others	9	Agricultural Tractors	
	10	Motorcycle	
	11	Bicycle	
	12	Animal Cart	

(2) Origin-Destination (OD) Survey

The contents of the OD survey were as follows.

Table 1.4.4 Contents of Origin Destination Survey

Survey Date	(1^{st}) Consecutive four days from 10^{th} May, Sunday, to 13^{th} May 2009, Wednesday (2^{nd}) Consecutive four days from 9^{th} August, Sunday, to 12^{th} August 2009, Wednesday
Survey Hour	12 hours from 6:00 a.m. to 6:00 p.m.
Vehicle Type	Same as the traffic count survey excluding the bicycle
Survey Method	Interview to drivers by surveyors at the roadside
Survey Content (see the appendix)	- Number of plates - Number of passengers - Model - Type of vehicle - Origin and Destination of trip - Travel time - Purpose of trip - Trip frequency - Contents and volume of freight

Figure 1.4.2 Photo of Traffic Survey

The Project area and neighboring region are divided into 36 zones to define the location of origin and destination. The zone number and location are as follows.

Province	District	Zone No
NAMPULA	MURRUPULA	1
	NAMPULA	
	RIBAUE	2
	MALEMA	3
NIASSA	CUAMBA	4
NAMPULA	ANGOCHE	5
	ILHA_DE_MOZAMBIQUE	
	MECONTA	
	MOGINCUAL	
	MOGOVOLAS	
	MOMA	
	MONAPO	
	MOSSURIL	
	MUECATE	
	NACAROA	
	NACALA	6
	NACALA_A_VELHA	
	ERATI	7
	MEMBA	
	MECUBURI	8
	LALAUA	9
NIASSA	MARRUPA	10
	MECULA	
	MECANHELAS	11
	MANDIMBA	12
	NGAUMA	13
ZAMBEZIA	ALTO_MOLOCUE	14
	GILE	
	GURUE	
	ILE	
	LUGELA	
	NAMARROI	
	PEBANE	
TETE		15
ZAMBEZIA	QUELIMANE	16
	CHINDE	
	INHASSUNGE	
	MAGANJA_DA_COSTA	
	MOCUBA	
	MOPEIA	
	NAMACURRA	
	NICOADALA	
	MILANGE	17
	MORRUMBALA	
SOFALA	BEIRA	18
GAZA		19
INHAMBANE		
MANICA		
MAPUTO		
South of Malawi		20
North of Malawi		21
South Africa and Swaziland		22
North of Zimbabwe		23
South of Zimbabwe		24
Zambia		25
NIASSA	LICHINGA	26
	LAGO	27
	MAVAGO	
	MUEMBE	
	SANGA	
	METARICA	28
	MAUA	29
	NIPEPE	
	MAJUNE	30
CABO DELGADO		31
NAMPULA	CIDADE_DE_NAMPULA	32
NIASSA	CIDADE_DE_LICHINGA	33
Beira Port		34
Quelimane Port		35
Nacala Port		36

Figure 1.4.3 OD Zone and Zone Code Number

1.4.4 Results of Traffic Counts

The traffic count results were analyzed from various views such as the vehicle type, daily variation and large vehicle rate to figure out the traffic trend on the Project Road.

In 1st survey in May, the traffic volume for vehicle at Mandimba and Cuamba ranged from 50 to 90 for 12 hours. It is expected that many vehicles drive in short trip around Lichinga area because the traffic volume at Lichinga is much bigger than at other points. During the night from 6p.m. to 6 a.m. only less than 20 vehicles passed and traffic concentrated from 6p.m. to 9p.m. In the 2nd survey in August, the traffic volume was much lower than that in the 1st survey. It would appear that this was caused by the period of harvest season.

The number of bicycles shows that the bicycle is main traffic means around this area rather than the vehicles. Over one thousand bicycles per day passed in Mandimba.

Table 1.4.5 Result of Traffic Volume including Passenger Cars, Buses and Trucks

Location	Point	Direction	Daytime (6:00 – 18:00)		Night time (18-06)	24h/12h (1st)
			1st Survey in May (veh/12h)	2nd Survey in August (veh/12h)	1st Survey in May (veh/12h)	
Lichinga	Mandimba Side	To Mandimba	152	65	68	1.32
		To Lichinga	128	54		
Mandimba	Lichinga Side	To Mandimba	65	-	11	1.17
		To Lichinga	79	-	16	
	Cuamba Side	To Mandimba	56	-	-	-
		To Cuamba	76	-	-	
	Border Side	To Mandimba	54	-	6	1.16
		To Border	52	-	11	
Cuamba	Mandimba Side	To Mandimba	72	49	18	1.25
		To Cuamba	76	40	18	

Source: Study Team

Table 1.4.6 Result of Traffic Volume for Bicycles and Motorcycles (in May)

Location	Point	Direction	Bicycle		Motorbike	
			Weekday Average	Weekend Average	Weekday Average	Weekend Average
Lichinga	Mandimba Side	To Mandimba	438	522	55	51
		To Lichinga	562	428	57	42
Mandimba	Lichinga Side	To Mandimba	1,498	1,490	90	82
		To Lichinga	1,496	1,377	96	84
	Cuamba Side	To Mandimba	1,188	916	65	72
		To Cuamba	1,135	798	70	79
	Border Side	To Mandimba	1,159	1,359	57	56
		To Border	1,094	1,636	62	62
Cuamba	Mandimba Side	To Mandimba	825	947	148	130
		To Cuamba	873	1,081	142	136

Source: Study Team

In the view of the vehicle type, the proportion of trucks was relatively high. This is because the road is used mainly for the haulage of goods. The specific feature did not appear on the date variation. The traffic volume on Sundays was a little lower than other days as well as the result on traffic count survey done by ANE. The large vehicle rate on Mandimba was higher especially at the weekend. The definition of large vehicles consisted of the large bus and the heavy goods vehicle in this analysis.

Also, motorcycles and bicycles were counted at each point. There were a lot of bicycles used on Study Road more than 1,000 per day, and motorcycles were used in almost the same volume as vehicles.

Following figures show the situation described above.

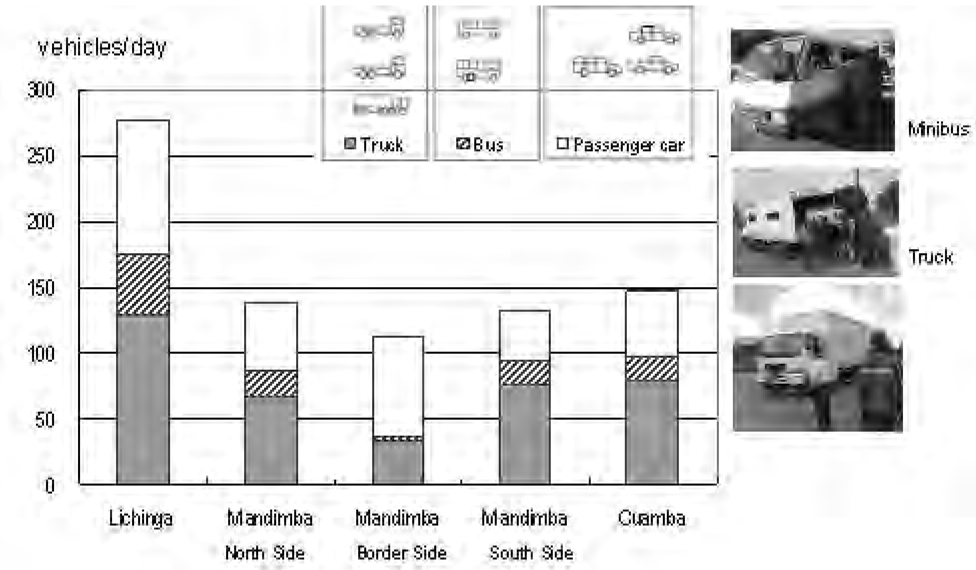


Figure 1.4.4 Traffic Volume per Vehicle Type

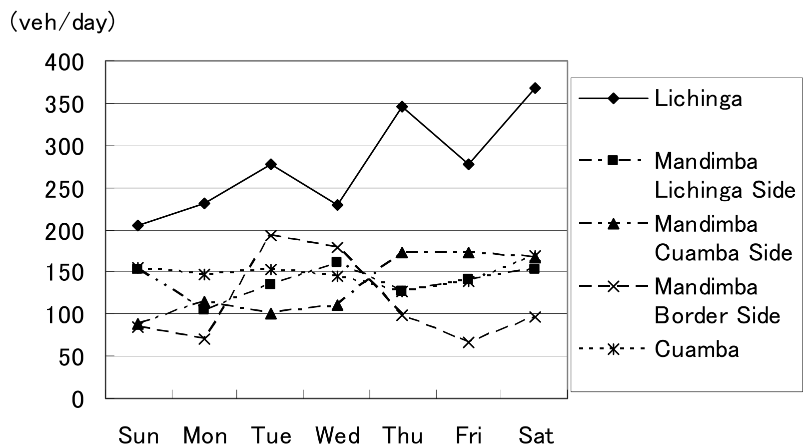


Figure 1.4.5 Daily Variation for the Passenger Cars, Buses and Trucks

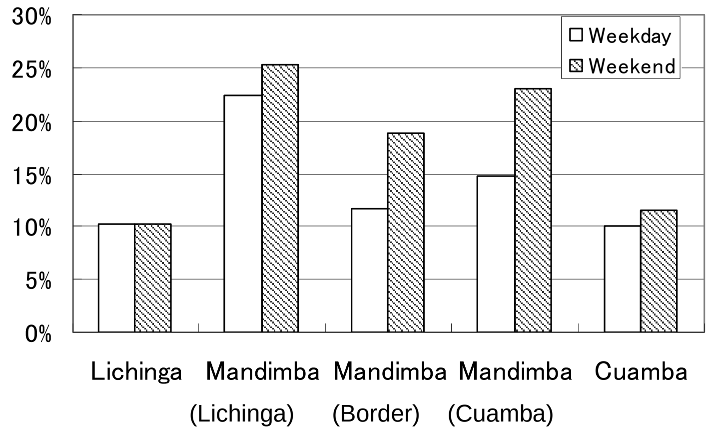


Figure 1.4.6 Large Vehicle Rate

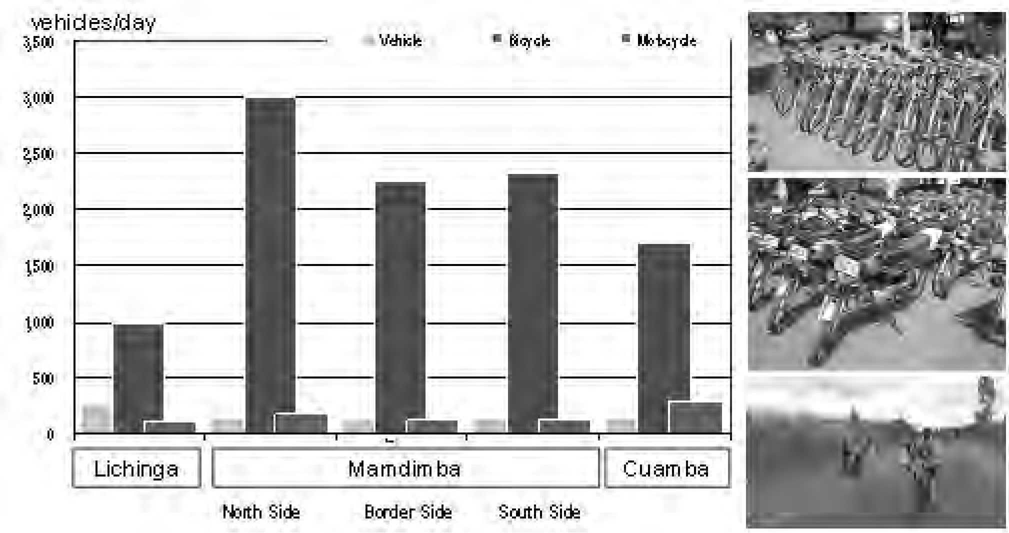


Figure 1.4.7 Motorcycles and Bicycles on Study Road

1.4.5 Results of Origin-Destination (OD) Survey

(1) Sample Rate

The sample rate of OD data for 1st survey remained relatively low with 37% and the result seems to contain some doubtful data. As the 2nd survey achieved a sample rate of 100% as a result of the experience in 1st survey, the data in 2nd survey was mainly analyzed in this Study.

(2) OD Table

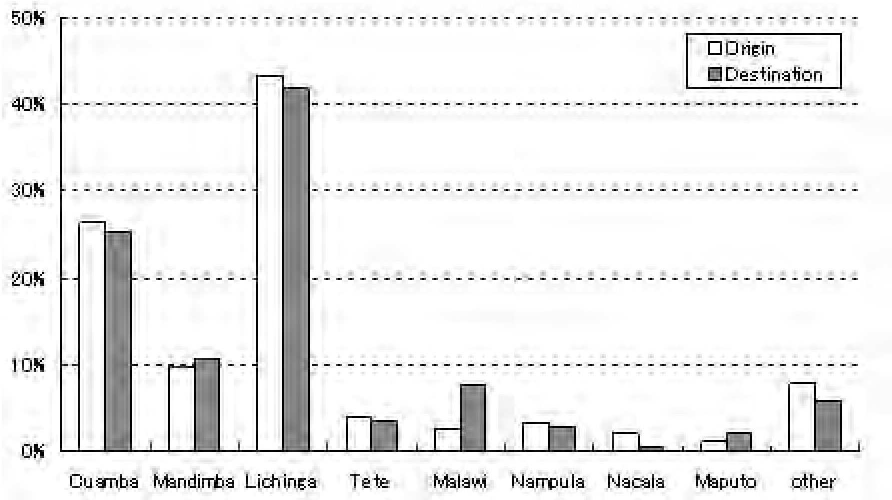
OD tables were produced based on the survey result. OD tables are attached in the Appendix.

(3) Summary of OD survey

853 vehicles were counted in the OD survey at three locations, Lichinga, Cuamba and Mandimba border, for four consecutive days. It included the internal traffic which is 130 vehicles in Lichinga town and 75 vehicles in Cuamba town. The characteristics of traffic in this area are summarized as follows.

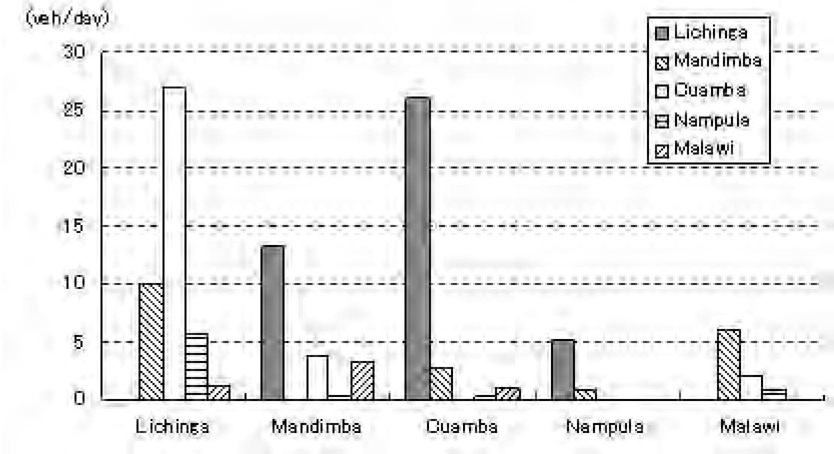
- Origin and Destination

The location of origin and destination of almost 80% of vehicles is either Lichinga or Mandimba or Cuamba. In particular, Lichinga is the main point as origin and destination, with half of the above traffic. It shows that the road is mainly used for the short trip traffic in the province at present, but some of traffic has places outside of Niassa Province such as Tete, Malawi, Nampula, Nacala and Maputo as the origin or destination. The vehicles which come and go to Tete, Maputo and South Africa appear to pass through Malawi because it is faster, safer and more accessible than through the rough roads in Northern Mozambique.



Source: Study Team

Figure 1.4.8 Rate of Traffic at Main Origin and Destination



Source: Study Team

Figure 1.4.9 Number of Vehicles between Main Origin and Destination

➢ Number of Passengers

Buses have the largest average number of passengers with about 14 people for minibus and 24 people for large bus. Average number of passengers in passenger cars, four-wheel vehicles and heavy goods vehicles is less than four people.

Table 1.4.7 Average Number of Passengers

Vehicle Category	Average Number of Passenger
Passenger car	3.7
Mini-bus	14.3
Large Bus	65.0

Source: Study Team

➢ Travel Time

Travel time from origin to destination was surveyed based on estimation and experience of drivers. Average travel time between Lichinga and Cuamba which is the most common trip in this area, is 10 hours. Travel time from Lichinga is 23 hours to Nampula, 43 hours to Nacala, 86 hours to Maputo and 150 hours to South Africa. It takes time between Malawi south and Nampula/Nacala, which seems to be caused by the trucks transporting a lot of goods.

Origin \ Destination	1	4	6	12	15	18	19	20	22	26
1		10.0	0	23.7	0	0	0	64.0	0	22.8
4			0	4.6	40.8	60.0	0	8.4	0	8.4
6				18.0	0	0	0	53.2	0	42.4
12					12.6	48.5	0	1.7	0	3.2
15						0	0	0	0	33.7
18							0	0	0	55.2
19								0	0	85.8
20									0	14.7
22										150.0
26										

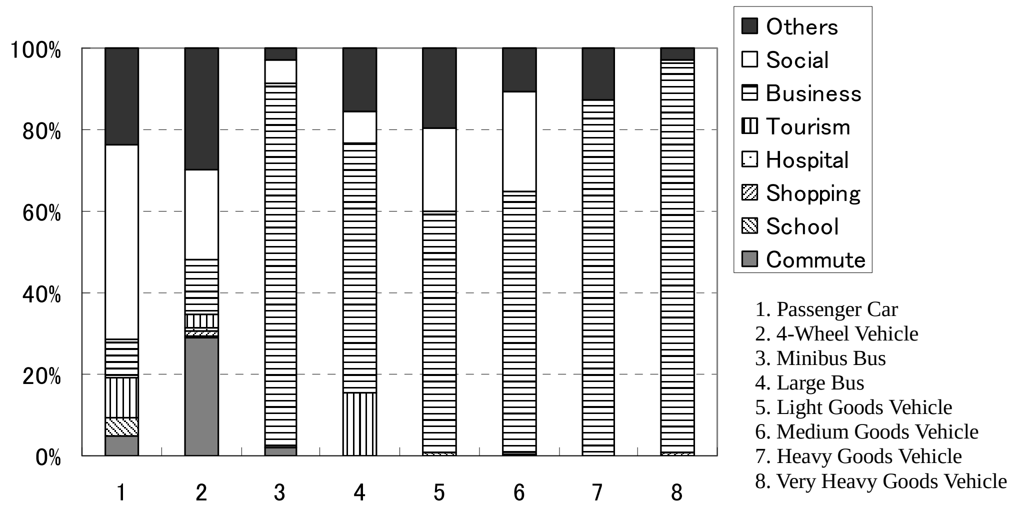
(Zone No.)
1. Nampula 12. Mandimba 19. Maputo 26. Lichinga
4. Cuamba 15. Tete 20. Malawi South
6. Nacala 18. Beira 22. South Africa

Source: Study Team

Figure 1.4.10 Travel Time between Main Origin and Destination (unit: hour)

➢ Purpose of Trip

Social is main purpose only for drivers of small vehicles. For other vehicles, over half of them are driven for business purposes. The purpose for tourism is included in the small vehicles and large buses.

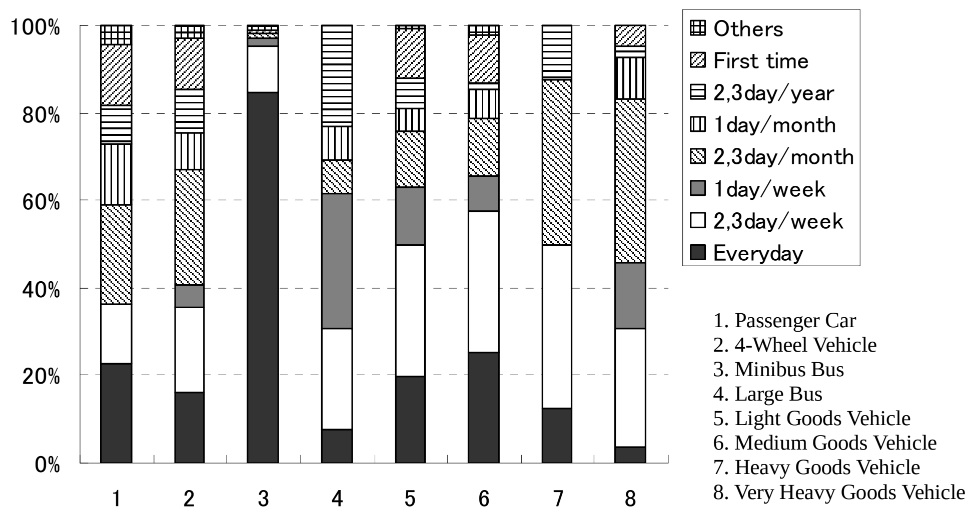


Source: Study Team

Figure 1.4.11 Trip Purpose

- Trip Frequency

The trend of trip frequency is mainly divided into two groups, less than a few days per week or a few days per month. More or less 40% of vehicles drive around this area 2, 3 days per week. In contrast, over 80% of mini buses are operated everyday. 20% of large trucks are driven a few days per month.



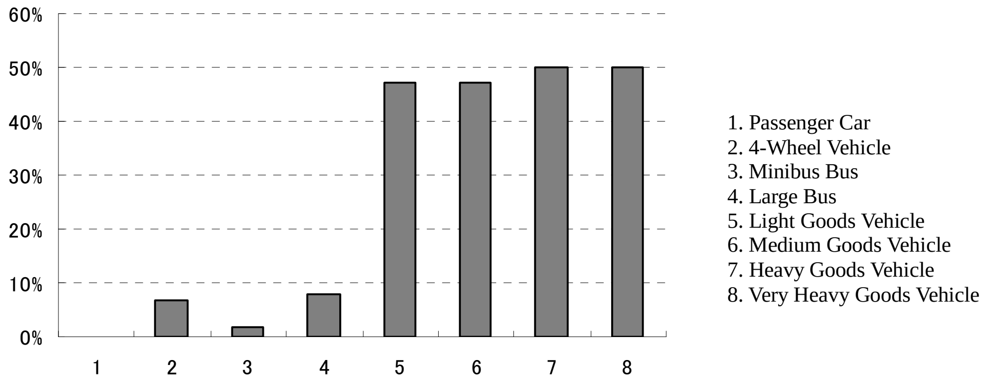
Source: Study Team

Figure 1.4.12 Trip Frequency

- Goods transportation

Almost half of the cargo trucks driving this area convey some kind of goods. But the proportion of loaded trucks against all trucks differs largely in each direction. In the direction from Cuamba to Lichinga, most vehicles carry the goods, especially 100% of large goods vehicles. In contrast, over half of vehicles are empty in the opposite way, from Lichinga to Cuamba, which shows that Lichinga relies on the goods from outside and has a few goods and products to distribute out of town.

The principal commodity transported is tobacco leaf, with one quarter of all transported goods. Tobacco leaf is mostly conveyed by the 30 tons trucks to the tobacco factories in Tete through Mandimba border. The next largest volume goods carried are maize with over 10%, followed by beans, cement, diesel and beer.



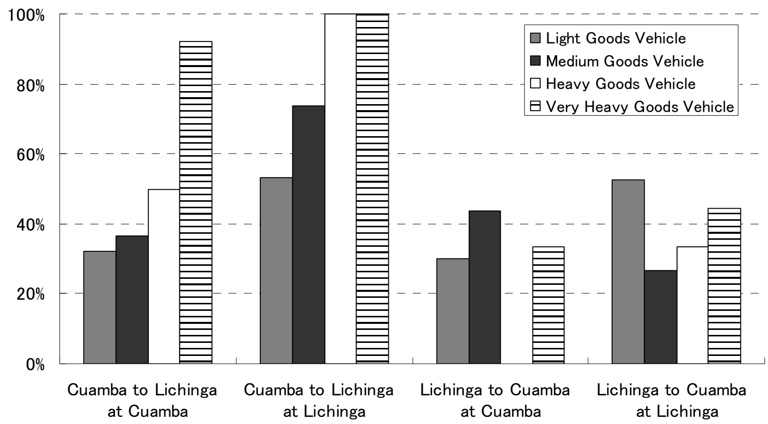
Source: Study Team

Figure 1.4.13 Rate of Goods Loaded

Table 1.4.8 Average Tonnage of Goods Transported

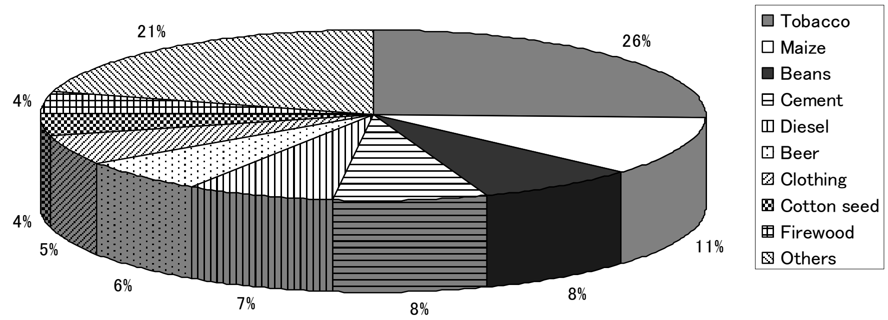
Vehicle Category	Average Tonnage per Vehicle (ton/vehicle)	
	Included All Vehicles	Only Loaded Vehicle
Light Truck	0.545	1.13
Medium Truck	2.6	5.5
Heavy Truck	5.5	11.0
Very Heavy Truck (Trailer)	11.0	22.4

Source: Study Team



Source: Study Team

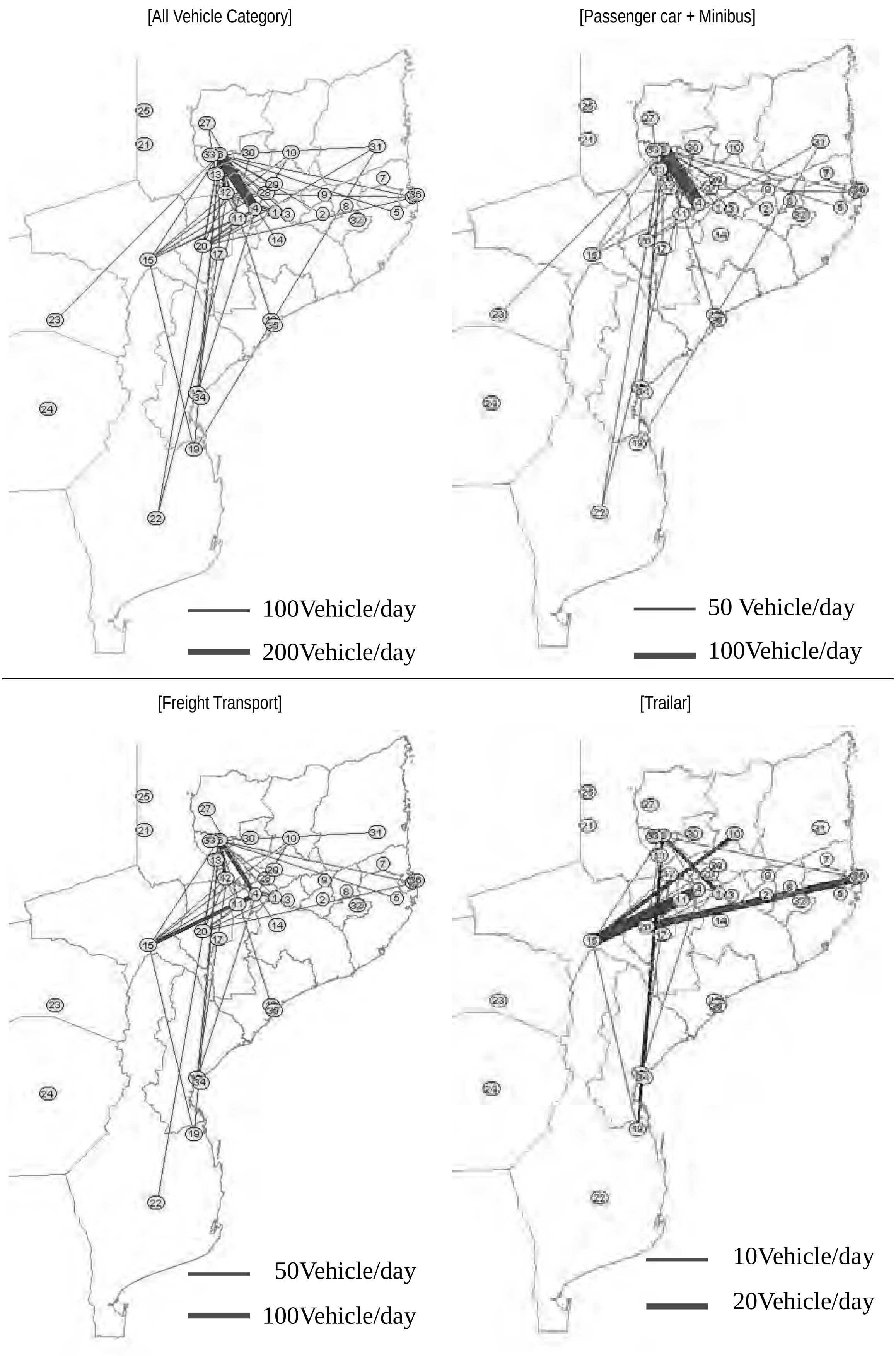
Figure 1.4.14 Rate of loaded truck at each section



Source: Study Team

Figure 1.4.15 Main Transported Goods

As described before, OD trip table is attached in the appendix of this report. Following figures show the trip desire line diagram for each vehicle category. In this figure, there are characteristics of strong relationship between Cuamba and Lichinga for passenger trip, while Lichinga is the major concentrated trip attraction/ generation point for freight transport.



Source: Study Team

Figure 1.4.16 Diagram for Trip Desire Line

1.5 Interview Surveys

1.5.1 List of interviewees

During the Study period, the Study Team interviewed the following organizations and companies concerned with traffic activities in the Study area.

Table 1.5.1 List of Interviewees

Field		Interviewee
Traffic	Public Transport Freight Transport Private / Motorcycle	Ministry of Transport & Communication in Niassa Road Transport Association in Niassa INAV (Instituto Nacional de Viacao) Minibus Manager Truck Driver Police Provincial in Cuamba
	Railways	Lichinga Railway Station, Chief, CDN Cuamba Railway Station Entre Lagos Railway Station, Chief Operator, CDN CFM-Norte Office CDN-Nampula Office CDN-Maputo H.Q.
	Aviation	ADM (Lichinga Airport)
Commercial	Daily Goods	Ministry of Industry & Trade in Niassa Ministry of Industry & Trade in Cuamba Whole Sale Shop (Lichinga) Stores on NH13
	Drinking	Mozambique Beer Company in Lichinga Handling LDA in Lichinga Handling LDA in Cuamba Whole Sale Shop (Mandimba)
	Fuel	Not yet interviewed
Industry, Manufacture	Cement/ Construction Materials	Whole Sale Shop (Mandimba) Construction Company (ONIOBRAS, ALVARO) MOPWH Provincial Office in Cuamba ECMEP Stange Consultant
Agriculture	Maize Cassava Beans Rice Wheat Nuts Sunflower	Malonda Foundation AMADER (Mozambique Association Rural Development) GED (Cabinet of Study for Strategy & Development) Rural Consult, Lda.
	Tobacco (Fertilizer)	Mozambique Leaf Tobacco (MLT) in Lichinga Mozambique Leaf Tobacco (MLT) in Cuamba Buying Centre in Melange for MLT
	Cotton	SAN Lda.
Livestock		Rural Consult, Lda.
Fisheries		Rural Consult, Lda.
Forestry	Timber Jatolopha	Malonda Foundation
Tourism	Niassa Lake Game Reserve	Rural Consult, Lda.

1.5.2 Interview results: General Description of Traffic Patterns on Study Road/ Area

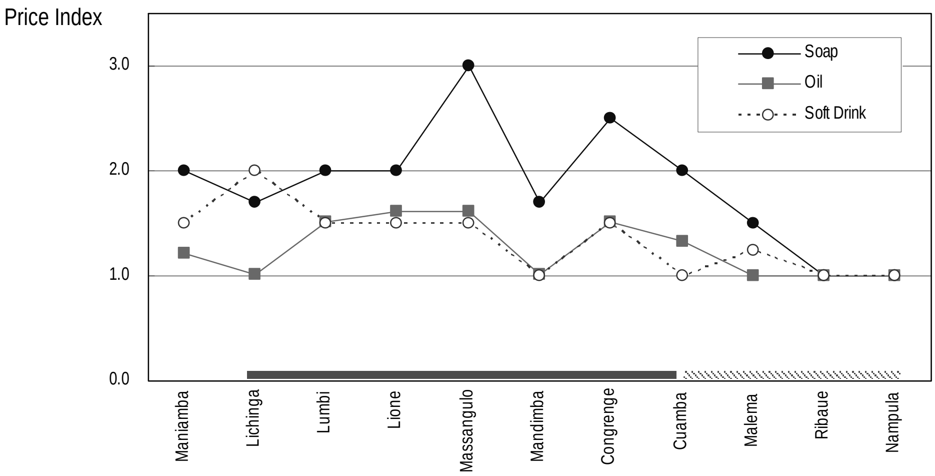
From the interview conducted during the last period, Study Team had grasped the characteristics of traffic patterns on the Study Road and area. The findings are summarized in each traffic category.

(1) Traffic Movement in General

The Study Road, where it connects Cuamba to Lichinga through Mandimba, is the essential road for transporting daily goods, communicating for social and private purposes with other provinces/ districts and supplying the agro-products to the markets.

The Study Road is earth road so it is only possible to drive appropriately in limited periods, while in the rainy season it sometimes becomes impassible. It is observed that potential traffic demands for various purposes are hidden in this area.

As one of the examples for describing the characteristics of this area, the Study Team conducted the price survey for daily goods along the Study Road. The figure below shows the results of this survey, which is affected by large transportation costs.



Note: Price index: Nampula = 1.0
Source: Study Team

Figure 1.5.1 Price Changes of Daily Goods on NH13

The railway connected between Cuamba to Lichinga is now operated only twice per month because of damaged condition of the railway. Therefore, the railway does not have enough capacity for transportation at this time. .

In Nacala Corridor, railway has been spread from Nacala Port to Cuamba up to Entre Lagos. Normally, long distance transportation both of passengers and goods uses the railway from/ to Nampula to Cuamba and uses the Study Road to Lichinga and other northern districts of Niassa. Note that railway operation is almost at full capacity for traffic throughput.

For another road network in this region, there are already improved roads between Lichinga to Marrupa, where it will be connected with Pemba Port and Montepuez, provincial capital of Cabo Delgado, however, they still prefer to connect Nampula and Nacala Port through Cuamba.

Niassa Province has high potential for agro-products, not only food crops (e.g. maize, rice and beans) but also cash crops (tobacco and cotton) and forestry products. It means that these potentials are now restricted because of low passing ability on the road and railway networks.

In the followings section, the characteristics of movement for each category are summarized.

(2) Passenger Movement

Passengers pass though the Study Road mostly by mini-bus and covered truck between Cuamba and Lichinga. Normally, it takes about six hours between Lichinga and Cuamba for a fee of 350MTN per person by minibus (Lichinga to Mandimba is 160MTN). This fee is regulated by ministry as 1.10MTN per person per km. It is not fixed scheduled operation, normally three buses are dispatched in the morning, two at noon and three in the afternoon from one side. Number of passengers in minibus (one box-type vehicle or covered truck, photo below) is regulated to provide seats and roofs, so that only 18 persons are allowed to sit in one bus. At this moment, it is impossible to operate a return trip within one day.

Figure 1.5.2 Photo of Minibus and Truck

The route of Cuamba to Lichinga is a trunk network for minibus transportation in Niassa, while the other routes connected to another district in Niassa should be started from Lichinga or Cuamba towns because of road conditions. For example, if passengers from near Lichinga want to travel to Maua located just near Marrupa, they have to travel to Cuamba first, then change to another minibus for Maua.

The long-distance bus for Maputo is operated twice per month with 56 to 60 seats for 2,300 ~ 2,500 MTN. It takes about 3 or 5 days.

There is a small number of private vehicles. At the nearer towns such as Cuamba, Lichinga and Mandimba, motorcycles are used for traveling to neighboring districts. Note that bicycles are used for local transportation delivering firewood small businesses.

(3) Goods Movement

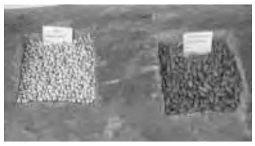
Freight transportation can be divided into following items which have different characteristics of movement:

- Food Crops (Maize, Beans other Farm Products)
- Cash Crops (Tobacco and Cotton)
- Daily Goods (Drinks, Plastics and Equipments,)
- Fuel
- Construction Materials (Cement, Timber)

(a) Food Crops (Maize, Beans, Rice and other Products)

Niassa Province has an advantage of food production because of its suitable climate and lands so that it provides not only in Niassa but also distributes to the whole of country, especially the large consumption area in Nampula. The following are described for typical movement of food crops.

Table 1.5.2 Goods Movement for Food Crops

Maize	Most of the farm surplus of maize (about 80%) is transported to Nampula through railways from Cuamba. Other 20% is for Malawi and Beira. These towns have milling factories and distribute their products.	
Beans	Beans harvested in Niassa are distributed to Maputo and Beira with 70% and to Nampula with 30%. Niassa's beans are preferred to Swaziland's because of their good taste.	
Other Harvests	At this moment, most of other harvest is consumed within their district because of transportation difficulties. Recently, rice production is starting to be boomed in Mecanhelas, it has a potential to distribute in whole of country in future.	

(b) Cash Crops (Tobacco and Cotton)

Cash crops are now booming as new business in Niassa, especially the tobacco industry has grown up over the past few years. These movements needs long distance to the processing plants as described below.

Table 1.5.3 Goods Movement for Cash Crops

Tobacco	Tobacco leaves and fertilizer are transported between "Buying Centers" which are dotted in Niassa and "Processing Factories" in Tete through Malawi by 30t truck. Tobacco leaves (from Niassa to Tete) are delivered from February to June. Fertilizers are distributed from Tete to Niassa in September.	
Cotton	Cotton is processed in factories in Cuamba, Cotton fiber is transported to Nacala Port by railway and cotton seeds are transported to Malawi by road and railways for exporting. Railways: bound for Blantyre and Lilongwe via Entre Lagos from Cuamba Road: bound for Blantyre and Lilongwe via Mandimba from Cuamba	

(c) Daily Goods, Fuel and Construction Materials

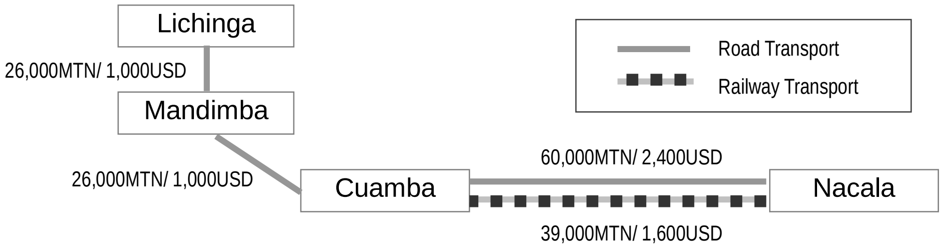
As explained before, Niassa Province is far from other major towns and ports, so that there are limited transport routes and measures. The following are summarized for each movement to Niassa. Normally, they are transported to Lichinga or

Cuamba first, then distributed to various places in Niassa Province.

Table 1.5.4 Goods Movement for Daily Consumed Goods

Daily Goods	**Processed foods, oil, snacks and miscellaneous goods**: each retailer hires the truck from various towns by various transport measure as below; From Nacala: Normally, it is transported from Nacala to Cuamba by railway, then rest of route is by truck From Beira and Maputo: Directly from there by truck via Gurue and Cuamba (only in rainy season, Malawi route is selected) **Bicycles** (2,000~2,500MTN) and **motorcycles** (16,000MTN) are popular sale items. 
	Beer: At this moment, beer breweries are located in Beira and Maputo. Maputo's beer is shipped to Beira Port, and transported together with Beira's beer by 30t trucks through Malawi to Lichinga. After arriving in Lichinga, they are distributed in Niassa Province. One of two major distributers in Lichinga said that five trucks per week is normal transportation. Note that coming October in 2009 a new beer brewery will be opened in Nampula. It is considered to be transported by truck.
	Soft Drinks: At this moment, a factory is located in Nampula. It distributes by railway from Nampula at 05:00 to Cuamba at 19:00. Normally, two wagons are transported per day (one wagon = 30t = 2,015crates). Soft drink company said that it would prefer to shift to truck transportation if road condition will be improved because railway transportation has a lot of time loss.
Fuel/ Petrol	Petrol is transported from Beira by tank truck which has 40,000 liter capacity, to Lichinga. Normally, it is transported three or four times per month. After arriving at Lichinga, it is distributed to any other district in Niassa.
Construction Materials	There is a cement factory near Nacala Port. Transportation is used by 10 ~ 20t truck from Nacala directly. If a large amount of cement is distributed by client, railway can be used for containers. For example, price of cement is normally 350MTN/50kg in Cuamba, instead of 100MTN/50kg in Nacala. During rainy season, it will be increased up to 450~500MTN/50kg. 

From the results of interview to retailers at Mandimba, transportation costs when 40 feet container is transported by railway or road truck are summarized below.



Source: Interview Survey, Study Team

Figure 1.5.3 Transportation Cost from Nacala to Lichinga

At this moment, road condition is bad that transporters charge a lot of fees to clients. It is expected when the road will be rehabilitated many retailers will purchase own trucks and start distributing more than now.

1.6 Summary for Existing Traffic Flow Patterns

Through above information researched by data collection, interview and traffic volume and OD survey, the Study Team recognized the trip characteristics for each section, which tend to show different types of trip patterns. It is summarized in the table below. These characteristics will be considered for the traffic demand estimation in Chapter 3.

Table 1.6.1 Characteristics of rip Pattern for Each Section

Category	Lichinga - Mandimba	Mandimba - Cuamba
Characteristics in General	・ This section is the only route for delivering consumer goods to Lichinga which is the provincial capital of Niassa, where is the base for distributing to northern part. This section can be said the lifeline for northern area. ・ Majority of social and official movement is the OD-pair between Lichinga and Cuamba. ・ Some agro-products are generated from Northern side to south side of Mozambique and Malawi through Mandimba.	・ This section is used for passenger movement from Lichinga and other district in Niassa to connect railway or Nampula province. ・ Some consumer goods are dispatched from Cuamba to Lichinga. On the other hand, most consumer goods for Cuamba city are come from Nampula side mainly by railway. ・ Some trailers with empty container are found which delivers to Nacala port from Malawi. ・ Some agro-products generated around Cuamba to transport to Malawi or Tete province.
Vehicle Type	・ More than half of vehicles are trucks including medium and trailer. ・ Minibus is major for passenger movement.	・ More than half of vehicles are trucks with mainly trailer and large truck. ・ Minibus is major for passenger movement.
Average Trip Length (time) without internal zone trip	・ **16.8** hours (All Vehicles) ・ 11.5 hours (Passenger Car + Bus) ・ 25.2 hours (Trucks) ・ 2.86 days (Trailer)	・ **19.3** hours (All Vehicles) ・ 11.4 hours (Passenger Car + Bus) ・ 28.5 hours (Trucks) ・ 1.99 days (Trailer)

Chapter 2 Traffic Demand Forecast

2.1 Macro-Economic Background

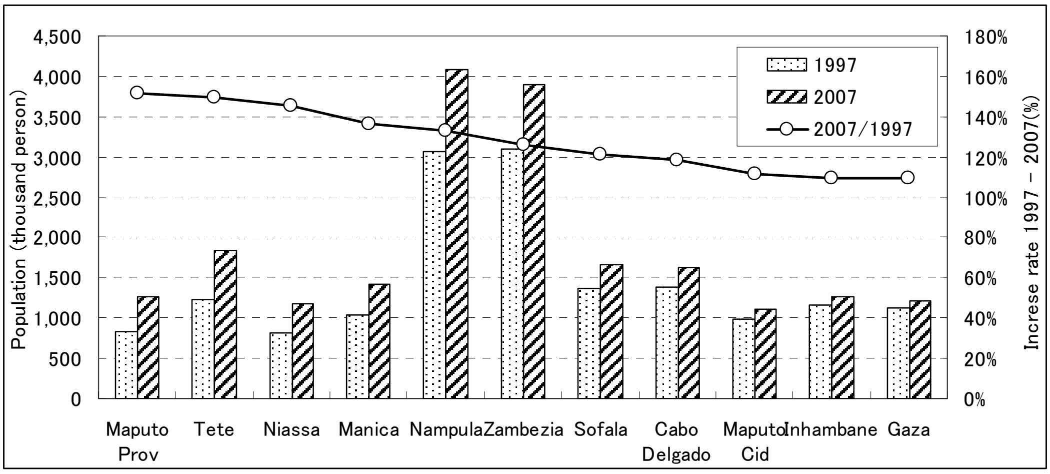
2.1.1 Current Population and Growth Scenario

(1) Population in Census Data (Comparison between 1999 and 2007)

The population in Mozambique increased from 16 million in 1997 to 21 million in 2007, resulting in a 28% increase over the last decade.

On the provincial level, each Nampula and Zambezia province accounts for about 20% of national population. Niassa Province accounted for only 5.0% of total in 1997 and 5.7% in 2007.

Looking at population growth in the last decade, Niassa Province has one of the highest population growth rates with 46% (1997: 8.1 million, 2007: 11.8 million).



	1997		2007		2007/1997
	Population	Rate	Population	Rate	
Niassa	808,572	5.0%	1,178,117	5.7%	145.7%
Cabo Delgado	1,380,202	8.6%	1,632,809	8.0%	118.3%
Nampula	3,063,456	19.1%	4,076,642	19.9%	133.1%
Zambezia	3,096,400	19.3%	3,892,854	19.0%	125.7%
Tete	1,226,008	7.6%	1,832,339	8.9%	149.5%
Manica	1,039,463	6.5%	1,418,927	6.9%	136.5%
Sofala	1,368,671	8.5%	1,654,163	8.1%	120.9%
Inhambane	1,157,182	7.2%	1,267,035	6.2%	109.5%
Gaza	1,116,903	6.9%	1,219,013	5.9%	109.1%
Maputo Prov	830,908	5.2%	1,259,713	6.1%	151.6%
Maputo Cid	987,943	6.1%	1,099,102	5.4%	111.3%
Total	16,075,708	100.0%	20,530,714	100.0%	127.7%

Source: INE

Figure 2.1.1 Population in Each Province

The figure below shows the current population in each district and transport networks in Niassa Province and other neighboring towns. The size of population is indicated as the magnitude of circle in this diagram. It shows that Lichinga - Cuamba road connects the two largest towns in Niassa, and there are not so many larger towns in neighboring areas.

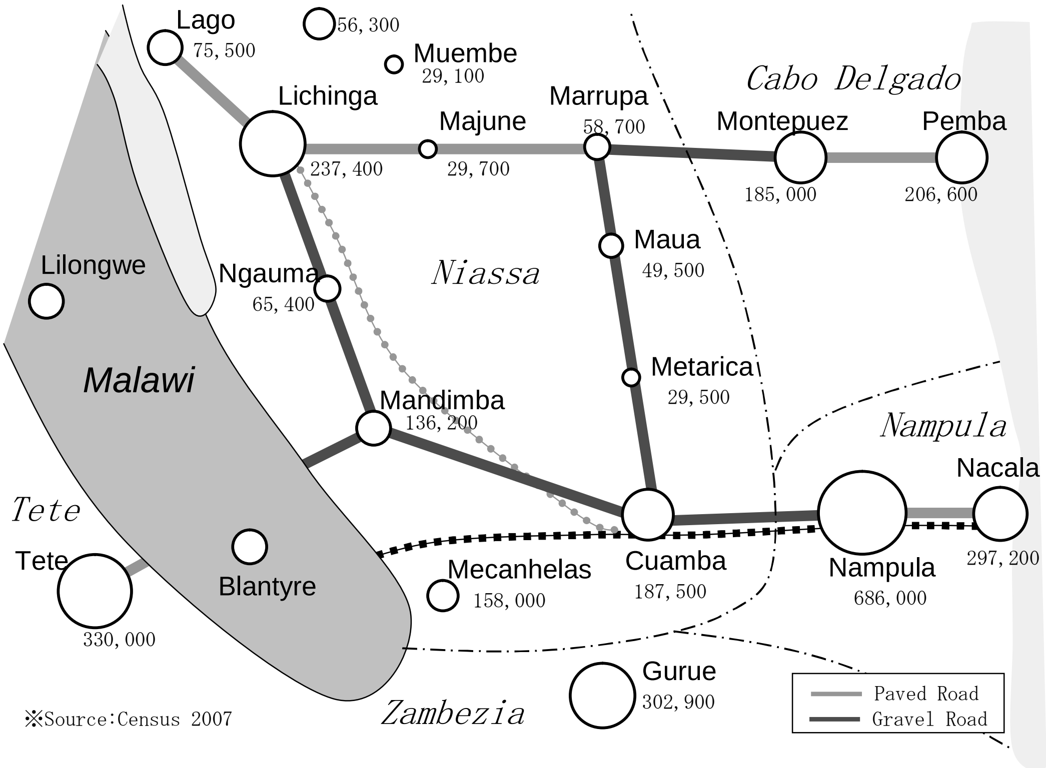


Figure 2.1.2 Population of Each Town at Study Area

(2) Population Growth Scenario in Niassa Province

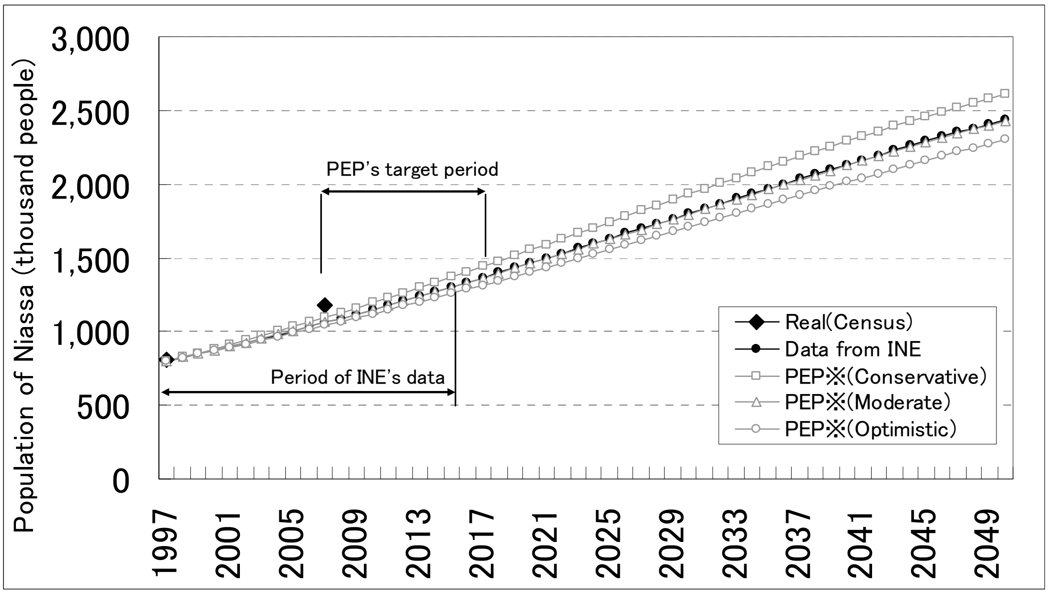
There are two sources for population growth framework in Niassa Province. One is estimated by the “Plano Estrategico Provincial (PEP), Niassa 2017” which is conducted as a provincial study, and the other is estimated by national statistic organization (INE).

The PEP published the future estimated population from 2007 to 2017, which was estimated based on the census survey in 1997 and consisted of three scenarios (conservative, moderate and optimistic). The population growth rate in the conservative scenario, moderate scenario and optimistic scenario is assumed as 3.0%, 2.7% and 2.5%, respectively.

The figure on the next page shows the future estimated population in Niassa up to 2050. This estimation was applied by the logistic curve (growth curve) based on the estimation period and the future population in each scenario.

According to this estimation, even in the lowest case which is the optimistic scenario, the population is about 2,300,000 and increases about 200% within 40 years. Most serious case is the conservative scenario which is 2,600,000 people in 2050 and about 220% within 40 years.

It should be noted that the preliminary results of 2007 census population in Niassa have already exceeded the above estimations.



Source: INE, PEP (Plano Estrategico Provincial, Niassa 2017), estimated by Study Team

Figure 2.1.3 Population Estimation

For reference, conditions for estimation of PEP are as below;

- Target year: 2007 - 2017
- Anchor Project of Transportation

a. Road Project

- ➢ Complete paving of the highways in the development triangle Lichinga-Cuamba-Marrupa (N13 and N14).
- ➢ Paving and good conservation of the two roads, N360 (Cuamba to Marrupa) and N361(Lichinga to Metangula)

b. Railway Access

- ➢ Complete rehabilitation of the Lichinga – Cuamba railway within five to 10 years, and provide daily circulation of passenger and cargo trains.

c. Air Transportation

- ➢ Rehabilitation and expansion of Lichinga airport and its transformation into an international airport to accommodate, among other things, the foreseeable increase in tourism
- ➢ Opening of international roads in Metangula and Cobue, both with pertinent services for migration.

Table 2.1.1 Growth Scenarios in PEP

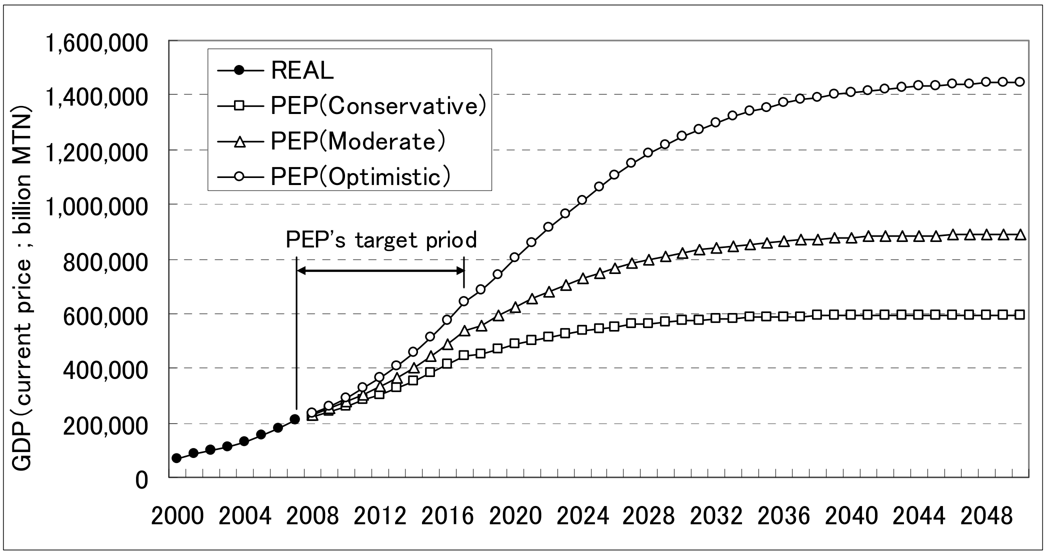
	Conservative	Moderate	Optimistic
GDP Growth	+8%	+10%	+12%
Population	+3%	+2.7%	+2.5%
GDP per Capita	+4.8%	+7.1%	+9.3%
Agricultural Production	+2.1%	+4.5%	+5.0%

Source: PEP

2.1.2 GDP & Poverty Index (Current, Growth Scenario)

PEP analyzed three different scenarios. Growth rate of GDP is estimated as 12% in optimistic scenario, 10% in moderate scenario and 8% in conservative scenario. The analysis period is till 2017.

Future GDP by 2050 is estimated by applying a logistic curve (growth curve) based on the PEP's estimation till 2017. As a result, upon comparing GDP between 2050 and 2007, it is about 3 times in the conservative scenario, about 4.3 times in the moderate scenario, and about 7 times in the optimistic scenario.



Source: INE, PEP, estimated by Study Team

Figure 2.1.4 GDP Estimation

2.1.3 Economical Development Potentials in Niassa Province

(1) Introduction

In case of traffic demand forecasting, it should be taken into consideration that each economical development potential discussed in Chapter 1 should affect the future traffic demand. Therefore, this section discusses the three possible potentials, such as a) Agro-products, b) Forestry and c) Tourism.

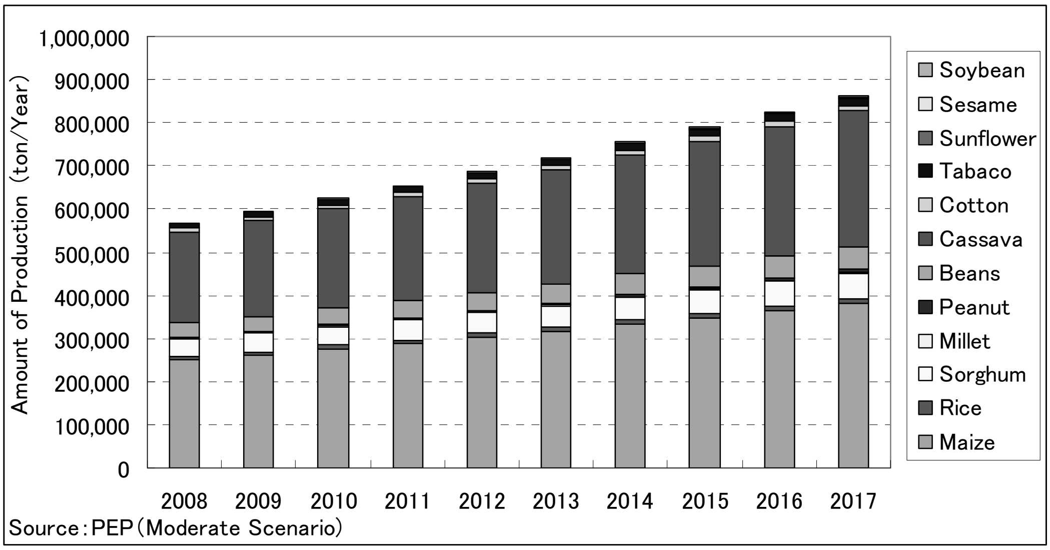
(2) Agro-products (Source: Strategy Plan in Niassa Province)

PEP treated 12 kinds of agro-products and estimated future volume of its production. In moderate scenario, annual increase rate is estimated as 4.5%.

The volume of each agro-product from 2008 to 2017 is shown in the next pages.

Each agro-production has different level in different local/district areas.

For example, millet, potato, cotton, sesame, and sunflower, etc. are produced only in limited areas/districts, while maize, beans, rice, sorghum, peanuts, and cassava, etc. are produced almost all over Niassa.



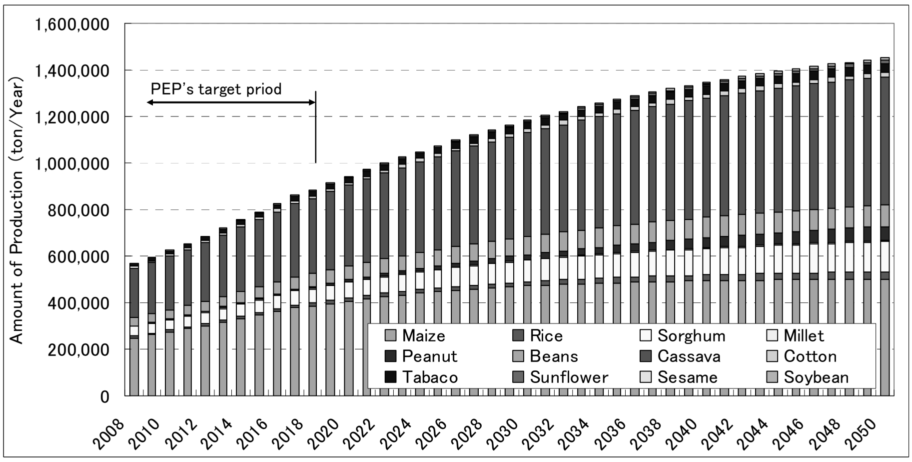
	Maize	Rice	Sorghum	Millet	Peanut	Beans	Cassava	Cotton	Tabaco	Sunflower	Sesame	Soybean
2008	250,000	8,000	40,000	1,200	2,500	34,000	212,000	8,000	12,000	291	150	35
2009	261,250	8,360	41,800	1,254	2,613	35,530	221,540	8,360	12,540	304	157	37
2010	274,882	8,736	43,681	1,310	3,292	37,529	231,509	8,736	13,104	718	164	400
2011	287,958	9,129	45,647	1,369	3,493	39,300	241,927	9,129	13,694	832	171	600
2012	302,540	9,540	47,701	1,431	4,064	41,446	252,814	9,540	14,310	1,247	179	1,200
2013	316,327	9,969	49,847	1,495	4,330	43,870	264,191	9,969	14,954	1,863	187	1,600
2014	332,765	10,418	52,090	1,563	5,256	46,677	276,079	10,418	15,627	2,779	195	2,000
2015	347,739	10,887	54,434	1,633	5,492	48,777	288,503	10,887	16,330	2,904	204	2,090
2016	363,388	11,377	56,884	1,707	5,739	50,972	301,485	11,377	17,065	3,035	213	2,184
2017	379,740	11,889	59,444	1,783	5,998	53,266	315,052	11,889	17,833	3,171	223	2,282

Source: PEP (Moderate Scenario)

Figure 2.1.5 Estimated Agro-products in PEP

In the moderate scenario, the PEP estimated annual increased rate for agro-production volume is 4.5% by 2017 as shown in table above. Based on above data, the Study Team estimated by the method of applying logistic curve (growth curve) which has upper limitation of provincial capacity of production which should be same as capacity of production per capita. And the Study Team assumed the limited products such as sunflower, sesame, and soybean which are only farmed in limited districts to be applied the same as 4.5% annual increase rate after 2017.

In the results described in figure below, agro-production in 2050 is estimated as 1,450,000 tons compared to 500,000 tons in 2008. This represents an increase of about 2.6 times.



Source: PEP (Moderate Scenario)

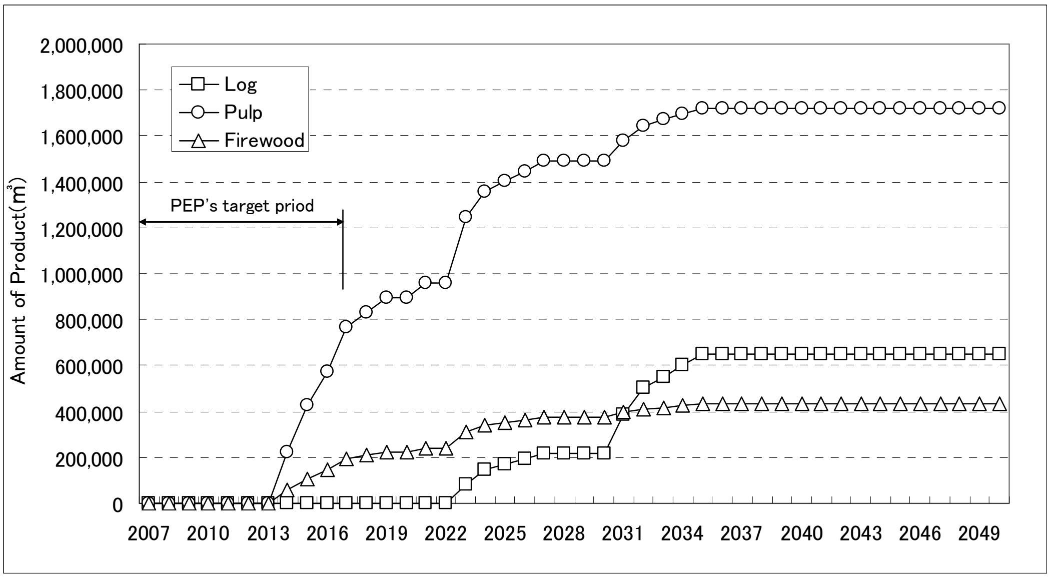
Figure 2.1.6 Estimated Agro-products

(3) Forestry (Source: Strategy Plan in Niassa Province)

In the moderate scenario, PEP assumed that annual tree planting will be planned as 6,000 - 17,000 ha, and forestry products (e.g. log, pulp and charcoal) will be distributed on the market gradually after planting and growing. In 2017, it is planned that 130,000ha of area will be covered by forest.

Assuming that the same level of annual afforestation (17,000ha) will be continued after 2017, afforestation area will cover about 741,000ha (about 6% of province area) in 2050.

Based on the conditions described below, the quantity of production will increase gradually and level from 2035. Annual production will be 1.7 million cubic meters for pulp, 0.6 million cubic meters for log and 0.4 million cubic meters for charcoal.



Source: PEP（Moderate Scenario）

Figure 2.1.7 Forest Estimation

Reference: Condition for estimation in PEP

The forestry products produced by afforestation of 1ha are divided into three products, namely log, pulp and charcoal. Forest of 1ha area is supposed to produce 80 cubic meters. Table below shows share of each production in accordance with the elapsed years after afforestation.

Table 2.1.2 Assumed Share of Forest Production

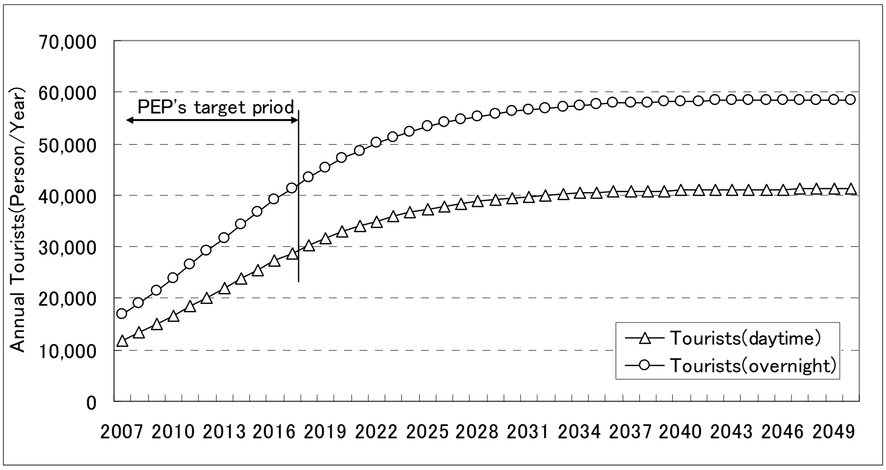
	8years later	16 years later	25 years later
Log	0%	30%	60%
Pulp	80%	56%	32%
Firewood	20%	14%	8%
Total	100%	100%	100%

Source: PEP after 8 years, 16 and 25 years are estimated by description of PEP

(3) Tourism (Source: Strategy Plan in Niassa Province)

PEP analyzed that tourists will increase to 70,000 tourists including one day trips and stays in 2017 which is more than twice the number in 2007 (about 30,000 tourists). However, PEP also estimated that the increase rate will be reduced after 2017.

Therefore, the Study Team applied the logistic curve (growth curve) based on PEP's estimation and estimated future tourists by 2050. It shows that increase of visitors will level out around 2030 at about 100,000 tourists comprising 40,000 visitors for one-day tours and 60,000 visitors for stay tours as shown in the figure below.



Source: PEP (Moderate Scenario), Study Team estimated Long term

Figure 2.1.8 Tourism Estimation

2.1.4 Summary

The Section from 2.1.1 to 2.1.3 discussed the basic macro-economic assumption for traffic demand forecasting. These assumptions are summarized in the table below.

Table 2.1.3 Summary for Macro-Economics Assumptions

Item	Assumptions	Annual increase rate (2050/2007)
Population	Future population up to 2050 has been estimated in each district based on PEP's estimation, and applied logistic curve by the Study Team	About 2.5 – 2.8% (2.2times)
GDP	Future provincial GDP up to 2050 has been estimated based on PEP's estimation, applied logistic curve	Conservative: 8% (3.0times) Moderate: 10% (4.3times) Optimistic: 12% (7.0times)
Agro-products	Future agro-products up to 2050 have been estimated based on PEP's estimation, applied logistic curve and some conditions/ assumptions	About 4.5% (2.6times)
Forest	Future forest products up to 2050 have been estimated based on PEP's estimation, applied logistic curve and some conditions/ assumptions	Annual production after 2035 Pulp: 1.7 mil. m^3 Log: 0.6 mil. m^3 Chacol: 0.4 mil. m^3
Tourism	Future tourists up to 2050 have been estimated based on PEP's estimation, applied logistic curve and some conditions/ assumptions	Annual visitors after 2030, One-day: 40,000 visitors Stay: 60,000 visitors

2.2 Forecasting Methods

2.2.1 Review of Forecasting Methods in Previous Feasibility Study

In order to apply suitable forecasting method, the forecasting method in the previous study should be reviewed. In this context, the Study Team examined the following previous studies which are a) Lichinga – Montepuez (2001), b) Milange – Mucuba (2008) and c) Nampula – Cuamba (2007).

The outline of these studies is summarized in the table below.

Table 2.2.1 Outline of Previous Feasibility Studies

Item	Lichinga ~ Montepuez: N14 BCEOM, 2001	Milange ~ Mucuba: N11 BCEOM, 2008	Nampula ~ Cuamba: N13 JICA, 2007
Forecasting Period	2005～2015	2011～2030	2012～2028
Traffic Survey	2002 Traffic volume survey: 3 locations 7days (18hrs.) + 1day (24hrs.) OD survey: 2 locations (3days)	2007 Traffic volume survey: 4 locations 4days (12hrs.): incl. Sat. Sun. 2nights at 1 location OD survey: 3 locations 4days (12hrs.): incl. Sat. Sun. 2nights at 1 location	2006 Traffic volume survey: 9 locations 4: 3days(24hrs.): Oct&Dec 5: 2days(12hrs.): Oct&Dec OD survey 4 locations 3days(12hrs.): Oct
	Interview survey to traffic related firms at Lichinga	Interview survey to transporter at Lilongwe	Railway/ Bus passenger survey Interview survey for railway company Interview survey to transporters
Road Network	TAZ: 5 combined with districts Link nos.: 6 (straight line) Network assignment: No	TAZ: not treated Link nos.: not treated Network assignment: No	TAZ: 17→25 Link nos.: many with Malawi's link Network assignment: done
	Study link nos. : 5	Study link nos.: 1	Study link nos.: 4
Forecasting Method	- Carefully discussed with Traffic Generation (daily consumption, agro-products) - Passenger traffic was estimated by fix unit generation ratio.	- The concept of trip generation and attraction was not treated. - Traffic volume was estimated based on the fuel consumption estimated by another agency[1]	- Traffic volume was estimated based on the fuel consumption estimated by another agency, and included future provincial population[2]. - Diverted traffic from railway was considered.
Generated Traffic	About 30~50% of each consumption item	Estimated by the saving of time value using elasticity of value	N/A
Diverted Traffic	N/A	- Route diverted from Nacala and Beira Port related traffic	- International route choice from Beira to Nacala Port - Modal shift from railway both passenger/ freight traffic - Route diverted estimated by traffic assignment
Bicycle	N/A	Change to vehicle for long trip bicycle riders	N/A

According to the above results, it is found that there are many differences of forecasting methods among studies. It is true that each study road has different characteristics of traffic pattern, so that it may be possible to apply more suitable method for the objective.

More details of estimation method in each study are attached in the appendix.

[1] An assessment of road traffic growth, 2006, prepared by ANE in-house consultant (not officially opened)
[2] Same as above

However, African Development Bank (AfDB) pointed out the several issues for traffic demand estimation in the preliminary appraisal mission for Nampula – Cuamba road improvement project. The issues pointed out are summarized as follows;

- Generated traffic must be included in Traffic Demand Forecasting (Economist of AfDB suggested that 30% of estimated traffic will be added as generated traffic)
- For sensitivity analysis, GDP should also consider both the optimistic and pessimistic scenarios.
- For economic analysis, both motorcycles and bicycles should be taken into consideration.

2.2.2 Concepts for Traffic Demand Forecasting Method

(1) General Concepts

Considering the above section, the Study Team has set the general concepts for traffic demand forecasting method described below.

- Forecasting model shall be able to explain the potential/ hidden demands caused by rainy season and bad surface conditions.
  - Passenger traffic: model includes difficulties of moving in rainy and dry seasons.
  - Freight transport: model includes the demands of consumption and supplement in market by each item.
- Route choice shall be considered by each item’s origin/ destination
- International freight transport from Malawi shall be considered as diverted traffic.
- Railway transportation shall be treated as below;
  - Nacala - Nampula – Entre Lagos – Malawi Line: Capacity of railway transportation has already leveled out because of poor rail condition and limited number of locomotives as described in 1.6. In this estimation, railway improvement will not be considered, and capacity of traffic will be stable as it is.
  - Cuamba – Lichinga line: As described in 1.6, Northern line is not operated properly, and wagons can make only one round tripper month. And CDN, which is the operation firm under concession, has difficulties of rehabilitation of railway condition under its concession agreement. Therefore, this line will stay in its current condition.
- Port facility shall be considered to be the same condition as present.
- Border facility at Mandimba will be assumed in both its current status and improved status such as one-stop-border post.

Note that in the middle of October 2009 there was an announcement for new railway construction plan between Motivaze and Blantyre for transporting coal to Nacala Port. It is said that feasibility study will be started soon. At this moment, there is no concrete information for this project. However, there must be much rehabilitation through the SEAR and CDN for allowing coal transportation. Therefore, in this Study, this will not be considered for application to this estimation.

(2) Estimation Periods

For estimation of future traffic demand, the following analysis period is defined:

- Horizon year: 2009
- Construction period: 2011-2013
- Base year: 2014
- Analysis period: 2014 – 2034 (20 years)

(3) Scenarios for Traffic Demand Forecasting

According to general concepts described before and study sections between Cuamba and Lichinga, forecasting scenarios are formulated as below.

Table 2.2.2 Scenarios for Traffic Demand Forecasting

Scenario Case	Road Network			Border	Railway Network			Port
	Lichinga ~ Mandimba	Mandimba ~ Cuamba	Nampula ~ Cuamba	OSBP	Nacala~ Entre Lagos	Cuamba ~ Lichinga	Malawi Doest.	Nacala
Without Case	As it is	As it is	As it is	As it is	As it is	As it is	As it is	As it is
With Case (Scenario -1)	As it is	Improved	Improved	As it is	As it is	As it is	As it is	As it is
With Case (Scenario -2A)	Improved	Improved	Improved	As it is	As it is	As it is	As it is	As it is
With Case (Scenario –2B)	Improved	Improved	Improved	Improved	As it is	As it is	As it is	As it is

Nampula – Cuamba (N13) section is already undergoing implementation of construction, therefore, all of the “with” cases take this section to be improved.

2.3 Traffic Demand Forecast

2.3.1 Methodology of Traffic Demand Forecasting Method

Based on the discussion in 2.2, future traffic volume was estimated by three different types of traffic, such as i) passenger, ii) regional goods and iii) international goods, used by following data and process.

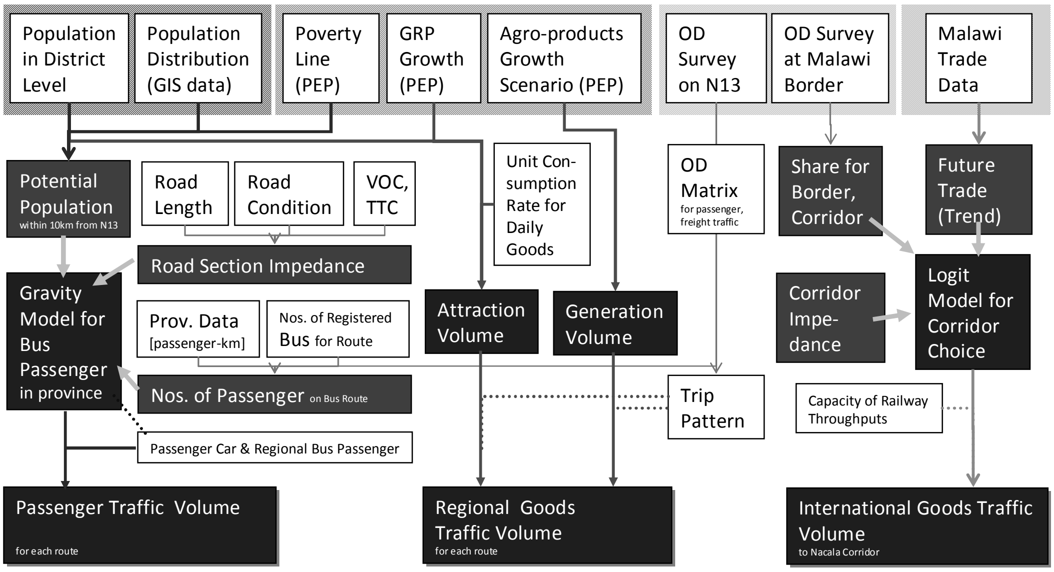


Figure 2.3.1 Process of Traffic Demand Forecast

Each component of traffic estimation is described below;

Passenger traffic volume is estimated by "Gravity Model" with the variable index of potential population and road section impedance, developed by the actual number of passengers for each O-D trip.

Regional traffic volume is considered by divided traffic as attraction and generation for each zone. Trip attraction is estimated by the consumption of daily goods, and trip generation is based on agro-products from Niassa province.

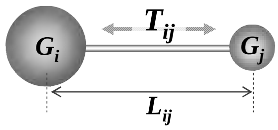
International traffic volume is thought to be generated after the road network is improved. It is estimated by the Malawi trade and railway capacity, and applies the corridor choice model, named lodgit model.

Following sections describe the estimation method and the results for each estimation component.

2.3.2 Passenger Traffic Estimation

(1) Introduction

For describing the "hidden demands" of social and business passenger movement, "gravity model" had been chosen as a suitable method. The basic model equation for gravity model is shown below.



$$T_{ij} = k\frac{G_i^{\alpha}\, G_j^{\beta}}{L_{ij}^{\gamma}}$$

T_{ij} Nos. of Passengers between "i" to "j"

G_i Potential for moving (e.g. Population)

L_{ij} Impedance between "i" to "j" (e.g. Road Length under condition)

Figure 2.3.2 Gravity Model Equation

(2) Model Development

In order to apply this model into this Study, the Study Team selected following definitions for each data set after acquiring data available in Niassa Province.

T_{ij} : Number of minibus passengers between "i" to "j", calculated by the static data (e.g. provincial data for passenger-km and number of registered buses for each route) and OD survey data. The figure right shows the estimated number of daily passengers for each OD trip.

L_{ij} : Number of population within 10km from district center calculated by GIS, whose income level is above the poverty line (52% in 2007). Future value based on the INE projection and target poverty index in 2017 (37%).

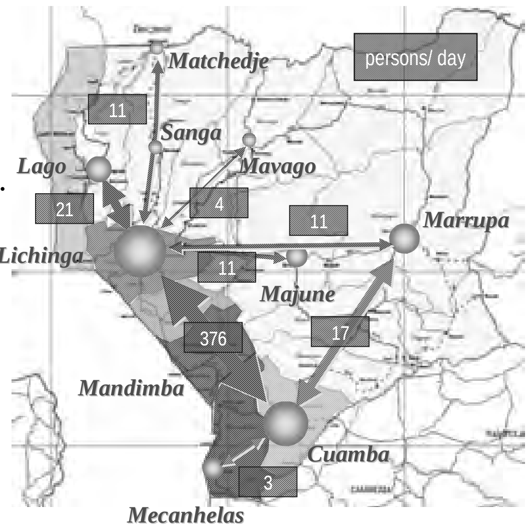


Figure 2.3.3 Estimated Number of Minibus Passengers

G_i : Impedance between "i" to "j", which is calculated by the vehicle operation cost (VOC) and travel time cost (TTC) at each road section with same road condition such as IRI. Note that the Study Road will have decreased impedance when the rehabilitation is completed.

After collecting the above data, coefficients for each explanatory variable were estimated and validated for relevance. The results of model estimation are described in the table below. It is clear that t-value of parameter was estimated as more than two, and coefficient determination is nearly 1.00.

Table 2.3.1 Results of Model Estimation

[Model Equation]

$$T_{ij} = k\frac{G_i^{\alpha}\, G_j^{\beta}}{L_{ij}^{\gamma}}$$

Explanatory Variables	Estimated Coefficient (t-value)	R^2 (Coefficient Determination) = 0.94, DW (Durbin-Watson) Ratio = 1.41
α: Population-1	2.78 (3.25)	
β : Population-2 / 3	1.02 (4.80) / 0.22 (1.35)	
γ : Impedance	-0.85 (3.19)	
K: Constant	1.58*10^-15 (-3.63)	

Using this developed gravity model, the future traffic volume will be estimated using the future population and road condition when the Study Road will be improved.

(3) Future Number of Passengers and Vehicles

There are two types of scenario for the "with case" discussed in 2.2.2, so three types of estimation including "without case" have been conducted as shown below.

- **Without case**: only "normal traffic" affected by population increase
- **With case (Senario-1)**: "normal traffic" and "generated traffic" are affected by the improvement of only "Cuamba – Mandimba" section. [Generate-1 in figure 2.3.4]
- **With case (Senario-2)**: "normal traffic" and "generated traffic" are affected by the improvement of all Study Road section. [Generate-2 in figure 2.3.4]

The conversion factor from number of minibus passengers to vehicles is taken as 14.3 passengers/vehicle, which is analyzed by the result of OD survey.

The results of estimation are shown in figure below. The normal traffic will be increased more than 20% per year due to hidden traffic demand, and 30% of normal traffic will be generated when the road will be improved.

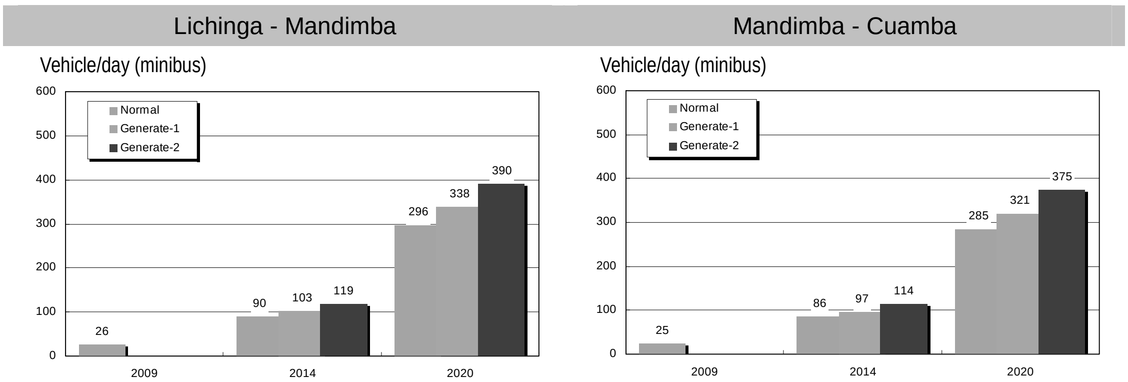


Figure 2.3.4 Minibus Traffic Estimation <Results>

In the case of passenger cars, the trip pattern is analyzed by the OD survey, which is shown as the percentage of OD pair in figure below. More than half of trips communicate between Cuamba and Lichinga. Only a few trips reach Tete or Beira.

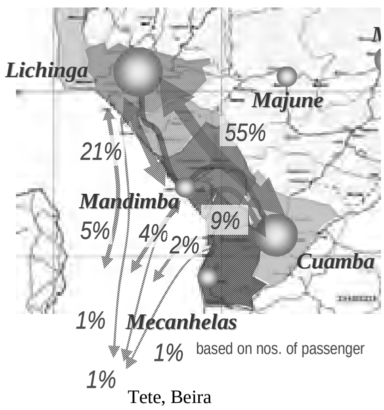


Figure 2.3.5 OD-pair Trip Pattern for Passenger Cars

Due to the estimation for future trips, the annual increase rate of population and GRP per capita will be applied to the number of passengers of trip generated zone.

The results of passenger vehicles for each section are shown in figure below.

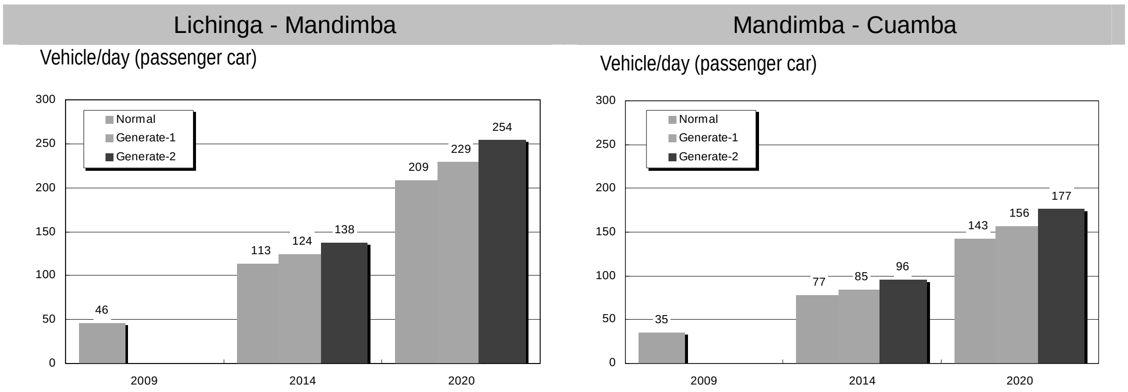


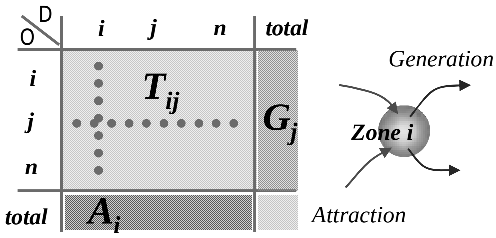
Figure 2.3.6 Passenger Traffic Estimation <Results>

Based on the results, both minibus and passenger car vehicles are cumulated to future traffic volume. Note that some minibus passengers may shift traffic mode to passenger cars as they enter higher income groups. However, it is difficult to account because of the limitation of this type of estimation method.

2.3.3 Regional Goods Traffic Estimation

(1) Introduction

As already discussed in the previous section in 1.5.2, the regional goods movement is characterized when the OD survey is carefully analyzed on separated trip "attraction" and "generation" described on the right.

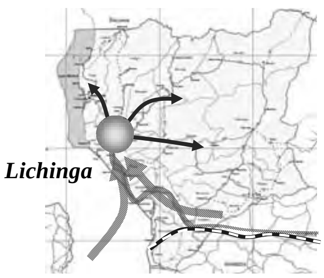


T_{ij} : *Volume of goods which are transported from "i" to "j"*

G_j : *Trip Attraction to "i" from other zone*

A_i : *Trip Generation from "j" to other zone*

It is assumed that the "**trip attraction**" is mainly caused by the traffic of consumer goods for Lichinga, because of the limited road network surrounding this provincial capital. Therefore, once consumer goods reach to Lichinga, these are distributed to northern part of Niassa Province. The result of trip attraction to Lichinga is calculated as 165.0ton per day. Future attracted traffic will be estimated by the future consumed goods volume.

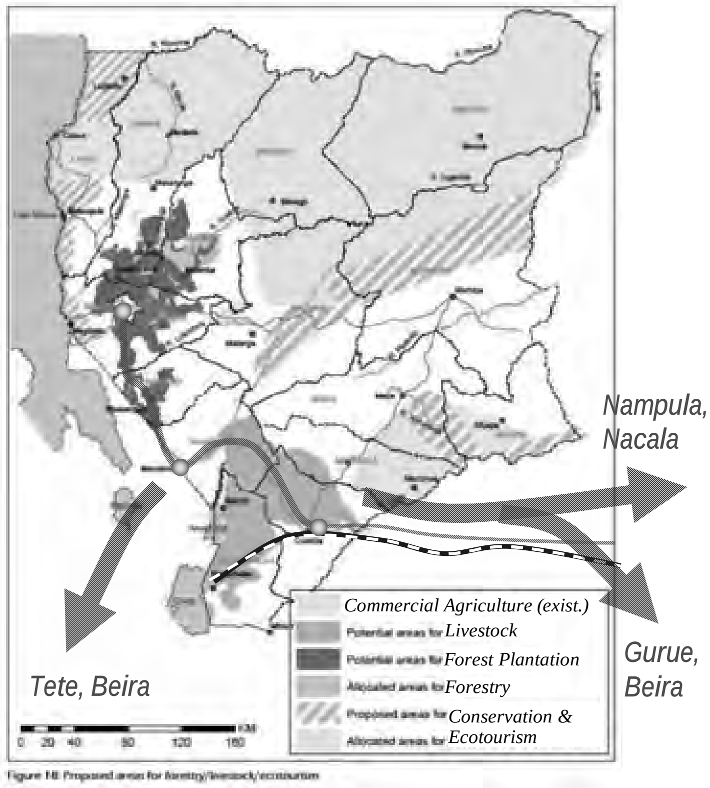


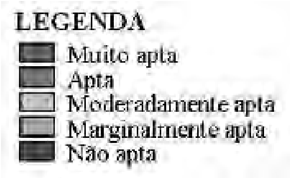
$\Sigma A_{Lichinga}$ = **165.0** *ton/ day*

Distributed to;
Lichinga Municipal, Lichinga District, Ngauma District, Mandimba District, Lago District, Sanga District, Muembe District, Mavago District, Majune District, Mecula District, Marrupa District

Figure 2.3.7 Concept of Trip Attraction

On the other hand, for the "**trip generation**", the Study Team recognized that Niassa Province has essential potential for agro and forestry products, therefore, future generated traffic will be estimated by the planned agro products in Niassa Province on PEP (Niassa Provincial Strategy). The figure below shows the current potential for trip generation conducted by Niassa Province.





Source: Zoning & Identification of Areas for Investment in the Agrarian Sector and Socio-Environmental Analysis for Niassa Province, Rural Consult. Ltd. and Savocor Indufor, 2007.5

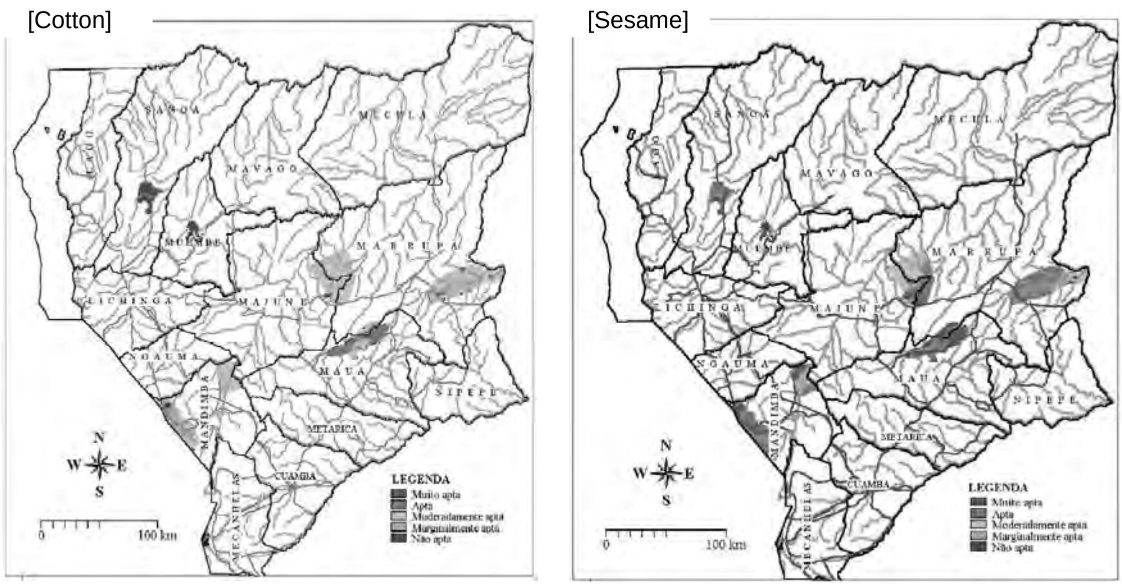


Figure 2.3.8 Current Potential for Trip Generation

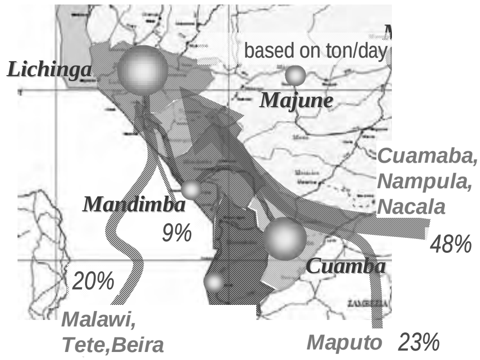
(2) Estimation Process and Results for Trip Attraction

The figure below shows the trip pattern analyzed by OD survey attracted to Lichinga, Mandimba and Cuamba. The percentage of share is calculated based on the tonnage of goods transported.

[To Lichinga]

165.0ton/day

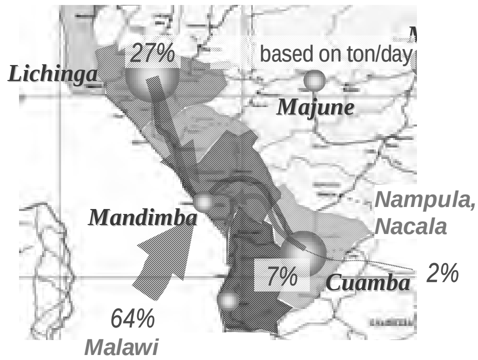
- About half of goods are transported from Cuamba, Nampula and Nacala side.
- 23% of goods are from Maputo.
- 20% of goods are from Malawi, Tete and Beira..



[To Mandimba]

18.0ton/day

- Mamdinba relays on the goods from Malawi for more than half of them.
- 27% of goods are distributed from Lichinga.
- Only a few goods are transported from Cuamba side.



[To Cuamba]

9.7ton/day

- Because OD survey was only conducted on the Study Road section, there are no transportation data from east side to Cuamba. Also, there may be existing railway transportation.
- The road transportation on the Study Road accounts for 74% from Tete and Beira.
- 24% of goods come from Lichinga.

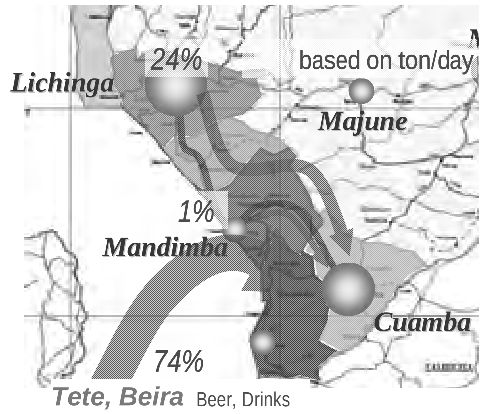


Figure 2.3.9 Current Trip Pattern for Attraction

It is assumed that this trip pattern will be kept to the future traffic pattern.

Regarding the future volume of required goods, the unit method for major consumption goods will be applied, such as “unit consumption rate”, future population and increased growth of disposable income level (+10% in annual). The table below shows the applied rate for major consumed goods.

Table 2.3.2 Applied Unit Consumption Rate

Item	Consumption Rate
Consumer Dry Goods	14.4kg/ pp/ year
Oil	3.6kg/ pp/ year
Salt	1.2kg/ pp/ year
Sugar	3.6kg/ pp/ year
Powdered Milk	3.6kg/ pp/ year
Construction Materials	5kg for Cement, 10kg for roof material
Beer/ Soft drink	20bottles/ pp/ year
Fuel	2truck for 30,000L per day
Fertilizer	17 % of cotton, 42% of tobacco product

Source: Feasibility Study on Lichinga - Montepuez (N14) BECEOM, 2001 and Study Team (adjusted to OD results)

Based on the above procedure, the future goods traffic is estimated in the figure below. Regional goods traffic will be increased by 10 - 15% per year.

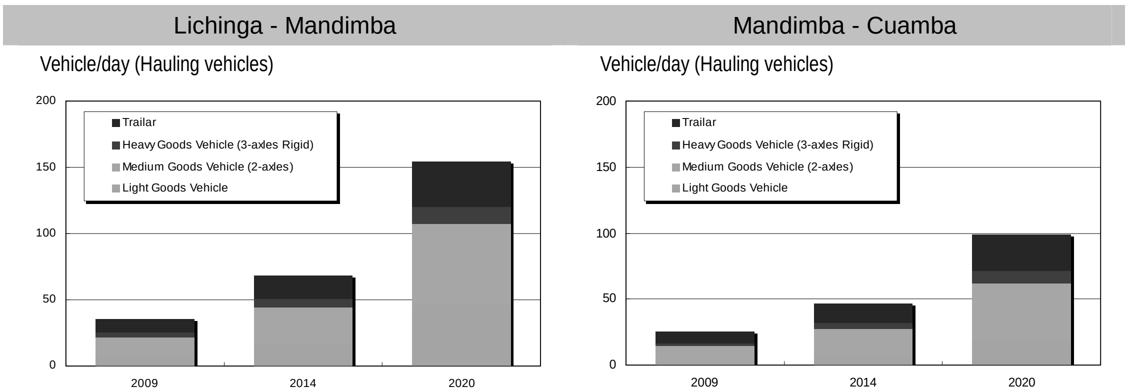


Figure 2.3.10 Regional Goods Traffic Attraction Estimation <Results>

(2) Estimation Process and Results for Trip Generation

As described in 2.1.3 (2) and (3), future agro-products and forestry products are applied to regional generation traffic.

The figure below shows the trip pattern analyzed by OD survey generated from Lichinga, Mandimba and Cuamba for type of goods. Note that this movement is supposed to have many seasonal or monthly variations. Therefore, the ideal modeling of trip generation described below will be applied.

Future generation volume (ton) for agro-products is estimated in figure below. Total volumes of agro-products are estimated by “Agro-products in PEP – Internal Consumption (maize, rice, sorghum, millet, peanuts, beans, cassava, cotton, tobacco, sunflower, sesame, soybeans)”.

Note that forest products are assumed to be generated from the northern side of Niassa as described in Figure 2.3.8. Therefore, all products will be generated from Lichinga.

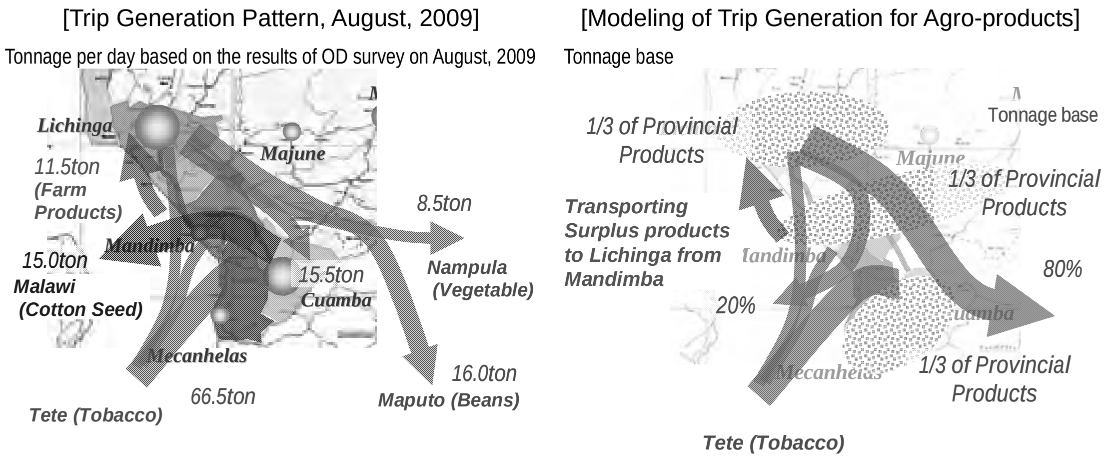


Figure 2.3.11 Trip Pattern for Regional Goods Traffic for Generation

Based on the above procedure, the future goods traffic is estimated in figure below. Regional goods traffic will be increased by 5 - 10% per year.

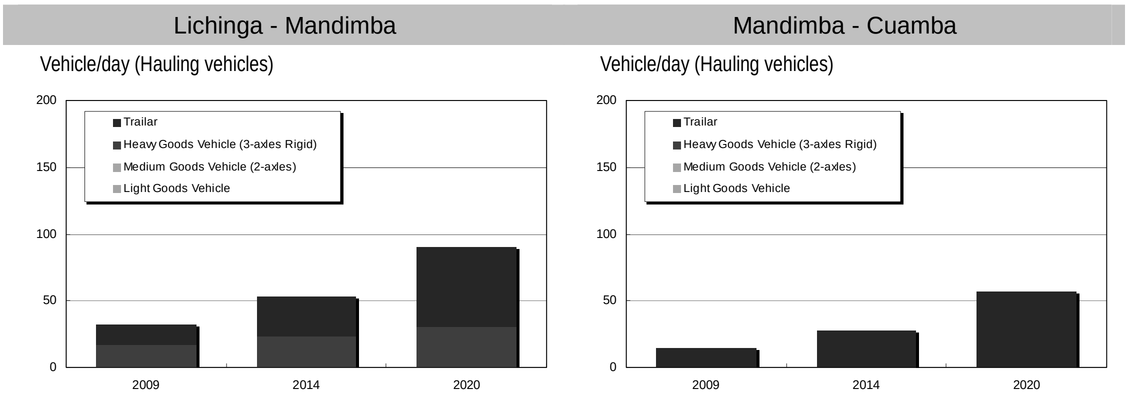


Figure 2.3.12 Regional Goods Traffic Generation Estimation <Results>

2.3.4 International Goods Traffic Estimation

(1) Introduction

For the international goods transportation on Nacala Corridor in future, both Nacala and Beira Corridor networks should be considered with Malawi and Zambia trade. However, the OD survey found that only Malawi trade existed and is possibly applied to future corridor transportation, so this Study took the possible route for Malawi trade in the figure below.

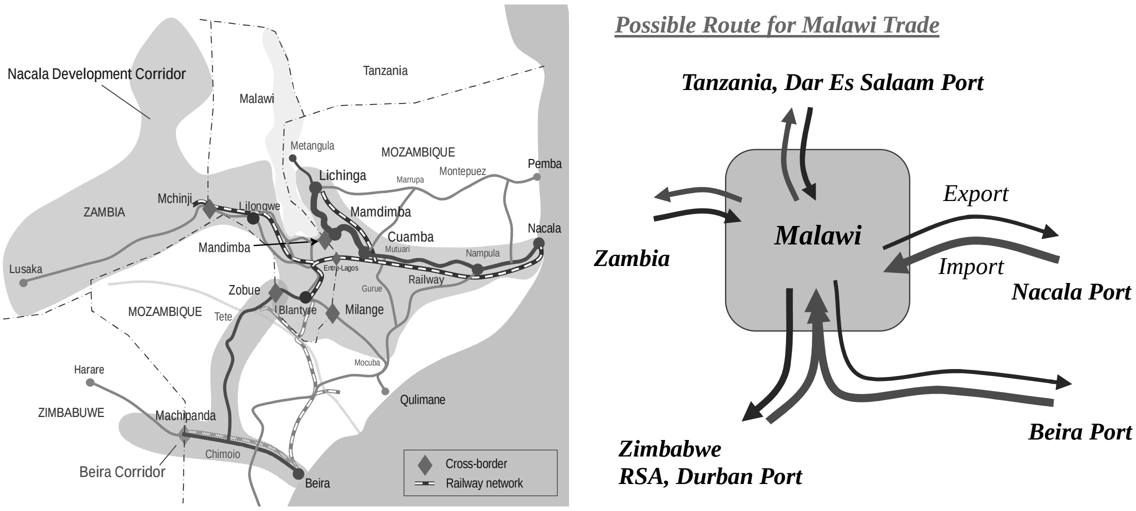


Figure 2.3.13 International Network and Possible Route for Malawi Trade

In order to find more suitable estimation for international transportation in this area, the Study Team took the point of view for Malawi trading data, then assigned to each route.

(2) Estimation Process

The future Malawi trade will be estimated based on the historical trade data. Then, applying the border share at different borders in/out of Malawi and neighboring counties, possible volume of international transportation is estimated for railway on Nacala Corridor (CDN) and road transportation on Nacala and Beira Corridors. The route preference between Beira Corridor and Nacala Corridor is estimated by the "Logit Model" which is developed based on the existing stated preference such as the result of cross-border OD survey. The whole process is shown in the figure below.

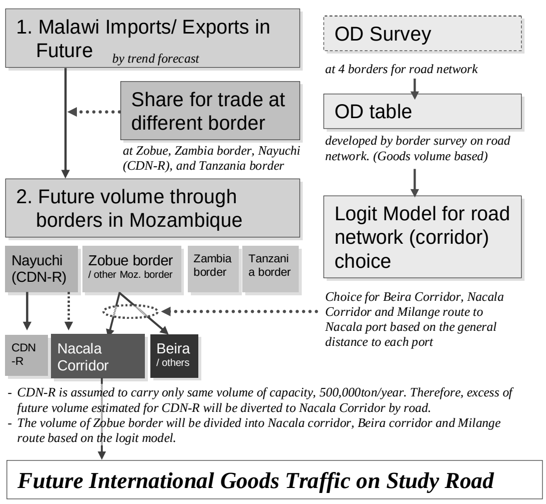


Figure 2.3.14 Estimation Process for International Goods Transportation

(3) Results for each Estimation Step

Future Malawi trade is estimated by the logistic model developed using the last 20 years trade data in monetary value for Malawi (1987-2006). The figure right shows the curve of future estimated trade data. Then, this estimated future monetary value is converted into tonnage value by the actual ratio between monetary value and total tonnage of the top 20 commodities in 2006. It should be noted that there are still large gaps between export and import from Malawi.

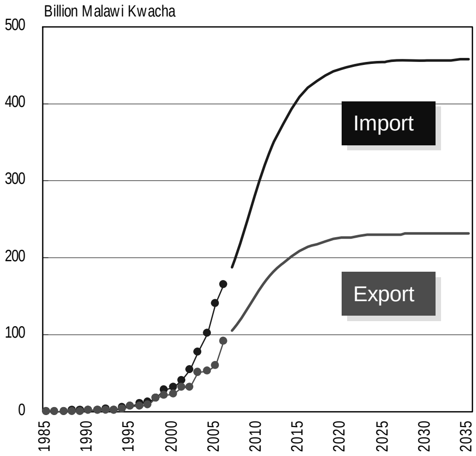


Figure 2.3.15 Estimated Future Malawi Trade

After estimating this trade data, previous research was conducted to find the percentage share of throughput at various borders in Malawi to neighboring countries. For example, taking the case of importing, 63.8% of imports use road transportation through Mozambique and 21.2% are by Nacala railway as indicated in "Entre Lagos". The details are shown in below.

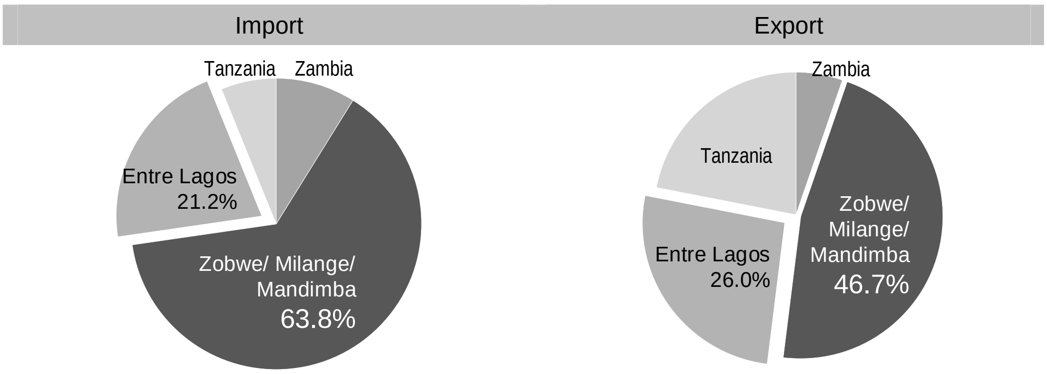


Figure 2.3.16 Percentage Share for Border Throughput

In addition, OD survey conducted at four Malawi borders in August 2009 were analyzed to find the percentage share for road transportation to select the route in tonnage based on different origin and destination. The table below is the result of this analysis.

Table 2.3.3 Percentage Share of Route Choice for Road Transportation (tonnage base)

Import (from)			Export (to)		
Mozambique		9.8%	Mozambique		5.0%
Nacala Port	Mandimba	-	Nacala Port	Mandimba	-
	Milange	-		Milange	18.2%
Beira Port		40.5%	Beira Port		33.3%
South Africa		24.0%	South Africa		18.2%
Zimbabwe		25.7%	Zimbabwe		25.3%

Source: Study Team (Border OD Survey)

Based on the performance of route choice for Nacala Port and Beira Port, the Study Team developed the route choice model such as "logit model" described in the following equation.

$$Pr_i = \frac{e^{V_i}}{\sum_j e^{V_j}}$$

Pr_i: Probability for route choice "i"

$$V_{Beira} = \beta_1 L_{Beira} + \beta_2 ASV_{Beira}$$

$$V_{Milange\text{-}Nacala\ (M\text{-}N)} = \beta_1 L_{M\text{-}N} + \beta_3 ASV_{M\text{-}L}$$

$$V_{Mandimba\text{-}Nacala\ (Ma\text{-}N)} = \beta_1 L_{Ma\text{-}N}$$

where,

V_i: Utility of route choice "i"

L: General distance (Explanatory Variable)

ASV: Alternative Specific Variables

It should be noted that general distance was applied to the length of each route and its surface condition. When the Nacala Corridor will be improved, the general distance will be changed to less distance compared with Beira Corridor.

The results of route choice probability after road improvement on Nacala Corridor are summarized in the table below. It is estimated that about 40% of imports and 77% of exports will use Nacala Corridor, which means that more time-conscious transportation will choose Nacala Corridor, which can be described as the "Diverted Traffic" for route.

Table 2.3.4 Route Choice Probability after Road Improvement on Nacala Corridor

Import (from)			Export (to)		
Nacala Port	Mandimba	39.5%	Nacala Port	Mandimba	76.7%
	Milange	0.1%		Milange	8.3%
Beira Port		60.4%	Beira Port		15.0%

Source: Study Team, estimated by Logit Model

Moreover, regarding diverted traffic from railways, after estimating the transportation volume on Nacala railway, overflow of railway capacity will be diverted to Nacala Corridor. Based on the discussion in 2.2.2, there are not enough investment and rehabilitation plans, so the capacity of railway is assumed as "Export: 182,000 tons/year" and "Import: 325,000 tons/year".

The diverted traffic will be generated for international goods transportation when the Study Road will be improved. About 70 or more trailers will start running diverted from the other corridor (Beira Corridor) or Nacala railway (CDN). Note that this will happen only on Cuamba – Mandimba section, not on Mandimba – Lichinga section. The photo right is the typical trailer running at cross-border in Mozambique/Malawi.

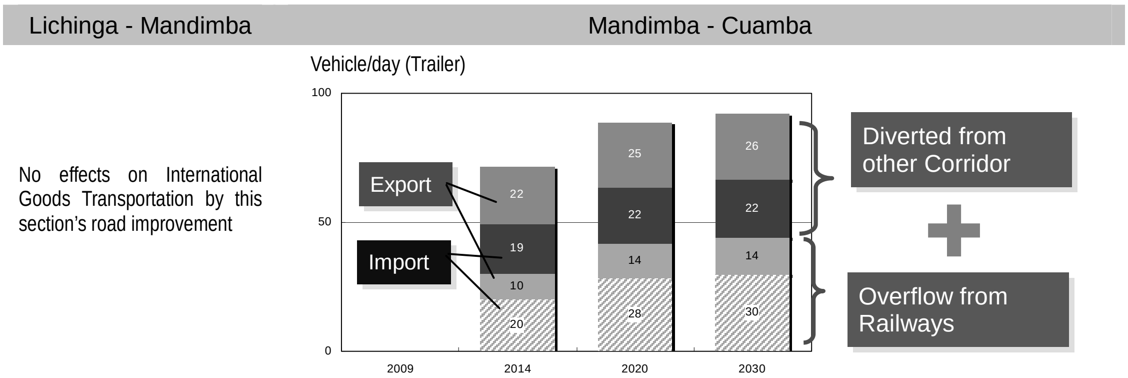
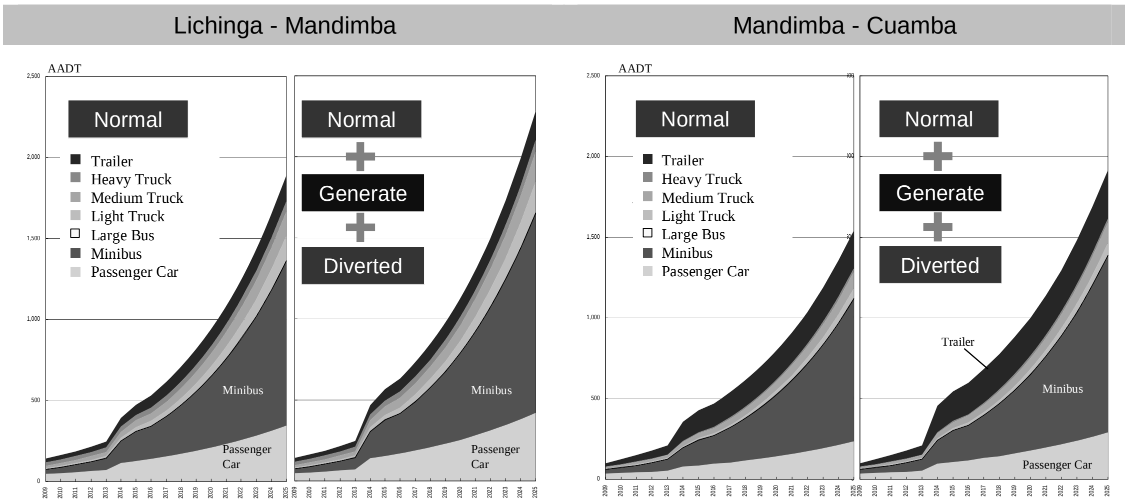


Figure 2.3.17 Diverted Traffic for International Goods Transport <Results>

These estimations are based on the assumptions described in 2.2.2. One of most sensitive factors which will influence traffic demand, especially heavy vehicles, is railway and port investment and rehabilitation. It should be carefully checked whether these plans will be announced. At the end of this Study, an investment plan has been announced for creating new railway line connecting from Moatize in Tete province to Blantyre in Malawi for coal delivering from Tete to Nacala Port. The plan announces that it will be constructed by 2015, However, the Study Team has disregarded this because many improvements and rehabilitations are required in both the Malawi (CEAR) and Mozambique (CDN-R) sections in order to bear the heavy wagons for coal delivering, and there are not enough financial resources.

2.4 Results of Traffic Forecast

Accumulating the results of 2.3.1 to 2.3.4, future traffic volume for both sections will be summarized. Future traffic volume in AADT is estimated about 450AADT in 2014, 1,700AADT in 2023 and 6,000AADT in 2033. If comparing only the AADT, the section of Lichinga – Mandimba is more than Mandimba – Cuamba. It is because social communication will be more active by minibus and passenger car than the connection of provincial capital in Lichinga. The section of Mandimba – Cuamba is characterized by numbers of trailers e diverted from Beira Corridor and railway. It is evidenced that this section will compose part of the international corridor.



year	2009	2014	With case	2023	With case	2033	With case
Passenger Car	46	113	*138*	283	*344*	760	*925*
Minibus	28	136	*165*	738	*897*	2,958	*3,598*
Trailer	26	53	*58*	138	*152*	288	*328*
Others	42	91	*106*	280	*339*	1,278	*1,566*
Total	142	393	*467*	1,439	1,732	5,284	*6,417*

year	2009	2014	With case	2023	With case	2033	With case
Passenger Car	35	77	*96*	193	*239*	519	*643*
Minibus	26	117	*145*	641	*795*	2,587	*3,207*
Trailer	23	118	*164*	213	*272*	343	*425*
Others	17	42	*52*	143	*176*	612	*753*
Total	101	355	*457*	1,190	*1,481*	4,061	*5,027*

Figure 2.4.1 Estimated Traffic Volume for Each Section

Compared with the previous feasibility study between Nampula and Cuamba, this estimated traffic volume is almost same level of volume for previous section. The table below shows both results on the same time series.

Table 2.4.1 Comparison of this Study and Previous Study

	Nampula-Ribaue						Ribaue-Malema					
	Passenger Car	Mini Bus	Large Bus	Cargo	*Total*	*D/D Total (Normal+Div.+Gen.)*	Passenger Car	Mini Bus	Large Bus	Cargo	*Total*	*D/D Total (Normal+Div.+Gen.)*
2007	37	80	54	57	*228*		51	28	25	47	*151*	
2008	40	85	56	60	*241*		55	30	26	49	*160*	
2009	43	91	59	63	*256*		59	33	27	52	*171*	
2010	46	9	61	66	*182*	*356*	63	35	29	54	*181*	*107*
2011	48	104	64	69	*285*		67	37	30	56	*190*	
2012	51	198	107	443	*799*		71	57	80	436	*644*	
2013	54	207	111	461	*833*		75	60	81	454	*670*	
2014	58	218	115	479	*870*	*1,201*	79	61	84	472	*696*	*808*
2015	61	228	119	499	*907*	*1,259*	84	68	86	491	*729*	*847*
2016	64	238	122	520	*944*		89	71	89	512	*761*	
2017	68	249	127	542	*986*		94	75	91	534	*794*	
2018	72	260	131	565	*1,028*		99	80	94	556	*829*	
2019	76	272	135	588	*1,071*		105	84	96	580	*865*	
2020	80	283	139	613	*1,115*	*1,647*	110	89	98	604	*901*	*1,089*
2021	85	295	145	640	*1,165*		117	94	102	631	*944*	
2022	89	308	150	669	*1,216*		123	99	104	659	*985*	
2023	91	322	155	698	*1,266*		130	104	107	688	*1,029*	
2024	100	337	160	729	*1,326*		137	110	111	718	*1,076*	
2025	105	351	167	761	*1,384*	*2,117*	145	116	114	750	*1,125*	*1,384*
2026	111	367	173	795	*1,446*		153	123	117	783	*1,176*	
2027	117	383	179	830	*1,509*		162	130	120	818	*1,230*	
2028	124	401	186	867	*1,578*		171	137	124	854	*1,286*	
2029	131	419	193	906	*1,649*		180	145	128	892	*1,345*	
2030	138	438	200	946	*1,722*		190	153	132	931	*1,406*	
2031	146	458	207	988	*1,799*		201	161	136	973	*1,471*	
2032	154	480	215	1,032	*1,881*		212	171	140	1,016	*1,539*	
2033						*3,198*						*2,071*
2034												
2035												

	Malema-Cuamba						Cuamba-Mandimba					
	Passenger Car	Mini Bus	Large Bus	Cargo	*Total*	*D/D Total (Normal+Div.+Gen.)*	Passenger Car	Minibus	Large Bus	Cargo	Trailer	*Total*
2007	46	13	21	41	*121*							
2008	49	14	22	43	*128*							
2009	53	15	23	45	*136*		35	26	0	17	23	*101*
2010	57	16	24	47	*144*	*252*	39	34	0	19	32	*124*
2011	60	17	25	49	*151*		43	43	1	22	41	*150*
2012	64	77	91	484	*716*		48	56	1	25	50	*178*
2013	68	81	93	504	*746*		53	71	1	28	57	*209*
2014	72	84	96	525	*777*	*1,083*	96	145	1	52	164	*457*
2015	76	87	97	546	*806*	*1,136*	108	195	1	59	181	*543*
2016	80	90	100	569	*839*		117	217	1	67	195	*598*
2017	85	93	103	593	*874*		130	266	2	76	210	*684*
2018	89	96	106	619	*910*		144	324	2	87	219	*777*
2019	94	100	107	645	*946*		160	393	2	100	229	*883*
2020	100	104	110	672	*986*	*1,478*	177	472	2	114	236	*1,001*
2021	105	107	113	702	*1,027*		195	565	2	131	245	*1,139*
2022	111	110	116	733	*1,070*		216	672	3	150	252	*1,294*
2023	117	114	118	766	*1,115*		239	795	3	173	272	*1,481*
2024	124	118	122	800	*1,164*		264	934	3	198	286	*1,686*
2025	131	121	124	836	*1,212*	*1,893*	292	1,093	4	229	297	*1,914*
2026	138	125	127	873	*1,263*		323	1,272	4	264	309	*2,171*
2027	146	129	131	912	*1,318*		357	1,473	4	304	321	*2,459*
2028	154	134	134	953	*1,375*		394	1,697	5	352	332	*2,780*
2029	162	138	137	995	*1,432*		435	1,945	5	408	345	*3,137*
2030	172	143	141	1,040	*1,496*		480	2,219	6	473	359	*3,536*
2031	181	147	145	1,086	*1,559*		529	2,520	6	550	381	*3,986*
2032	191	153	148	1,135	*1,627*		583	2,849	7	640	404	*4,483*
2033						*2,855*	643	3,207	8	745	425	*5,027*
2034							708	3,594	9	870	448	*5,628*
2035							780	4,011	10	1,017	473	*6,290*

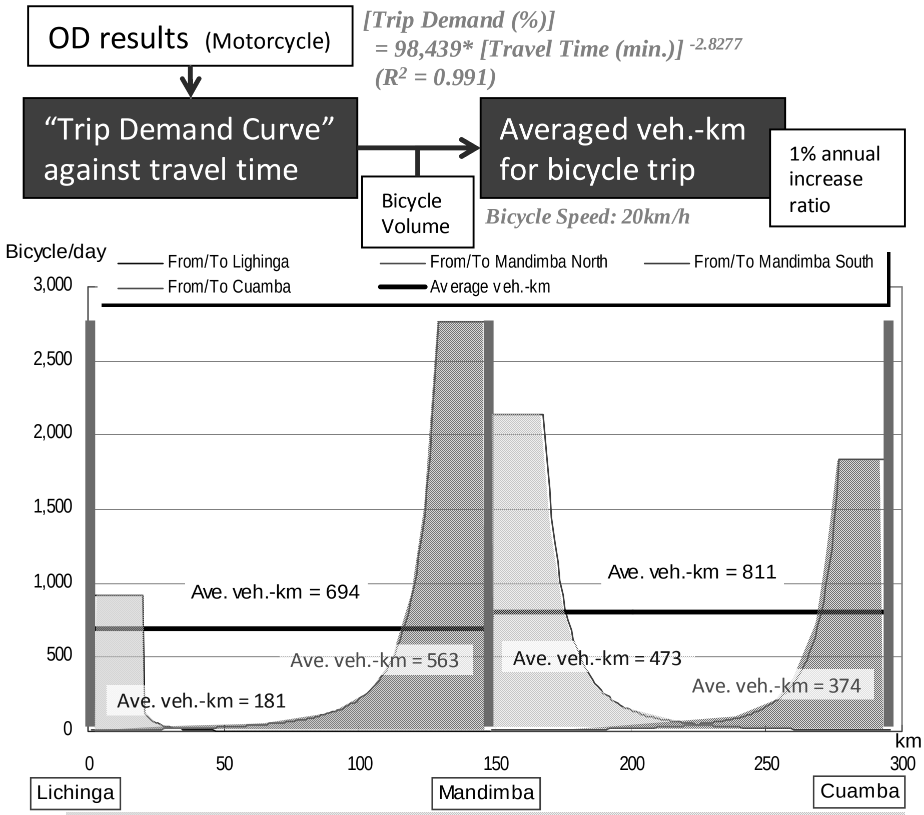
	Mandimba-Lichinga					
	Passenger Car	Minibus	Large Bus	Cargo	Trailer	*Total*
2007						
2008						
2009	46	28	1	42	26	*143*
2010	51	36	1	47	29	*163*
2011	57	46	1	52	31	*187*
2012	63	58	1	58	34	*214*
2013	70	74	1	65	37	*247*
2014	138	165	1	104	58	*467*
2015	154	221	2	118	70	*566*
2016	169	247	2	133	80	*631*
2017	187	302	2	151	92	*735*
2018	207	368	2	171	99	*848*
2019	229	445	2	195	108	*979*
2020	254	535	3	222	114	*1,129*
2021	281	639	3	254	123	*1,301*
2022	311	759	3	291	131	*1,495*
2023	344	897	4	335	152	*1,731*
2024	381	1,054	4	386	166	*1,991*
2025	421	1,233	5	446	179	*2,283*
2026	465	1,433	5	516	192	*2,612*
2027	513	1,658	6	600	207	*2,984*
2028	567	1,909	6	699	220	*3,401*
2029	626	2,187	7	816	235	*3,871*
2030	690	2,494	7	955	252	*4,398*
2031	761	2,831	8	1,121	278	*4,999*
2032	839	3,199	9	1,320	304	*5,671*
2033	925	3,598	10	1,555	328	*6,416*
2034	1,019	4,031	11	1,836	356	*7,253*
2035	1,122	4,497	12	2,173	385	*8,189*

In the case of appraisal for AfDB, estimation of future non-motorized traffic (NMT) should be also estimated for economic evaluation. Therefore, based on the traffic count data at four locations and OD results for motorcycles, averaged bicycle traffic volume for each section will be estimated by applying the trip demand curve method.

As a result of the OD survey for motorcycles, the trip demand curve based on the travel time is developed.

*[Trip Demand (%)] = 98,439 * [Travel Time (min.)]* $^{-2.8277}$ *(R^2 = 0.991)*

The figure below shows the bicycle demand curve applied to the number of bicycles counted at each section. The total area for each curve means the same traffic volume at survey point. The averaged vehicle-km for each section will be calculated based on this curve in each direction. The results of averaged bicycle volume are 694 bicycles/day in the section of Lichinga – Mandimba and 473 bicycles/day in the section of Mandimba – Cuamba. The annual increase is applied as just 1% because of consideration to mode shift to minibus or other modes due to the income increased.



Traffic Survey (May 10-16, 2009)			
1,000 bicycles	2,994 bicycles	2,323 bicycles	1,986 bicycles

Figure 2.4.2 Estimated Bicycle Traffic Volume for Each Section

Chapter 3 Economic and Financial Analysis (Lichinga-Mandimba Section)

3.1 Introduction

The Study objective is “to determine the most technically feasible and economically viable, environmentally acceptable and socially optimal option of upgrading the existing earth/ gravel roads in the rural areas to paved roads.” For the purpose of the economic evaluation, it is important to first define the existing state of the Project road for the base case, and then to define the alternatives to be analyzed, and finally the structure of the analysis.

Economic analysis for the Project consists of comparing the case “without the project” to those “with the different project alternatives.” The case “without the project” entails maintaining the existing road and applying routine/periodic maintenance where necessary. The case “with the project” is the implementation of the road improvement interventions discussed in the previous chapters. The analysis determines their impact, and whether or not they are economically feasible, i.e. yielding a positive Net Present Value (NPV) and other indicators. Sensitivity tests are then applied on costs and traffic volume.

3.2 Methodology

In the road improvement under the Road and Bridge Management and Maintenance Project (RBMMP or Roads-3) implemented by the World Bank and other major road construction projects, calculation of economic indicators is mainly applied by the Highway Design and Maintenance Standards Model (HDM-4 model). HDM-4 was developed by the World Bank's Transportation Department to meet the needs of highway authorities, particularly in developing countries, for evaluating policies, standards, and programs of road construction and maintenance. Thus, ANE commented on the Inception Report for the Project on April 2, 2009, that the economic analysis for the Project will be conducted based on the HDM-4 model.

However, it should be noted that some advantages and disadvantages are found comparatively among the typical tools for economic analysis for the road project. In this Study therefore, HDM-4 analysis will be applied, and supplemented by other tools for reference or comparison, where necessary.

The quantitative measure used to determine the feasibility of the Study Road to evaluate the Project from an economic perspective is the economic internal rate of return (EIRR) and other indicators. EIRR is the discount rate at which the net present value of an investment is zero.

3.3 Basic Assumptions for Analysis

The economic analysis was made based on the information and data derived from the natural condition in the Project area, existing road condition, improvement plan of the Project road, vehicle characteristics and traffic demand forecast, that are studied in the previous chapters. However, regarding the motorcycle surveyed individually, its forecasted volume is incorporated in the automobile or bus category in HDM-4 computation.

Careful attention should be paid when selecting the discount rate for cost-benefit analysis and investment decision making. The estimated economic benefits that are expected to accrue from improving the roads should be assessed against the expected benefits from making alternative investments. From an economic perspective, the opportunity cost of capital is the most appropriate discount rate to rationalize road investment decisions and inform investment choices. For purposes of the economic analysis conducted in this feasibility study, the discount rate applied to the cash flows is 12 percent, as is suggested by ANE. Other major premises of the Project evaluation are summarized below.

- Project life: 20 years after the opening of the project road (2014)
- Pricing date: As of October 2009
- Social discount rate: 12%
- Exchange rate: US$1.00 = 28.00 Meticais (MT)

The economic evaluation period for the Project is assumed as 24 years from 2010 at which the detailed design work will be commenced prior to the construction works for 3 years. Analysis period for the Project is defined considering the durability of the road to be improved, reliability of accuracy of the traffic volume forecasted and other standard analysis conducted by the international institutions.

3.3.1 Conversion Factors (CF) to Economic Price

For the purpose of the economic analysis, all Project construction, maintenance and vehicle operating costs are expressed as economic costs. Economic costs represent the opportunity cost of a production in the Project, or of a benefit resulting from the Project, such as savings in vehicle operating expenses. This entails removing transfer payments such as taxes, import and export duties and subsidies from the financial, or accounting costs, thus changing them to their values "on the border", such as CIF or FOB. The economic cost of transporting to the Project site is also included.

In practice, the direct unit costs of every construction and maintenance activity of borrow, fill, sub-base, etc., to be used as input to the HDM-4 model must be broken down by percentages into their basic components, such as labor, materials and equipment. Each percentage is weighted by its economic pricing factor, then added together and multiplied by the quantities to obtain the direct economic cost of the activity. Total economic cost is obtained by adding indirect costs such as contractor's overhead.

It is important to calculate economic prices for the construction and maintenance activities, because the vehicle operating costs which are Project benefits will be expressed in economic terms. As economic costs are usually lower than financial ones, failure to do so will negatively impact the economic feasibility of the Project. The economic pricing factors are determined as follows for labor, materials and others.

Table 3.3.1 Assumptions for Conversion Factor to Economic Cost

Major Items	CF	Remarks
Fuel/ Oil	0.95	5% of the price is assumed as fuel tax for gasoline and diesel.
Unskilled labor	0.41	Extracted from the VOC model of ANE and calculated from the production capacity of agricultural goods against the opportunity wage of unskilled labor.
Imported materials	0.84	According to the rate of weighed average import duty on the imported products
Machine and skilled labor	1.00	Due to the scarcity of these items in Mozambique.
Tax and license	0.00	They are just financially transferred to the government.
House compensation (or land acquisition cost)	1.00	It is assumed that land within the right-of -way has potential to be productive so that resettlement accrues the cost of losing such potentials and the price of house compensation reflects such loss.

Source: JICA Study Team

a. Construction Materials

The economic pricing for materials was based on the removal of taxes and import duties from the financial prices. The principal material items in civil works on roads are asphalt, gravel, structural steel, culverts and cement. Asphalt is imported, likely from the Republic of South Africa, and cement and gravel are produced locally. Financial cost for cement, structural steel and culverts includes the relevant taxes. As materials are fairly common in the Project area, haulage is considered as included in the costs of the equipment portion.

The factor for material is a weighted average of the material types used in each intervention. Factors to convert to the economic prices for material are tabulated in Table 3.3.2.

b. Construction Costs

The financial total costs are also broken down into labor, materials and plant weighted by the economic pricing factors to create the corresponding economic costs.

To the total of direct financial costs are added contingencies, supervision service fee, IVA, and a reserve for compensation. However, IVA does not enter into the economic costs, since IVA, being a tax, is a transfer payment. Compensation cost is a wish in economic terms, as it compensates people for the economic value of the returns to the land or other properties that are appropriated for use in the Project. In this Study, the compensation is included in the economic cost for the Project.

The economic prices for surfacing which include asphalt seal and cement stabilized base were estimated by a weighted average of the economic factors for the pavement with bitumen and gravel.

c. Maintenance Costs

To calculate the maintenance costs used in the HDM-4 analysis, economic costs are used for the comparison of alternatives. As explained above, the direct unit costs of every maintenance activity such as pothole filling, seals etc. to be input to the HDM-4 model must be broken down by percentages into their basic components, such as labor, materials and equipment.

Each percentage is weighted by its economic pricing factor, then added together to obtain the conversion factor of the activity. The results are shown in Table 3.3.2 below.

Table 3.3.2 Conversion Factors for the Works

Component	Construction Materials			Construction Works		Maintenance Works	
	% (A)	CF (B)	A x B	% (A)	A x B	% (A)	A x B
Construction Materials	-	0.86	-	20%	0.17	15%	0.13
Land	20%	1.00	0.20	-	-	-	-
Machine (Rent)	35%	1.00	0.35	30%	0.30	20%	0.20
Fuel/Oil	5%	0.95	0.05	10%	0.10	5%	0.05
Skilled Labor	5%	1.00	0.05	10%	0.10	20%	0.20
Unskilled Labor	15%	0.41	0.06	10%	0.04	30%	0.12
License/Tax	5%	0.00	0.00	5%	0.00	5%	0.00
Imported Materials	-	0.84	-	10%	0.08	-	-
Others	15%	1.00	0.15	5%	0.05	5%	0.05
Total	100%	**-**	**0.86**	100%	**0.84**	100%	**0.75**

Source: JICA Study Team

3.4 Main Economic Analysis Components

3.4.1 Road Scenarios "Without" and "With" Project

For the calculation of economic value of the Study Road, two cases had to be prepared; one "with" and the other "without the road improvements."

"Without project" scenario

The reference situation, "without project" scenario, considers the continuation of the existing situation, whereby the normal traffic continues to use the existing earth road, maintained as such, including routine and periodic maintenance. Accordingly, it is assumed that maintenance would provide average roughness conditions of the International Roughness Index (IRI) during the dry season and the wet season.

For the "without" Project case, traffic volumes would be the result of the current phase of the project, which would provide an outlet for the normal traffic flow of goods and passengers in the Project road section.

"With project" scenario

Mainly due to software input constraints, the "with" project situation, assumes that the existing road is surfaced during the construction period and that the routine and periodic maintenance would provide an improved average roughness of IRI during the analysis period of the road facility. Benefits related to generated and diverted traffic apply in this case, in addition to those of the normal traffic.

Following table shows possible cases of “with” and “without” to be compared for the Project evaluation.

Table 3.4.1 Alternative Cases for “With” and “Without”

Cases	Road Section			Border	Railway Section			Port
	Lichinga-Mandimba	Mandimba-Cuamba	Nampula-Cuamba	OSBP	Nacala-Cuamba-Entrelagos	Cuamba-Lichinga	Malawi	Nacala
Without Case	As it is	As it is	As it is	As it is	As it is	As it is	As it is	As it is
With Case	Intervention	Intervention	Intervention	Intervention	As it is	As it is	As it is	As it is

Source: Study Team

For the analysis, careful attention will be paid to the period when the passability is disrupted by a highly deteriorated road condition (wet season). In this case, vehicles will find alternatives routes or use alternative paths along the existing road that facilitate the passage, resulting in higher transport costs due to change of travel distance, road roughness, and/or driving speeds.

According to the World Bank on 15 separate occasions over the past 25 years Mozambique has been highly vulnerable to changes in rainfall patterns which have caused severe droughts and severe flooding, both of which have resulted in significant reductions in agricultural production. Additionally, distance to the road or access or the lack thereof has further been a disincentive to smallholder agricultural producers by contributing to the high cost of production and placing downward pressure on margins. Similarly, passability or the inability to pass through a section of the road due to a bridge being out, a washed out road during the rainy season, or vegetation encroachment during the dry season limits passage by up to approximately 160 days per year.

3.4.2 Comparison of Pavement Option

Another major concern regarding the economic analysis in this report is to identify the optimum paving method for the Project road, through a comparison of the DBST option, Gravel option and Asphalt option. Technical advantages or disadvantages are studied in the previous chapter and in this chapter, comparative analysis from the viewpoint of national economy is conducted.

3.4.3 Economic Benefit

The economic road user costs to be considered in this Study are vehicle operating costs and passenger travel time costs which are the most significant economic costs in the economic appraisal of road improvements. In developing countries with low income levels, passenger travel time costs are a less important component of road user costs than vehicle operating costs.

All existing and future road users will benefit from the road improvements as journey times and vehicle operating costs will reduce. As between 60 to 80% of the traffic on the national roads consists of goods vehicles, transport operators will directly benefit the most. It is expected that these savings, accruing to the several hundred trucks using the road every day, will result in reductions in prices of the goods being transported as savings in fuel and other costs are passed on.

It is also expected that bus operations will become more efficient and that public transport provision will improve for persons living along the Nacala Corridor. This may increase opportunities for the population living in the road corridors to access health and educational facilities more easily. Road traffic accidents may decrease on improved road sections, although this may well be counter-balanced by increased accidents due to the opportunity to travel faster than before.

(1) VOC Saving Benefit

Vehicle operating costs are made up of the following cost components:

- Vehicle acquisition costs (for depreciation costs)
- Tire costs
- Gasoline and diesel costs
- Lubricant costs
- Crew costs
- Maintenance labor costs
- Spare parts (their consumption is analyzed within the model)
- Interest
- Overhead costs (these are sometimes omitted from economic costs on the grounds that their marginal cost is zero)

The price and cost information is supplemented by information on vehicle utilization and life. The consumption of spare parts is calculated internally by a sub-model within the HDM-4 vehicle operating cost module, and it is related directly to the vehicle acquisition cost, utilization and road character and condition. Also, non-motorized traffic is included in the traffic volume forecasted.

Oil cost has changed drastically according to the current world economic downturn. As the pricing date was assumed as October 2009, the Study Team adopted US$0.72, and US$0.62 per litter for the economic prices of gasoline and diesel oil respectively, based on the current taxation system in Mozambique. Table 3.4.2 shows the major inputs to the HDM-4 model related to the VOC estimation.

Table 3.4.2 Major Inputs to the HDM-4 Model

(Unit: US$)

Vehicle Type \ Cost Item	New Car Cost	Fuel Cost per litter	Lubricant Cost / litter	New Tire Cost	Mechanic Cost/hour	Crew Cost per hour	Passenger Time Value	Interest Rate
1. Medium Passenger Car	23,682	0.72	2.710	46	5.88	0.94	1.24	12%
2. Light Goods Vehicle	20,087	0.72	2.710	63	5.88	2.21	0.00	12%
3. Minibus and Light Bus	14,700	0.72	2.710	63	5.88	3.44	1.24	12%
4. Medium/Large Bus	66,382	0.62	2.710	120	5.88	3.94	1.24	12%
5. Medium Goods Vehicle	61,208	0.62	2.710	123	5.88	3.97	0.00	12%
6. Heavy Goods Vehicle	105,995	0.62	2.710	233	5.88	4.81	0.00	12%
7. Very Heavy Goods Vehicle	126,449	0.62	2.710	233	5.88	4.81	0.00	12%
8. Non-motorized (Bicycle)	85	0.00	0	10	0.00	0.30	0.00	12%

Source: Road User Cost (ANE, 2006), Detailed Design for Nampula-Cuamba Road Development (partly updated)

(2) Time Saving Benefit

The key elements are the difference in the treatment of work and non-work time and the distinction has to be based on information on passenger trip purpose. Information on passenger trip purpose has to be collected in roadside surveys where vehicles are stopped and drivers and passengers are interviewed.

In the past in Mozambique, such surveys have only been undertaken as part of the Study Teams' origin-destination surveys, and where such surveys have not been considered to be necessary, no passenger trip purpose information has been collected. Whereas origin-destination information is only required where there are potential traffic diversion aspects to be considered, passenger trip purpose and vehicle occupancy information is always required. This has not been widely recognized and as a result there is a considerable shortage of passenger trip purpose information in Mozambique and many other developing countries.

The time saving benefit was calculated based on the time value of passengers, drivers and mechanics, which are input to the HDM-4 model. The time value per hour was estimated based on an average wage level statistics by the Ministry of Labor (DNPET 2008). Such time saving benefit accrued from the normal traffic, generated traffic, diverted traffic and non-motorized traffic was calculated by the HDM-4 model.

(3) Benefit from Diverted Traffic

Two types of traffic diversion will be estimated. One is the diverted traffic from railway, since there is a railway line along the Nacala Corridor; the other is from other roads, which is caused by the transport route change from the existing to the newly paved road mainly because of decreased travel time.

The diverted traffic from the railway with regard to passengers is estimated in the following steps.

- The Study Team conducted interview surveys with passengers regarding the railway service.

- Travel time and cost of the railway and bus services along the Project road are studied. Based on the travel cost per hour examination, the Study Team estimates the number of passengers, diverting from railway to road.
- This number is converted to number of vehicles per day.

Based on a supplemental survey of trucking companies conducted by the Study Team, freight tariff and transport time are examined together with traffic volume of road and railway. Such diverted traffic from railway is incorporated as the normal traffic in HDM-4 computation.

Another diversion to be examined and estimated by the Study Team is the increase in traffic volume caused by “travel or transport route change”. The travel route change happens when new road opens and existing route takes long time to travel compared to the newly paved road because of its longer road length.

According to the Study, Beira Port is a major port for transporting cargoes to/from the sea for the northern area of Lilongwe of Malawi at the moment. After the Nacala Corridor is improved and transport time reduced, the Study Team considered that Nacala Port would become the major port for the area, and transport route would change to the Nacala Corridor, because transport time becomes shorter compared to the exiting route from Beira.

Actual diverted traffic volume in this section is not forecasted eventually.

(4) Benefit from Generated Traffic

a. Agriculture and Agricultural Industries

The traffic projections of agricultural commodities assumed that production will increase at the same level as the population growth. This is because the capital/ labor ratio would remain the same (one man/ one hoe). New techniques could be made available such as the use of bicycles to increase productivity. However, if there is not better access to markets, there will be no incentive to implement these techniques for increasing production. In the “with” project case, on the contrary, it is extremely likely that the Project will provide incentives for additional agricultural output by increasing access to markets.

As Mozambique is largely an agriculture-based economy, the major indirect beneficiary of the road improvements will be farmers who will benefit with lower prices of inputs and better access to markets in northern and southern Mozambique and neighboring countries. Niassa, which suffers from very poor access to external markets, will benefit particularly from improvement to the N13 corridor.

b. Mineral Extraction Industry

There is potential for mineral extraction (including oil) in northern Mozambique. An improved national road network will contribute to the development of this industry through facilitating the delivery of inputs and outputs.

c. Tourism Industry

There is an existing tourism industry in Niassa based on its excellent natural reserves and exotic lake. Accessibility is so poor to this area that most tourists fly by airplane; but the improved national road access should provide the opportunity for cheaper road travel for tourists to access this area and enlarge the potential market. Cheaper inputs will also benefit these industries. In particular, the improvement of N13 to Niassa may provide the opportunity to stimulate tourism opportunities on Lake Malawi.

d. Forest Industry

The province of Niassa has forest reserves in Cuamba, Mandimba, Metarica, Nipepe and Marrupa Districts with a predominance of valuable species. These forests are presently not exploited for lack of transport. Forestry represents only 2% of provincial GDP. Forestry has the potential to grow rapidly once the existing road is upgraded. The exploitation of these lots should start as soon as the road becomes passable by railway or heavy trucks up to the port of Nacala. Traditionally, timber is hauled by trucks from the areas of exploitation to the sawmills. There are currently no sawmills in the area of influence, so the wood should be taken to Nacala for export as logs or raw timber.

e. Other Industries

Other products included in the basic consumption category are processed foods such as cooking oil, salt, sugar, powdered milk, beer, soft drinks, dry goods and construction materials that are brought in from outside the area of influence. The industrial sector barely exists in Niassa except for a small industrial park in Lichinga with small units for milling cereals, producing wooden furniture, pottery, and soap etc. that are supplied to the urban population and areas close to Lichinga. It is not expected that the construction of the proposed road will substantially develop the sector, as the goods can be brought in more cheaply with the road, thus negatively impacting local production.

3.4.4 Economic Costs

The cost to improve, maintain and operate the road was developed on a U.S. dollar per kilometer basis. Investment and maintenance cost data were obtained for alternative road improvements for both paved and unpaved sections. The road improvements are multiyear investments that were allocated over a time period of three years, and the road maintenance costs include routine and periodic maintenance costs over the year life of the Project for each type of road works performed. Source data for determining road improvement, maintenance and operating costs were obtained from the cost estimation conducted by the Team.

1) Investment Cost

Detailed Project cost is calculated from the cost estimation in the previous chapter. The conversion of financial cost to economic cost is carried out by applying the different conversion factors to respective cost items. It is briefly explained that financial or market price contains several price disturbances such as tax or subsidies which distort the function of the price qualifying the real value of items. In order to measure the real loss of the value, i.e. economic cost, such distortion should be subtracted from the financial price of costs. Conversion factors calculated as above are applied in the HDM-4 computation.

The calculation of economic and financial costs for the different project alternatives is presented in Table 3.4.3. These include upgrading of the road from earth to seal and construction of bridges. The inclusion of these costs in the Project alternatives in detail is presented in the previous chapter.

Table 3.4.3 Investment Cost for Pavement Comparison (Financial Cost)

Alternatives	Length	Construction Cost		Disbursement (Thous.US$)				Reinvestment Cost	Residual Value
	(km)	US$	US$/km	2010	2011	2012	2013	US$	%
DBTS Option	148	160,479,281	1,084,319	9,629	42,595	42,595	26,031	14,128,742	73%
Asphalt Option	148	224,400,943	1,516,223	13,464	80,784	80,784	49,368	69,132,980	73%
Gravel Option	148	81,775,635	552,538	4,907	29,439	29,439	17,991	-	-

Note: Tax (IVA) is excluded in the cost.
Source: Study Team

Re-investment Cost

Re-investment cost was appropriated in 2029, when useful life (considered as 15 yeas) of the asphalt pavement and seals would expire in the case of the DBST and asphalt pavement option. The re-investment cost is summarized in Table 3.4.3.

Residual value

The invested resources to the Project have economic value to the economy until the useful life expires. In this Project, useful life of the asphalt pavement and seals is assumed as 15 years. Analysis period of the project is assumed as 20 years after its operation has started until 2033. Then the value of the re-investment remains for 11 years, or 73 % of the re-investment cost in 2029, when the analysis period ends. As a result, the residual value equivalent percentage of the economic investment cost will be estimated at the last year of the analysis as a negative cost.

(2) Operation & Maintenance Cost

The operation and maintenance cost was converted into economic cost the same as the investment cost. Table 3.4.4 shows the annual cost for the DBST, Asphalt, Gravel and Earth (without project case) roads, respectively in terms of economic cost. Regarding the gravel option, the maintenance and operation cost was assumed as an average of the DBST and earth costs.

In HDM-4 calculation, the operation and maintenance cost is indicated in the "Special cost" of Road Agency Cost, both the routine and periodic maintenance cost combined on the annual basis.

Table 3.4.4 Annual and Periodic Operation and Maintenance Cost

(DBST/ Asphalt/ Gravel/ Earth Option: Financial/Economic Cost)

Financial/Economic	Financial Cost				Economic Cost			
Type of Maintenance	DBST	Asphalt	Gravel	Earth	DBST	Asphalt	Gravel	Earth
Distance in km	148.0	148.0	148.0	148.0	148.0	148.0	148.0	148.0
Annual Routine Maintenance/km	$1,344	$1,344	$1,765	$2,186	$1,007	$1,007	$1,323	$1,638
Annual Routine Maintenance	$198,962	$198,962	$261,273	$323,584	$149,092	$149,092	$195,785	$242,478
Periodic Maintenance/km	$6,844	$6,844	$7,088	$7,333	$5,128	$5,128	$5,312	$5,495
Periodic Maintenance	$1,012,897	$1,012,897	$1,049,072	$1,085,247	$759,014	$759,014	$786,122	$813,230
Interval of Periodic (Years)	5	10	4	4	5	10	4	4

Source: "RSS" and Study Team

3.5 Result of Analysis

3.5.1 Economic Ratio for Alternatives

Output data worked out as a result of HDM-4 analysis for the Project are tabulated in Table 3.5.1.

Table 3.5.1 Result of Economic Analysis for Pavement Option

Design Option for comparison	Economic Ratio		
Pavement Type	NPV (US$ Mil.)	B/C	EIRR
DBST	69.7	1.6	17.7%
Asphalt	-7.2	1.0	11.6%
Gravel	-104.1	-0.8	-
DBST (with revised cost)	73.1	1.7	18.1%

Note: In case the traffic volume of non-motorized traffic (bicycles) is not counted in DBST option (with revised cost), EIRR is reduced to 16.9%.
Source: Study Team

From the results shown in Table 3.5.1 above, the gravel option exhibited lower values in the B/C, Net Present Value and EIRR (no value). Rather, the gravel option is not suitable for such higher volume of AADT forecasted. DBST option with Lichinga-Mandimba intervention showed satisfactory values among all.

The EIRR hurdle rate used to determine if a road project is economically feasible is 12 percent in general, over the estimated twenty-year period after intervention. The decision rule applied in conducting the economic analysis was to recommend to ANE the road project alternative that equaled or exceeded the 12 percent hurdle rate. The Study Team considered no other factors that influence their investment decision, based on local conditions and information developed during this Study, as an alternative to strict adherence to the EIRR, NPV and B/C.

Project cost for DBST is revised after more detailed calculation for the sub-base of the pavement. Then, DBST option (with revised cost) scores best with a normal level as the upgrade-to-paved intervention and its economic viability is acceptable, with an EIRR of over 12% in the selected alternative. Based on this result, the Project is evaluated as one of the prioritized projects to be implemented in the nation. Of particular importance is this primary road and bringing it to an all-weather passable condition.

3.5.2 Other Benefits for the Regional Road Network of the Comprehensive Approach

In the developed countries including Japan, the comprehensive method for economic analysis is applied focusing on the network benefit/loss including the targeted project section. Economic figures are derived from the difference of overall travel distance shortened by approximately 106km in the international corridor, travel time and VOC, in case the whole network in the Study area including Beira Corridor can be considered. The result of calculation for the network improves the B/C value of the Project intervention eventually.

Table 3.5.2 Comprehensive Economic Effects on the Road Network

Target for Economic Benefit/Loss	NPV @12% (Mil. US$)		
	Benefit	Cost	B/C
Project Road (DBST with Lichinga-Mandimba intervention)	179.2	106.0	1.7
Additional benefits in the network	65.2	-	-
Comprehensive benefit/loss	244.4	106.0	2.3

Source: Study Team

3.5.3 Sensitivity Analysis of Economic Analysis Result

In order to confirm the above favorite result against future uncertainties, sensitivity analysis is conducted for the best alternative case DBST option with Lichinga-Mandimba intervention that scores the highest EIRR. This is firstly done by changing the value of benefit and cost by -20% and +20% respectively and both combined as the worst case. When the EIRR is less than the discount rate of 12%, the project is thought to hold a risky aspect.

These are critical factors to watch, though there is more or less same sensitivity to drop in traffic levels and/or increase in investment costs. These situations are most unlikely as traffic growth rate on the network has been an average of 7.9% per annum in Niassa Province between 1995 and 2004. In the analysis, investment costs are based on the detailed engineering design for Nampula-Cuamba Road Improvement, the current unit rates of recently let contracts and the estimated cost of the evaluated lowest bids. And above those, a physical contingency provision of 10.0% has been taken into account, assuming such increase in capital costs unlikely.

As shown in Table 3.5.3, the feasibility of the project is secured even in the worst case.

Table 3.5.3 Result of Sensitivity Analysis (EIRR)

Case	Assumptions	EIRR
Base	Upgrade to paved road with DBST	18.1%
1	Decrease in traffic volume of -20%	15.4%
2	Increase in investment costs of +20%	15.6%
3	Both combined of above as the worst case	13.6%

Source: Study Team

Further, effects of oil price changes against the construction cost, which is one of the matters of most concern, were also examined. As a result, the oil price raise by 50% affects 5% increase in the total construction cost. The magnitude was the same in case of the oil price drop. The changes are covered sufficiently within the sensitivity analysis range above.

Table 3.5.4 Elasticity of Oil Price Change to Construction Cost

Price	Increase	Decrease
Oil Price	50%	50%
Construction Cost	105%	95%

3.5.4 Switch Values for Investment Cost and Traffic

In addition to the sensitivity tests above, "switch values" for the cost and benefit which would result in an EIRR of 12 percent threshold opportunity cost of capital for Mozambique have been identified as part of the economic viability analysis.

Switch values on the cost and benefit were calculated for the DBST option as the base case. It also shows satisfactory values as shown below.

Table 3.5.5 Switch Values for DBST Option

	Base Case	Case that yields NPV=0		
NPV @12% (Mil. S$)	Value	Value	Factor	Change
Cost	106.0	179.2	1.69	69.1%
Benefit	179.2	106.0	0.41	-40.8%

In the table above, near to 70% increase in construction costs indicated that the Project economic viability would be threatened, while on the other hand, if the user cost savings drop by 40%, the Project viability will be affected. These situations are most unlikely as discussed in the sensitivity analysis.

3.5.5 Comparison with Other Historical Economic Analysis used by RED for the Project

In the Road Sector Strategy (RSS) prepared in December 2005, N13 Cuamba - Lichinga was categorized as a national roads project under funding. Subsequently, the Millennium Challenge Corporation (MCC) conducted the field survey in the northern area to prepare the Mozambique Road Sector Program Development (Interim Report) on 23 October 2006. The Study is a part of larger program proposed by the Government of Mozambique (GoM), in coordination with the Millennium Challenge Account – Mozambique (MCA-MZ), to MCC. The program's objectives are to promote economic growth and reduce the poverty level in Mozambique's four northern provinces: Cabo Delgado, Niassa, Nampula, and Zambezia.

Calculated rates of return were well below the MCC economic feasibility threshold rate of 8.76% and the two road sections were accordingly not recommended for inclusion in MCC's list of roads for detailed feasibility study and potential implementation.

Above calculation was executed using another alternative model "Roads Economic Decision Model (RED)," that is a simplified model developed by the World Bank for use in the economic appraisal of lower traffic volume road projects. Under the same assumptions calculated by RED for the limited period of 20 years including construction period and operation period (17 years instead of 20 years in this Study), the revised IRR for DBST option with Lichinga-Mandimba intervention is sufficiently higher than the economic feasibility threshold rate.

Table 3.5.6 Comparison with Historical RED Analysis

Assumption	Period	JICA	MCC
Evaluation tool	-	HDM-4	RED
Unit construction cost (Economic)	-	US$0.88mil/km	US$0.34mil/km
Traffic forecast	-	Normal, Diverted, Generated	Normal
International Roughness Index (IRI)	-	12	14
Conversion Factor (CF)	-	0.84	1.0
Discount Rate	-	12.0%	8.76%
EIRR	24 years	18.1%	-
	20 years	15.6%	5.6%

3.6 Financial Analysis for the Project

In the "Programa Integrado do Sector de Estradas (PRISE 2009-2011)," a sector-wide approach is established for the road sector that incorporates a coherent Mozambican owned and led roads program in a comprehensive and coordinated manner. Under PRISE 2009-2011, sector planning, finance, implementation, monitoring and evaluation are fully integrated.

The program was developed to be in line with the priorities and objectives of the Government of Mozambique Road Sector Policy, PARPA, Medium Term Expenditure Framework (MTEF), and Road Sector Strategy (RSS). PRISE will enable the GoM to guide the road sector and monitor its performance to ensure that it supports the government's main objectives of poverty reduction and balanced economic development. It will also facilitate managing sector expenditures and intersect oral balance by bringing all activities on-budget.

Under PRISE, all funding for the road sector supports a single sector policy and expenditure programme under government leadership while adopting common approaches across the sector, eventually progressing towards full reliance on GoM procedures to disburse and account for all funds.

The sector-wide approach under PRISE will foster stronger country ownership and leadership of the road sector. It will also facilitate coordinated and open policy dialogue for the entire sector, involving the key GoM agents (MOPH, ANE, Road Fund, and various stakeholders) and the sector's financial partners, observing the government policy of decentralization.

Because PRISE entails a comprehensive planning framework that brings all sector activities under one umbrella, it will lead to a more rational resource allocation, both inter-sectional (the national budget and expenditure frameworks) and within the road sector, based on applications of GoM articulated priorities ranked by Multi

Criteria Analysis (MCA.) The results of the integrated planning approach are elaborated in the Road Sector Strategy, the five-year plan, and the rolling three-year PRISE Implementation Plan. Annual contract programs are then established between the Government and the implementing agencies (ANE and the Road Fund).

Among international donors, it appears now that the implementation of project for Cuamba-Mandimba in particular will be included under Enhanced Private Sector Assistance (EPSA) funding, probably beginning in 2011 and extending over three years.

EPSA for Africa was launched by the government of Japan in 2005 as a comprehensive initiative to support African private sector development. It sets forth that Japan International Cooperation Agency (JICA) will provide ODA loans, in cooperation with the African Development Bank (AfDB) which is a regional development bank, totaling up to USD$1 billion over the period of five years. On the ground of "the Guidelines for Implementation" to promote co-financing with the AfDB, providing financial assistance for African member countries with medium and long-term loans, equity participation, guarantee, and technical assistance, JICA has cooperative ties which include co-financing social and economic infrastructure development projects in Africa.

The Nacala Road Corridor project to be implemented under EPSA program, comprises 1,033km of road works and two one-stop border posts between Mozambique and Malawi and the other between Malawi and Zambia. Phase one comprises 361 km or 35% of the road works in Mozambique and Malawi. Phase II comprises 360 km or 34.9% of the road works in Zambia while Phase III comprises 312 km or 30.1% of the road works for the section Cuamba-Mandimba in Mozambique and Malawi and two one-stop border posts between Mozambique and Malawi and Malawi and Zambia. All the phases include design review, pre-contract services and supervision of the civil works, road safety, HIV/AIDS prevention and awareness, compensation and resettlement and audit.

The following figure and tables are the relevant budget allocation by the government and ANE for the road sector and particular projects to be implemented.

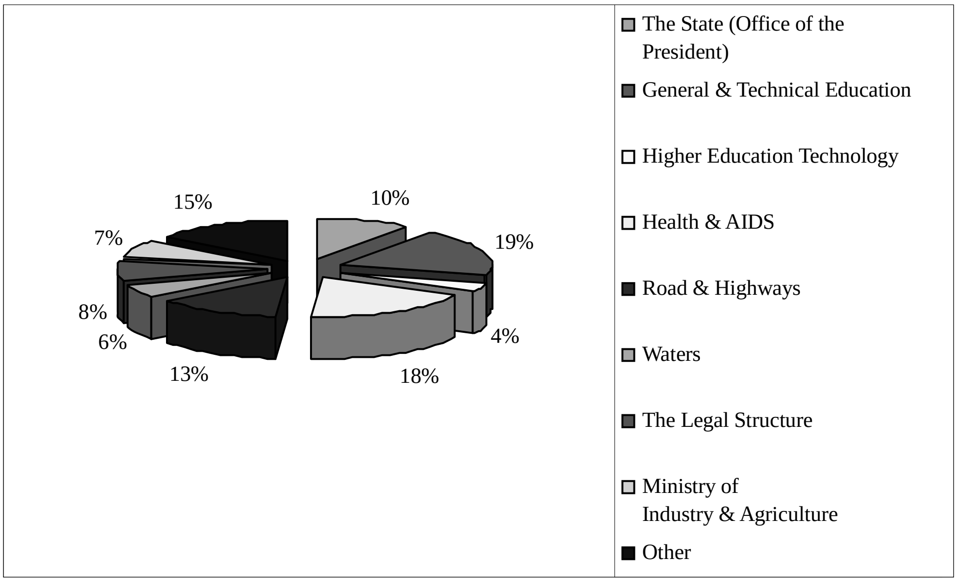


Figure 3.6.1 Government Budget Allocation (2005-2010)

Source: Ministry of Transport and Communications (MTC)

Table 3.6.1 Budget Allocation for Road and Bridge Management Plan (PRISE 2009 - 2011)

(mil. USD)

Designation	2009	2010	2011
Administrative and Support Expense	**21.1**	**21.8**	**22.4**
Technical Capacity and Sector Study	**6.2**	**5.2**	**6.6**
Technical Assistance	2.3	3	2.7
Consulting Service and Study	2.9	1.2	2.9
Logistics	0.6	0.6	0.6
Private Sector Support	0.4	0.4	0.4
Road and Bridge Maintenance	112.4	142.7	155.7
Urban Road Maintenance	7.5	8.1	8.7
District Road Maintenance	5	5.7	6.3
Maintenance Plan	8.3	8.5	8.8
Emergency Works	8.6	9.2	9.9
Maintenance of Unpaved Roads	39.4	43.4	47.7
Maintenance of Paved Roads	43.6	67.9	74.3
Routine Maintenance of Paved Roads	16.3	16.8	17.3
Periodic Maintenance of Paved Roads	26.1	50	56
Engineering Service: Preparation of New Projects	1.2	1.1	1
Construction and Rehabilitation of Bridges	72.3	46.3	46
Construction of Bridges	53.5	26	24.7
Rehabilitation of Bridges	18.8	19.7	20.7
Preparation of Bridge Projects		0.6	0.6
Rehabilitation and Upgrading of Roads	147.9	185	205.4
Rehabilitation and Upgrading of Regional Roads	24.6	38	54
Rehabilitation and Upgrading of National Roads	121.7	144	148.3
Preparation of Road Projects	1.6	3	3.1
Road Safety	4.1	7	7.4
Road Infrastructure Safety	1.6	2.5	2.6
Cargo Control	2.5	4.5	4.8
Grand Total	**364**	**408.1**	**443.5**

Source: ANE

Table 3.6.2 PRISE 2009 - 2011: Projects for Upgrading and Rehabilitation

Code	Name of Section	Km	Province	Intervention	Est. Value (m USD)	Period		Finance Resource		
	Projects Financed					From	To	FS	DD	Const.
52104	N7 Vanduzi - Changara	154	Tete	Rehab.	$46.00	2007	2009	GoM/ADB	GoM/ADB	GoM/ADB
52117	N1 Namacurra - Nampevo (Lote 1)	152	Zambezia	Upgrade	$21.20	2005	2009	EU	EU	EU
52117	N1 Nampevo - Alto Molocue (Lote 2)	117	Zambezia	Upgrade	$7.10	2005	2009	EU	EU	EU
522012	N14 Lote B Marrupa - Ruaca	87	Niassa	Upgrade	$40.70	2009	2011	Asdi	Asdi	Asdi
522013	N14 Lote C Lichinga - Litunde	67	Niassa	Upgrade	$31.40	2009	2011	ADB/JICA	ADB/JICA	ADB/JICA
522011	N14 Lote A Montepuez - Ruaca	136	C Delgado	Upgrade	$63.60	2010	2011	ADB/JICA	ADB/JICA	ADB/JICA
52101	N1 Maputo (Jardim - Benfica)	7	Maputo	Rehab.	$22.90	2009	2011	IDA	IDA	IDA
52102	N1 Xai - Xai - Chissibuca	96	Gaza	Rehab.	$52.00	2009	2011	IDA	IDA	IDA
52103	N1 Massinga - Nhachengue	59	Inhambane	Rehab.	$39.70	2009	2011	IDA	IDA	GOP
52205	N11 Mocuba - Milange	171	Zambezia	Upgrade	$91.10	2009	2012	EU	EU	EU
51106	R601 Estima- Magoe	130	Tete	Upgrade	$40.00	2008	2011		GoM	GoM
52204	N103 Gurue - Magige	35	Zambezia	Upgrade	$12.00	2009	2010	IDB	IDB	IDB
51105	R445 Macarretane - Massingir	106	Gaza	Rehab.	$20.00	2009	2011	OPEC	OPEC	OPEC
52105	N1 Rio Ligonha - Nampula	102	Nampula	Rehab.	$38.00	2010	2012	MCC	MCC	MCC
52106	N1 Namalo - Namapa (Rio Lurio	148	Nampula	Rehab.	$50.00	2010	2012	MCC	MCC	MCC
52108	N1 Rio Lurio - Matoro	74	C Delgado	Rehab.	$24.00	2010	2012	MCC	MCC	MCC
52109	N1 Chimuara - Nicoadala	167	Zambezia	Rehab.	$60.00	2010	2012	MCC	MCC	MCC
52203	N13 Nampula - Cuamba	341	Niassa/Nampula	Upgrade	$2,311.80	2010	2012	JICA	JICA	ADB/JICA
	Sub-total	2.149			$891.50					
	Projects Committed									
52202	N13 Cuamba - Mandimba	160	Niassa	Upgrade	$96.00	2011	2014	JICA		
52202	N13 Mandimba - Lichinga	149	Niassa	Upgrade	$89.00	2012	2015	JICA		
	Sub-total	309			$185.00					
	Prioritized Projects to be Financed									
TBA	N103 R657 Magige - Cuamba	85	Zambezia	Upgrade	$51.00	2012	2014			
52208	R1251. N381 Negomane - Mueda	187	C Delgado	Upgrade	$112.00	2011	2013	GoM	GoM	
TBA	N104. R683. R680: Nampula - Nameti - Moma	181	Nampula	Upgrade	$72.00	2011	2013	KCI	EXIM	EXIM
TBA	N200. R403. Maputo - Catembe - Ponta do Ouro	182	Maputo	Upgrade	$200.00	2010	2012	PPP	PPP	PPP
52110	N6 Beira - Inchope	128	Manica	Rehab.	$21.70	2011	2014	EU	EU	
52110	N6 Inchope - Machipanda	153	Manica	Rehab.	$26.00	2013	2016	EU	EU	
	Sub-total	916			$482.70					
	Additional Projects to be Financed									
TBA	N1: Pambara - Rio Save	122	Inhambane	Rehab.	$61.00	2011	2012	IDA	IDA	
TBA	N322: Cambulatsitsi - Mutara - Chire	252	Tete	Upgrade	$150.90	2014	2017	ADB	ADB	
52107	N380: Macomia - Oasse	102	C Delgado	Rehab.	$40.80	2010	2012	GoM	GoM	
TBA	N260: Espungabera - Sussundenga - Chimoio	235	Manica	Rehab.	$23.50	2011	2013			
TBA	N324: R Ligonha - Boila	128	Nampula	Rehab.	$12.80	2013	2014			
TBA	N360: Cuamba - Marrupa	236	Niassa	Rehab.	$23.60	2013	2015			
TBA	N221: Macarretane - Chicualacuala	321	Gaza	Rehab.	$32.10	2012	2015			
TBA	N222: Pafuri - Mapinhanhe	476	Gaza/I'bane	Rehab.	$47.60	2012	2016			
TBA	R689: Monapo - Liupo - Angoche	150	Nampula	Rehab.	$15.00	2013	2015			
TBA	R650. R658. Milange- Molubo - Magige	164	Zambezia	Rehab.	$16.40	2012	2013			
TBA	N282. Dondo - Inhaminga	188	Sofala	Upgrade	$75.20	2013	2016			
TBA	N320. Quelimane - Chinde	93	Zambezia	Rehab.	$18.60	2013	2015			
	Sub-total	2,467			$517.50					
	TOTAL	6.841			$2,968.20					

Source: ANE

In the program above cited, total unpaved road maintenance is budgeted at $130.5 million over three years, an average of about $4 million per province. Unpaved road maintenance is fully funded, all of it through the Road Fund collected from fuel levy exclusively. The unpaved roads maintenance budget is divided into the routine, periodic and passability maintenance; however, provincial engineers are to follow the unpaved roads maintenance strategy which prioritizes passability over riding quality. Following is the latest unpaved road maintenance work contracted for outsourcing in Niassa Province.

Table 3.6.3 Maintenance of Unpaved roads in Niassa Province

Route No.	Section	Distance (Km)	Fund	Period	Amount (Thous.Mt)
R1207	Lumbu-Chala	43	Road Fund	Jan 09-Dec 10	1,924/2,039
R1212	Mandinba-Amaramiza	45	Road Fund	Jan 09-Dec 10	4,272
N13	Cuamba-Missisi	75	Road Fund	Jan 09-Dec 10	9,319
N13	Missisi-Ngauma	75	Road Fund	Jan 09-Dec 10	4,089
R730	Congerende-Mitange	10	Road Fund	Jan 09-Dec 10	2,743

Source: ANE signboards

3.7 Conclusions and Recommendations

a. Economic Viability of the Project

According to HDM-4 calculation conducted as above, the DBST option is the most feasible among several alternatives.

The Project scores an average level as an upgrade-to-paved intervention and its economic viability is acceptable, with an EIRR of over 12% for the optimum intervention among alternatives. Based on this result, the Project is evaluated as one of the prioritized projects to be implemented in the nation. The particular importance of this primary road and of bringing it to all-weather passable condition is well established.

The Study Team concludes that the road upgrading Project is economically feasible in terms of national economy of Mozambique.

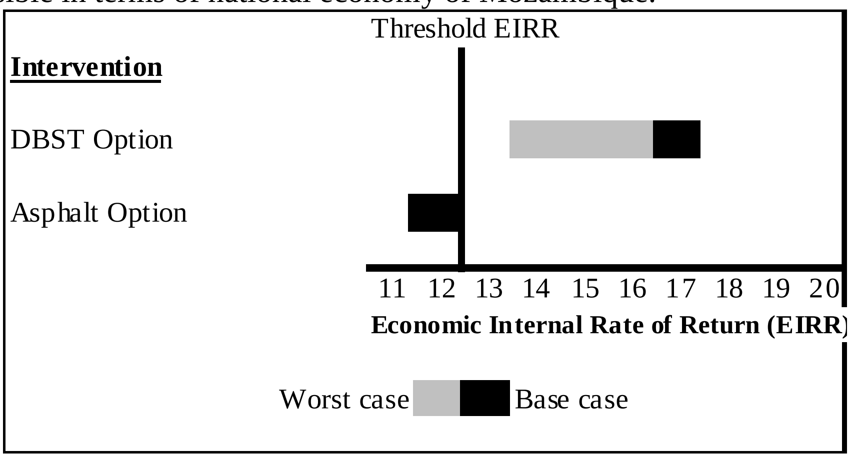


Figure 3.7.1 Summary of EIRR

Source: Study Team

b. Financial source for the implementation of the Project

In PRISE 2009-2011, the Project cost for implementation is estimated as US$96 million for Cuamba-Mandimba and US$89million for Mandimba-Lichinga. However, this Study proposes that additional project cost will be required.

Therefore, further discussions with the donors who may commit the funding for implementation, will be expected for the subsequent detailed design works and construction works based on the cost estimation in this Study.

c. Post-Construction Management and Maintenance

ANE, through provincial delegation, ensures the management and maintenance of all classified roads including the road sections proposed under this report. The Road Fund (FE) is responsible for financing these activities. The improvement of the maintenance performance is critical for post construction sustainability.

Since maintenance will largely be implemented by the provincial delegation of ANE, the establishment of functional offices will be crucial for the sustainability of the investments. Therefore, it is important to support ANE’s re-organization and capacity strengthening especially at provincial level. The funding and implementation of technical assistance, on-the-job training, infrastructure and logistical support activities will be effective measures to ensure sustainability.

Attachments to this Chapter
1.HDM Input for the Existing Road Condition (Lichinga -Mandimba)
2.HDM Input for Vehicle Characteristics
3.HDM Output for Economic Indicators of Alternatives

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Road Sections - Section per Page

Study Name: **LICHINGA-MANDIMBA**
Run Date: **30-10-2009**

LM / Lichinga-Mandimba

Definition

Section name:	Lichinga-Mandimba	Climate zone:	Lichinga	Shoulder width:	0.00 m
Section ID:	LM	Road class:	Primary or Trunk	Number of lanes:	2
Link name:	LT1	Surface class:	Unsealed	Motorised AADT:	142
Link ID:	LT1	Pavement type:	Gravel	NM AADT:	694
Speed flow type:	Two Lane Standard	Length:	148.00 m	AADT year:	2009
Traffic flow pattern:	Inter-urban	Cway width:	6.00 m	Flow direction:	Two-way

Geometry

Rise + fall:	56 m/km	Speed limit:	40 km/h
Avg horiz curvature:	164 deg/km	Altitude:	1,200 m

Pavement

Surface material:	Lateritic gravel	Compaction method:	Mechanical
Subgrade material:	Clays (inorganic) of medium plasticity (CI)	Last gravel year:	2008

Condition

Condition year:	2008	Gravel thickness:	300 mm	IRI:	12.00 m/km

Speed related

Num rises + falls:	3 no./km	XNMT:	1.00	XMT:	1.00
Superelevation:	3.00 %	XFRI:	1.00	Speed limit enforcement:	1.10
Sigma adral:	0.10 m/s2				

Surface Material Gradation

Max particle size:	21.90 mm	% passing 2.00mm sieve:	51.10 %	% passing 0.075mm sieve:	25.50 %
Plasticity index:	10.10 %	% passing 0.425mm sieve:	77.00 %		

Subgrade Material Gradation

Max particle size:	8.00 mm	% passing 2.00mm sieve:	83.50 %	% passing 0.075mm sieve:	59.00 %
Plasticity index:	18.80 %	% passing 0.425mm sieve:	77.00 %		

Shoulders and NMT Lanes

Num shoulders:	2	Num NMT lanes:	0	NMT lane surface type :	Bituminous
Separate NMT lanes:	No				

Roughness Model Calibration

Derivation:	Computed/derived	Surface minimum:	2.77 m/km	Subgrade minimum:	2.17 m/km
Surface maximum:	21.67 m/km	Subgrade maximum:	18.46 m/km		

Material Loss Calibration

Surface loss factor:	1.00	Subgrade loss factor:	1.00	Subgrade traffic induced:	1.00
Surface traffic induced:	1.00				

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Vehicle Fleet - Economic

Study Name: **LICHINGA-MANDIMBA**
Run Date: **30-10-2009**
Currency: **To be completed**

Motorised Vehicle Types:

Name	Base Type	New Vehicle	Replace Tyre	Fuel (per litre)	Lubr. Oil (per litre)	Maint Labour (per hr)	Crew Wages (per hr)	Annual Overhead	Annual Interest (%)	Passenger Work Time (per hr)	Passenger Non-Work (per hr)	Cargo Holding (per hr)
Medium Bus	Medium Bus	66,382	120	0.62	2.71	5.88	3.94	0	12.00	1.24	0.00	0.00
Medium Truck	Medium Truck	61,208	123	0.62	2.71	5.88	3.97	0	12.00	0.00	0.00	0.10
Car	Medium Car	23,682	46	0.72	2.71	5.88	0.94	0	12.00	1.24	0.00	0.00
Small Bus	Mini Bus	14,700	63	0.72	2.71	5.88	3.44	0	12.00	1.24	0.00	0.00
Articulated Truck	Articulated Truck	126,449	233	0.62	2.71	5.88	4.81	0	12.00	0.00	0.00	0.10
Heavy truck	Heavy Truck	105,995	233	0.62	2.71	5.88	4.81	0	12.00	0.00	0.00	0.10
Small Truck	Light Truck	20,087	63	0.62	2.71	5.88	2.21	0	12.00	0.00	0.00	0.10

Non-Motorised Vehicle Types:

Name	Base Type	Purchase Cost	Crew Wages (per hr)	Passenger Time (per hr)	Cargo Holding (per hr)	Energy Used (per MJ)	Annual Interest (%)
Jitensha	Bicycle	61	0.30	0.00	0.00	0.00	12.00

HDM - 4

HIGHWAY DEVELOPMENT & MANAGEMENT

Economic Indicators Summary

Study Name: **LICHINGA-MANDIMBA**

Run Date: **30-10-2009**

Currency: **US Dollar (millions)**

Discount Rate: **12.00%.**

Alternative	Present Value of Total Agency Costs (RAC)	Present Value of Agency Capital Costs (CAP)	Increase in Agency Costs (C)	Decrease in User Costs (B)	Net Exogenous Benefits (E)	Net Present Value (NPV = B+E-C)	NPV/Cost Ratio (NPV/RAC)	NPV/Cost Ratio (NPV/CAP)	Internal Rate of Return (IRR)
Without Project	3.886	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
With Project : DBST	113.355	111.946	109.466	179.153	0.000	69.685	0.615	0.622	17.7 (1)
With Project: Asphalt	160.088	159.035	156.201	148.974	0.000	-7.228	-0.045	-0.045	11.6 (1)
With Project: Gravel	58.157	56.321	54.271	-49.877	0.000	-104.148	-1.791	-1.849	No Solution
With Project: DBST(revised)	109.935	108.527	106.049	179.153	0.000	73.104	0.665	0.674	18.1 (1)

Figure in brackets is number of IRR solutions in range -90 to +900

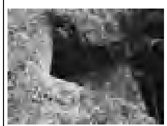
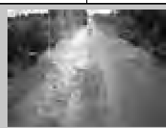
Appendices

Appendix-A

Drainage Inventory

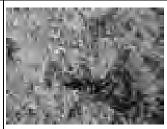
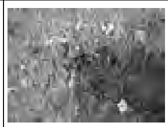
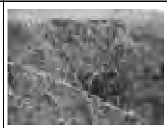
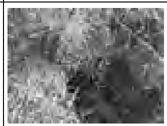
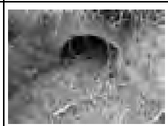
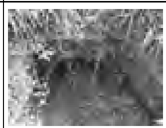
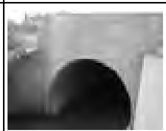
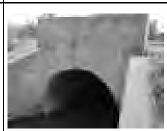
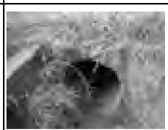
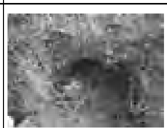
Drainage Inventory Sheet (1)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
1	0+701		Box Culvert	Concrete		1.00	0.90	0.50	0.00	6.85	6.85		L⇒R		
2	1+194	Ngame-Ⅰ											L⇒R		
3	1+982		Corrugated steel pipe	Concrete	0.80			0.30	0.15	8.20	7.60	0.30	R⇒L		
4	3+977		Box Culvert	Concrete		1.00	1.00	0.45	0.15	7.70	7.10	0.30	L⇒R		
5	4+493		Box Culvert	Concrete		1.00	1.00	0.40	1.10	13.20	13.20		L⇒R		—
6	4+702		Corrugated steel pipe	Concrete	0.80			0.20	0.20	8.20	7.60	0.30	L⇒R		
7	5+442		Corrugated steel pipe	Concrete	0.80			0.40	0.60	8.50	8.50		L⇒R		
8	5+830		Box Culvert	Concrete		1.00	1.00	0.30	0.20	7.30	7.30		L⇒R		
9	6+382		Box Culvert	Concrete		1.00	1.00	2.10	0.10	7.50	6.90	0.30	L⇒R		—
10	6+955		Box Culvert	Concrete		1.00	1.00	0.30	0.30	7.50	6.90	0.30	L⇒R		
11	7+479	Nacalongo											L⇒R		
12	8+61	Namiungu											L⇒R		
13	11+536		Box Culvert	Concrete		1.00	1.00	0.30	0.00	7.00	6.60	0.20	R⇒L		—
14	12+510		Box Culvert	Concrete		1.00	1.00	0.35	0.40	11.20	10.60	0.30	L⇒R		

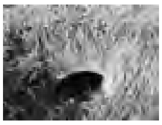
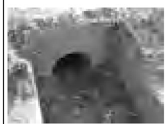
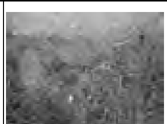
Drainage Inventory Sheet (2)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
15	12+803		Corrugated steel pipe	Concrete	0.80			0.20	0.50	8.10	7.60	0.25	L⇒R		
16	13+377		Corrugated steel pipe	Concrete	0.80			0.40	0.20	8.20	7.70	0.25	R⇒L		
17	14+899		Box Culvert	Concrete		1.45 × 2	1.4 × 2	0.40	0.90	14.50	14.10	0.20	L⇒R		
18	15+764		Corrugated steel pipe	Concrete	0.80			0.20	0.40	8.20	8.20		L⇒R		
19	16+27		Corrugated steel pipe	Concrete	0.80			0.30	0.30	8.30	7.80	0.25	L⇒R		
20	18+507	Luchimua											L⇒R		
21	19+168		Corrugated steel pipe	Concrete	2.20			1.10	-0.20	8.20	7.60	0.30	L⇒R		
22	20+843		Corrugated steel pipe	Concrete	0.80			0.30	0.60	8.20	8.20		L⇒R		
23	21+228		Corrugated steel pipe	Concrete	0.80			0.20	0.25	8.30	8.30		L⇒R		
24	21+461		Corrugated steel pipe	Concrete	0.80			0.30	0.50	8.20	7.80	0.20	L⇒R		
25	22+623		Corrugated steel pipe	Concrete	2.00			1.20	0.20	8.10	7.50	0.30	L⇒R	—	
26	23+397		Corrugated steel pipe	Concrete	2.00			1.00	-0.50	8.10	7.50	0.30	L⇒R		
27	24+539		Corrugated steel pipe	Concrete	0.80			0.30	0.30	8.20	7.70	0.25	L⇒R		
28	26+400	Lilasi											L⇒R		

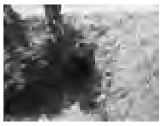
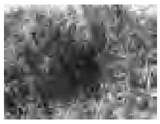
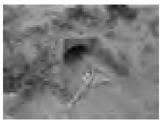
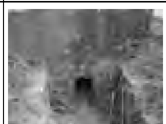
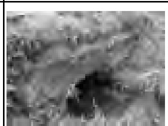
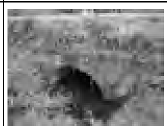
Drainage Inventory Sheet (3)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
29	26+793		Corrugated steel pipe	Concrete	0.80			0.65	0.15	8.20	8.20		L⇒R		
30	27+57		Corrugated steel pipe	Concrete	0.80			0.60	0.10	8.20	7.70	0.25	L⇒R		
31	27+374		Corrugated steel pipe	Concrete	0.80			0.60	0.10	8.30	7.70	0.30	L⇒R		
32	27+655		Corrugated steel pipe	Concrete	0.80			0.80	0.20	8.20	7.60	0.30	L⇒R		
33	27+960		Corrugated steel pipe	Concrete	2.00			1.10	0.30	8.20	8.20		L⇒R		—
34	28+502	Ninde											L⇒R		
35	30+609		Corrugated steel pipe	Concrete	0.80			0.55	0.15	8.20	7.60	0.30	L⇒R		
36	32+368		Corrugated steel pipe	Concrete	0.80			0.50	0.10	8.20	7.60	0.30	R⇒L		
37	33+759		Corrugated steel pipe	Concrete	1.20			0.30	0.30	8.20	8.20		R⇒L		
38	34+201		Corrugated steel pipe	Concrete	1.20			0.30	0.40	8.20	7.60	0.30	R⇒L		
39	35+738	Luelele											L⇒R		
40	38+903		Corrugated steel pipe	Concrete	0.80			0.60	0.10	8.20	8.20		L⇒R		
41	40+537		Corrugated steel pipe	Concrete	0.80			0.60	0.10	8.20	7.60	0.30	L⇒R		
42	43+392		Corrugated steel pipe	Concrete	0.80			0.20	0.60	8.40	7.90	0.25	L⇒R		

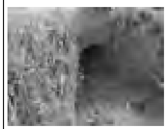
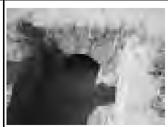
Drainage Inventory Sheet (4)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
43	44+244		Corrugated steel pipe	Concrete	1.10			0.30	-0.20	8.20	7.60	0.30	R⇒L		
44	46+809		Corrugated steel pipe	Concrete	0.80			0.30	0.50	8.30	8.30		R⇒L		
45	47+400		Corrugated steel pipe	Concrete	0.80			0.30	0.50	8.30	8.30		R⇒L		
46	47+727		Corrugated steel pipe	Concrete	0.70			0.60	0.20	8.30	8.30		L⇒R		
47	49+809		Corrugated steel pipe	Concrete	0.80			0.50	0.30	8.30	7.70	0.30	R⇒L		
48	50+477		Corrugated steel pipe	Concrete	0.80			0.50	0.15	8.30	7.70	0.30	R⇒L		
49	52+367	Mmaculumesi											L⇒R		
50	60+787		Corrugated steel pipe	Concrete	0.80			0.20	0.70	8.30	8.30		R⇒L		
51	61+100		Corrugated steel pipe	Concrete	0.80			0.50	0.30	8.30	7.80	0.25	R⇒L		
52	61+826		Corrugated steel pipe	Concrete	0.80			1.30	-0.25	7.70	6.90	0.40	R⇒L		
53	62+409		Corrugated steel pipe	Concrete	1.50			0.50	0.70	6.40	6.40		R⇒L		
54	63+19		Corrugated steel pipe	Concrete	0.80			0.40	0.25	8.20	7.60	0.30	R⇒L		
55	63+293		Corrugated steel pipe	Concrete	0.80			0.40	0.30	8.20	8.20		R⇒L		
56	63+752		Corrugated steel pipe	Concrete	0.80			0.30	0.20	8.30	8.30		R⇒L		

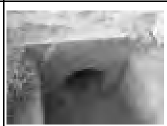
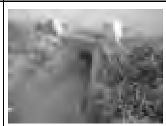
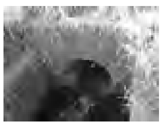
Drainage Inventory Sheet (5)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
57	65+34		Corrugated steel pipe	Concrete	0.80			0.30	0.10	8.30	8.30		L⇒R		
58	65+683		Corrugated steel pipe	Concrete	0.80			0.70	0.10	8.20	8.20		L⇒R		
59	67+89		Corrugated steel pipe	Concrete	0.80			0.40	0.30	8.30	8.30		R⇒L		
60	69+41		Corrugated steel pipe	Concrete	0.80			0.30	0.30	8.30	8.30		L⇒R		
61	69+460		Corrugated steel pipe	Concrete	0.80			0.60	0.10	8.20	8.20		L⇒R		
62	74+26	Lutembue											L⇒R		
63	76+41		Corrugated steel pipe	Concrete	0.80			0.40	0.00	8.20	7.20	0.50	L⇒R		
64	77+469		Corrugated steel pipe	Concrete	0.80			0.50	0.10	8.30	8.30		R⇒L		
65	78+535	Lusanga											L⇒R		
66	80+869		Corrugated steel pipe	Concrete	1.00			0.70	-0.10	10.50	9.90	0.30	L⇒R		
67	81+119		Corrugated steel pipe	Concrete	1.00			0.50	0.00	10.30	9.70	0.30	L⇒R		
68	81+418		Corrugated steel pipe	Concrete	1.00			0.70	0.00	10.20	9.60	0.30	L⇒R		
69	81+46		Corrugated steel pipe	Concrete	1.00 × 3	6.80		1.00	0.00	11.50	10.70	0.40	L⇒R		
70	81+648		Corrugated steel pipe	Concrete	0.80			0.70	0.10	8.30	7.70	0.30	L⇒R		

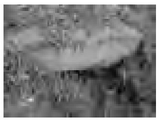
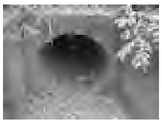
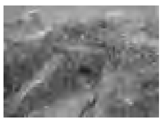
Drainage Inventory Sheet (6)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
71	81+813		Corrugated steel pipe	Concrete	0.80			0.70	-0.30	11.30	10.70	0.30	L⇒R		
72	82+4		Corrugated steel pipe	Concrete	0.80			0.70	-0.30	8.20	7.60	0.30	L⇒R		
73	82+120		Corrugated steel pipe	Concrete	1.20 × 3	6.20		1.00	-0.40	12.40	11.50	0.45	L⇒R		
74	82+196		Corrugated steel pipe	Concrete	0.80			0.60	-0.30	8.20	7.60	0.30	L⇒R		
75	82+477		Corrugated steel pipe	Concrete	1.00			0.50	-0.30	8.30	7.70	0.30	L⇒R		
76	83+649		Corrugated steel pipe	Concrete	0.80			0.70	-0.30	10.30	9.70	0.30	R⇒L		
77	83+954		Corrugated steel pipe	Concrete	1.20			0.70	-0.10	8.40	7.80	0.30	R⇒L		
78	85+262		Corrugated steel pipe	Concrete	0.80			0.50	-0.30	8.20	7.60	0.30	L⇒R		
79	85+508		Corrugated steel pipe	Concrete	0.80			0.50	0.20	8.20	7.70	0.25	L⇒R		
80	85+928	Luambala											L⇒R		
81	89+357		Corrugated steel pipe	Concrete	0.80			0.50	0.20	8.30	7.70	0.30	L⇒R		
82	92+126		Corrugated steel pipe	Concrete	2.80			1.10	0.00	5.70	5.70		L⇒R		
83	93+69		Corrugated steel pipe	Concrete	1.20			1.10	-0.10	12.00	11.30	0.35	L⇒R		
84	96+687		Corrugated steel pipe	Concrete	0.80			0.40	0.10	8.30	7.80	0.25	R⇒L		

Drainage Inventory Sheet (7)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
85	103+82		Corrugated steel pipe	Concrete	0.80			0.45	0.20	10.30	9.60	0.35	L⇒R		
86	101+567		Corrugated steel pipe	Concrete	1.00			1.20	-0.30	6.30	5.70	0.30	L⇒R		
87	101+90		Corrugated steel pipe	Concrete	0.80			0.40	0.20	8.30	7.80	0.25	L⇒R		
88	102+147		Corrugated steel pipe	Concrete	2.40			1.10	-0.15	5.50	4.80	0.35	L⇒R	—	
89	102+357		Corrugated steel pipe	Concrete	0.80			0.70	0.00	8.30	7.70	0.30	R⇒L		
90	102+718		Corrugated steel pipe	Concrete	0.80			0.40	0.10	8.20	8.20		R⇒L		
91	103+156		Corrugated steel pipe	Concrete	0.80			0.25	0.30	8.30	8.30		R⇒L		
92	104+59		Corrugated steel pipe	Concrete	0.80			0.20	0.50	8.20	7.70	0.25	L⇒R		
93	106+259		Corrugated steel pipe	Concrete	0.80			0.20	0.70	8.20	7.70	0.25	R⇒L		
94	106+597		Corrugated steel pipe	Concrete	0.80			0.30	0.70	8.30	8.30		R⇒L		
95	107+506		Corrugated steel pipe	Concrete	0.80			0.80	-0.10	8.80	8.20	0.30	R⇒L		
96	110+54		Corrugated steel pipe	Concrete	0.80			0.50	0.30	8.30	8.30		L⇒R		
97	114+148		Corrugated steel pipe	Concrete	0.80			0.40	0.20	8.20	8.20		L⇒R		
98	114+874		Corrugated steel pipe	Concrete	1.20			0.40	0.20	8.20	8.20		L⇒R		

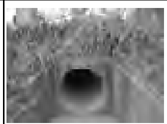
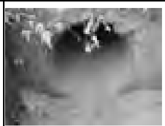
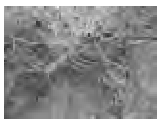
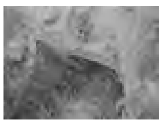
Drainage Inventory Sheet (8)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
99	115+547		Corrugated steel pipe	Concrete	0.80			0.40	0.00	8.20	7.50	0.35	L⇒R		
100	115+902		Corrugated steel pipe	Concrete	1.20			0.80	0.80	8.20	8.20		L⇒R		
101	116+361		Corrugated steel pipe	Concrete	1.20			0.30	0.30	8.20	7.50	0.35	L⇒R		
102	118+132		Corrugated steel pipe	Concrete	0.80			0.40	0.30	8.20	8.20		L⇒R		
103	120+352		Corrugated steel pipe	Concrete	0.80			0.30	0.40	8.20	7.70	0.25	L⇒R		
104	120+899		Corrugated steel pipe	Concrete	0.80			0.20	0.40	8.10	8.10		L⇒R		
105	122+459		Corrugated steel pipe	Concrete	0.80			0.40	0.30	8.20	8.20		L⇒R		
106	122+955		Corrugated steel pipe	Concrete	0.80			0.30	0.10	8.20	7.60	0.30	L⇒R		
107	123+940		Corrugated steel pipe	Concrete	0.80			0.20	0.50	8.10	8.10		R⇒L		
108	124+610		Corrugated steel pipe	Concrete	0.80			0.30	0.00	8.20	7.70	0.25	L⇒R		
109	124+892		Corrugated steel pipe	Concrete	0.80			0.40	0.35	8.20	7.70	0.25	L⇒R		
110	125+159		Corrugated steel pipe	Concrete	0.80			0.25	0.40	8.30	8.30		L⇒R		
111	125+675		Corrugated steel pipe	Concrete	0.80			0.25	0.50	8.20	8.20		L⇒R		
112	125+956		Corrugated steel pipe	Concrete	0.80			0.30	0.45	8.20	8.20		L⇒R		

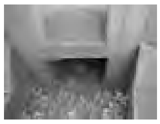
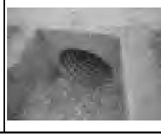
Drainage Inventory Sheet (7)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
113	126+250		Box Culvert	Concrete		1.10	0.80	0.20	0.30	11.00	10.40	0.30	L⇒R		
114	127+203		Corrugated steel pipe	Concrete	0.80			0.20	0.50	8.20	8.20		L⇒R		
115	132+803		Corrugated steel pipe	Concrete	0.80			0.20	0.50	8.10	8.10		L⇒R		
116	133+748		Corrugated steel pipe	Concrete	0.80			0.30	0.20	8.20	7.70	0.25	L⇒R		
117	134+626		Corrugated steel pipe	Concrete	0.80			0.20	0.15	8.20	8.20		L⇒R		
118	136+605		Corrugated steel pipe	Concrete	0.80			0.20	0.00	8.30	7.50	0.40	L⇒R		
119	137+202		Corrugated steel pipe	Concrete	0.80			0.40	0.30	8.20	7.60	0.30	R⇒L		
120	139+12		Corrugated steel pipe	Concrete	0.80			0.25	0.15	8.30	8.30		L⇒R		
121	139+195		Corrugated steel pipe	Concrete	0.80			0.20	0.40	8.20	8.20		R⇒L		
122	140+53		Corrugated steel pipe	Concrete	0.80			0.20	0.60	8.20	8.20		L⇒R		
123	141+480		Corrugated steel pipe	Concrete	0.80			0.30	0.40	8.20	8.20		L⇒R		
124	143+612		Corrugated steel pipe	Concrete	0.80			0.25	0.40	8.10	8.10		R⇒L	—	
125	145+585		Corrugated steel pipe	Concrete	0.80			0.30	0.10	8.20	8.20		L⇒R		
126	145+724		Corrugated steel pipe	Concrete	0.80			0.20	0.40	8.20	8.20		L⇒R		

Drainage Inventory Sheet (8)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness (m)	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness (m)	Flow Direction	Photos Left	Photos Right
127	146+634		Corrugated steel pipe	Concrete	0.80			0.30	0.30	8.10	8.10		L⇒R		
128	147+339		Box Culvert	Concrete		0.80	0.80	0.20	0.20	8.50	7.90	0.30	R⇒L		
129	148+70		Corrugated steel pipe	Concrete	0.80			0.25	0.00	8.20	7.60	0.30	L⇒R		

Drainage Inventory Sheet (11)

Mandimba～Lichinga

No.	Sta.	Bridge Name	Structure Type	Material	Pipe Φ (m)	Box Size W (m)	Box Size H (m)	Slab Thickness	Earth Covering (m)	Length (m)	Inner width (m)	Headwall Thickness	Flow Direction	Photos Left	Photos Right
1	48+249		Box Culvert	Concrete		0.90	0.80	0.20	0.15	9.90	9.40	0.25	R⇒L		
2	70+671		Box Culvert	Concrete		0.80	1.10	0.40	0.15	10.00	9.40	0.30	R⇒L		
3	77+841		―	―	―	―	―	―	―	―	―	―	L⇒R		
4	84+896		Box Culvert	Concrete		0.80	1.10	0.20	0.30	8.50	7.90	0.30	L⇒R		
5	87+818		Box Culvert	Concrete		0.80	1.00	0.20	0.10	9.30	8.70	0.30	R⇒L		
6	90+794		Box Culvert	Concrete		0.80	1.00	0.20	0.20	9.50	9.00	0.25	L⇒R		
7	106+976		Box Culvert	Concrete		0.80	1.00	0.20	0.15	9.20	8.60	0.30	L⇒R		
8	109+671		Box Culvert	Concrete		0.80	1.20	0.20	0.10	11.70	11.20	0.25	L⇒R		
9	119+787		Box Culvert	Concrete		0.80	1.10	0.20	0.20	10.00	9.40	0.30	L⇒R		
10	121+255		Box Culvert	Concrete		0.80	0.90	0.20	0.20	9.70	9.10	0.30	L⇒R		

Appendix-B
Weather

Precipitation Data in Niasa (Daily)

República de Moçambique

Instituto Nacional de Meteorologia
Caixa Postal 256 - MAPUTO
Teleg.: OBSERTOR - Telefs.: 490064-490148-492530 - Fax: 491150 - Telex: SMMMP 6-259

Nº80-09/INF-DAD

Maputo,31 de Março de 2009

Ao
JICA STUDY TEAM
Oriental Consultants,Ltd

MAPUTO

Estação: Cuamba

Periodo:1960-2008

Elemento: Precipitação total diária (das 9 as 9 horas em mm)

Ano/Mes	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0
1960-01	0.0	0.0	0.0	0.0	10.6	38.4	19.6	3.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	4.2	0.0	0.0	1.3	0.0	0.0	0.0	6.8	1.9	5.3	0.0	0.0
1960-02	5.7	0.0	5.1	0.0	0.0	0.0	8.7	0.0	63.8	36.8	2.7	3.9	0.0	25.4	0.0	0.0	0.0	0.0	5.3	24.3	0.0	0.0	2.7	9.5	9.5	0.0	1.6	0.0	0.0	--	--
1960-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	5.6	1.4	4.5	3.2	0.5	15.7	0.6	33.4	15.8	0.3	19.2	0.0	21.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-04	0.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	--
1960-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.6	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
1960-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	21.5	1.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1960-07	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.5	0.1	0.8	0.0	0.0	0.0	0.0	0.0
1960-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1960-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	7.8	0.0	0.0	25.6	10.3	14.0	0.4	--
1960-12	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	21.3	2.1	0.9	12.2	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.5	1.5	12.4	10.5	3.0	0.5	20.2	23.5	2.2
1961-01	0.0	0.0	0.0	0.0	5.0	20.5	5.1	39.2	0.0	45.1	0.6	0.0	1.9	3.4	7.0	17.0	9.0	3.3	1.0	5.0	0.0	2.5	0.0	2.5	0.0	0.5	0.0	28.5	0.0	0.0	0.3
1961-02	3.6	1.5	6.0	21.0	1.6	0.5	2.7	4.6	6.0	4.1	0.0	9.8	0.0	3.6	0.6	6.1	11.6	0.0	0.0	0.3	2.5	0.0	4.7	6.3	2.4	0.0	0.0	0.5	--	--	--
1961-03	1.1	0.5	17.9	0.7	45.8	29.5	0.1	116.8	2.9	1.5	7.8	13.8	16.2	22.4	0.0	0.0	4.3	0.0	0.0	2.0	27.9	0.0	23.4	12.6	11.8	1.9	2.0	0.0	4.2	2.4	0.0
1961-04	0.0	0.0	0.0	3.8	22.9	1.6	0.0	0.0	0.0	0.6	0.0	0.0	34.2	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3	6.2	0.1	0.0	0.0	0.8	0.0	0.0	0.0	--
1961-05	0.0	0.0	0.0	0.0	1.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	--
1961-07	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.7	0.0	0.0	0.3	0.0	0.0	1.7	0.5	0.9	0.0	0.0	0.0	0.0	0.0
1961-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.0	6.9	0.0	0.0	0.0	1.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1961-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
1961-11	0.1	0.1	0.0	0.0	0.0	5.1	0.0	0.0	0.0	0.0	17.7	1.4	0.0	0.0	0.0	8.7	0.4	0.0	49.1	9.5	0.0	0.0	0.3	0.0	4.2	0.0	0.0	0.0	0.0	0.0	--
1961-12	1.9	1.6	1.7	0.2	0.0	0.2	0.0	0.1	2.1	7.6	5.8	13.7	33.7	0.6	3.4	42.7	2.5	1.9	0.0	0.0	0.0	0.0	1.8	0.0	0.0	24.1	0.0	0.0	0.0	3.9	0.0
1962-01	14.7	1.8	4.2	5.3	5.2	12.0	3.7	0.4	0.3	3.5	24.6	7.4	8.0	2.8	8.2	1.4	1.3	0.1	2.2	0.0	5.4	14.0	0.0	0.0	0.0	0.0	36.7	11.7	137.4	17.2	0.8
1962-02	14.4	0.0	0.0	0.3	11.4	14.2	2.3	17.8	0.1	0.0	0.0	0.0	18.4	0.2	0.0	20.5	18.2	0.0	2.6	29.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
1962-03	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	12.4	0.0	0.1	0.1	15.7	9.7	0.0	8.0	0.3	15.7	0.5	8.6	14.8	0.0	82.4	16.2	5.0	4.0	0.0
1962-04	6.7	0.0	0.0	0.0	0.0	0.4	4.7	2.5	0.0	0.6	0.5	3.8	0.0	0.0	0.0	0.0	0.7	0.2	0.3	2.0	1.2	0.2	0.6	0.0	0.0	0.0	0.0	0.0	1.2	0.0	--
1962-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
1962-06	0.0	0.0	0.0	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1962-07	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1962-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
1962-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1962-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.2	0.2	0.0	0.0	4.2	24.3	0.1	0.0	0.0	0.0	0.0
1962-11	0.0	0.0	0.0	0.0	0.0	2.5	0.0	3.1	0.8	1.4	2.0	19.0	0.0	0.0	0.4	0.0	0.0	0.0	0.9	0.3	0.0	0.2	0.0	6.2	0.4	1.2	0.3	9.3	15.7	18.5	--
1962-12	0.0	2.6	11.8	0.0	0.5	23.1	21.1	55.0	29.8	0.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.1	53.5	0.2	9.0	0.0	0.0	0.0	0.0	0.0	70.8	50.0
1963-01	0.2	23.4	3.6	11.0	2.1	6.4	12.0	0.0	17.7	0.0	0.8	0.0	2.0	7.4	15.8	0.0	0.6	39.6	2.8	0.0	0.0	0.0	46.7	1.2	1.0	0.0	0.9	1.2	6.3	6.5	11.3
1963-02	0.8	4.5	0.0	29.3	6.8	13.0	1.4	56.8	35.6	44.3	25.4	3.2	0.3	9.5	10.8	32.9	9.5	19.0	0.0	0.0	0.0	67.3	11.3	48.6	0.0	0.8	0.8	0.4	--	--	--
1963-03	0.0	3.8	40.4	32.0	0.7	0.1	5.1	0.0	0.0	0.0	0.0	3.8	1.8	0.0	30.0	0.0	0.0	4.5	1.4	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	5.0	1.0	0.0	7.0
1963-04	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1963-05	0.0	0.0	0.0	0.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963-06	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1963-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1963-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8
1963-11	6.5	0.6	8.3	5.9	27.6	8.2	0.0	16.8	7.0	17.1	0.0	0.0	--	--	22.4	0.0	0.6	2.4	0.0	0.2	0.6	0.0	36.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1963-12	11.0	0.0	0.0	16.0	0.0	2.0	1.0	4.6	0.0	13.0	0.0	19.0	0.0	3.0	5.1	0.0	0.6	1.6	3.7	0.0	3.2	2.4	38.6	7.9	0.5	0.0	0.7	7.3	5.2	26.9	29.2
1964-01	0.0	0.0	10.9	12.7	1.5	16.8	2.7	0.4	1.8	3.2	19.5	7.1	10.8	1.4	0.1	0.0	0.0	7.9	0.0	0.5	1.4	0.0	0.4	2.4	1.6	99.3	9.6	16.4	0.4	8.2	1.3
1964-02	5.4	0.0	1.8	24.8	0.5	6.9	3.4	0.2	4.9	34.1	40.3	1.8	0.6	15.5	0.0	10.1	15.2	0.7	0.4	19.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
1964-03	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	1.1	0.0	4.2	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	1.6	25.4	3.7	0.0	0.0	0.0	0.0	0.0	0.0
1964-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0	0.0	--
1964-05	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
1964-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	--
1964-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-09	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1964-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.1	0.0	0.0	0.0	7.6	0.0	47.4	0.0	--
1964-12	0.0	0.0	0.0	0.0	0.0	42.2	0.0	0.0	3.5	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	3.8	0.0	0.0	4.5	0.0	4.0	0.0	5.6	0.0	21.4	39.1
1965-01	0.0	39.1	4.0	0.0	0.0	38.2	0.0	0.0	0.0	14.2	0.0	0.0	5.9	23.2	6.9	0.0	42.5	12.4	1.2	38.4	0.0	0.0	0.0	0.0	0.0	36.4	0.0	2.5	3.6	11.4	4.0
1965-02	7.3	1.0	0.0	12.2	0.0	0.1	1.3	0.0	0.0	10.7	5.2	5.1	12.3	0.0	12.2	0.0	6.1	25.6	1.4	6.6	29.4	0.0	0.0	0.0	0.0	7.5	0.0	0.0	--	--	--
1965-03	6.0	1.3	0.0	17.1	5.1	25.4	4.4	0.0	27.8	7.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	6.0	32.0	37.5	10.0	1.3	0.0	2.5	6.8	0.9	22.5
1965-04	1.8	18.8	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1965-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-06	0.0	4.0	0.0	0.0	0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1965-07	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-08	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.3	0.0	0.0	0.0	--
1965-10	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-11	0.0	0.0	0.0	0.0	0.0	0.0	48.2	53.0	23.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1965-12	8.4	7.2	19.2	0.0	0.0	0.0	0.0	0.0	1.9	0.7	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.5	2.8	1.5	45.4	10.4	32.0	8.5	23.3	13.0	0.0	0.2	2.3	0.2	3.8
1966-01	0.3	0.0	12.7	36.4	18.4	3.8	0.3	0.0	2.6	39.0	2.5	0.0	0.0	0.0	0.0	0.0	19.2	0.0	0.0	0.0	14.1	9.6	0.0	0.0	0.2	3.0	0.0	0.0	0.0	0.0	0.2
1966-02	0.0	0.0	0.0	0.0	31.2	0.0	0.0	0.0	6.2	0.0	5.3	27.8	37.2	0.3	1.8	0.0	5.9	11.0	26.6	81.8	6.7	0.1	7.4	6.1	32.1	79.7	29.7	0.0	--	--	--
1966-03	0.6	22.6	0.7	0.0	2.1	3.6	0.8	0.0	0.0	11.5	1.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1966-04	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	29.8	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1966-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	1.7	0.0	0.0	0.0	0.3	0.4	0.0
1966-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.2	0.0	0.0	0.0	0.0	0.0	--
1966-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.4	0.0	0.0	0.0	0.0
1966-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1966-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1966-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1966-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	5.7	0.0	0.0	0.3	0.0	10.8	0.2	30.1	3.0	0.0	0.0	5.1	1.1	0.0	0.0	0.0	0.0	0.0	--
1966-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	8.7	0.2	0.0	10.5	0.0	10.9	1.0	1.5	13.5	0.5	0.4	10.9	5.8	6.6	5.1	26.3	16.3	0.0	0.0	0.0	0.0	11.2
1967-01	5.3	15.5	19.8	0.0	0.0	14.0	22.0	2.1	0.0	12.1	0.0	0.0	0.0	0.0	18.4	46.4	32.4	6.0	0.0	2.3	7.5	0.0	17.1	0.8	15.3	1.8	0.0	32.3	2.4	0.0	0.0
1967-02	0.0	2.5	11.4	1.6	0.0	2.2	2.9	3.0	0.0	0.0	1.4	0.0	1.3	0.0	0.6	4.5	9.0	3.4	4.5	7.0	1.6	0.5	0.5	8.7	5.1	0.0	0.0	12.8	--	--	--
1967-03	7.7	0.3	0.0	23.1	5.2	0.0	0.0	0.0	0.0	0.0	28.4	0.0	1.2	7.1	52.3	22.9	0.0	4.5	0.3	33.1	10.1	2.2	0.0	23.7	1.4	78.9	17.8	39.4	0.2	0.0	0.0
1967-04	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.6	20.5	33.2	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1967-05	0.0	0.0	0.5	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0
1967-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	--
1967-07	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4	1.7	0.3	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1967-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1967-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	--
1967-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.0
1967-11	0.0	1.5	14.8	10.0	0.0	0.0	0.0	0.4	1.7	1.2	10.6	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.9	0.0	24.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1967-12	14.7	31.5	0.2	0.0	7.6	0.0	27.6	2.4	24.0	0.2	0.0	0.4	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	21.5	5.0	0.0	0.0	6.8	45.0	0.0	0.0	0.0
1968-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	8.1	0.0	0.0	12.3	14.8	1.4	10.3	14.0	0.7	30.4	0.0	0.4	69.4	0.2	1.4	2.6	13.0	4.9	46.5	0.0	0.0	0.0	0.0
1968-02	0.0	0.0	0.0	0.0	4.0	2.8	9.0	0.0	0.2	23.1	9.0	21.4	32.3	21.5	26.0	41.1	32.8	18.9	22.8	0.0	0.0	0.0	0.0	0.0	0.2	7.4	4.2	1.5	3.4	--	--
1968-03	3.4	1.2	0.0	3.6	0.0	0.5	0.4	1.3	10.8	0.7	0.0	10.4	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.9	0.0	0.0	0.0	4.1	1.0	0.1	0.2	0.0	0.0
1968-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.3	0.0	0.0	17.2	0.0	0.5	1.4	0.0	0.0	84.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1968-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.9	0.0	0.0	0.0	0.0
1968-06	0.0	0.0	0.0	3.4	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1968-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1968-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968-11	0.0	0.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	1.7	3.0	0.0	0.0	2.6	4.6	45.6	3.2	0.0	5.6	0.0	1.2	2.0	1.0	1.2	0.0	0.0	0.0	--
1968-12	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	29.2	34.4	6.3	2.1	0.0	0.3	31.3	1.5	39.8	3.0	31.7	3.3	3.5	0.0	0.0	0.0	0.0	0.0	0.6	22.2	12.9	4.4	16.3

1969-01	15.0	12.0	32.5	3.5	58.8	10.7	3.4	0.0	3.2	1.8	17.4	35.9	51.0	25.0	8.8	0.0	0.0	0.0	5.9	7.0	7.0	0.0	0.0	0.0	0.0	8.1	0.0	0.0	1.3	1.2	0.0
1969-02	0.0	18.6	0.0	0.0	0.0	1.8	71.4	28.8	0.0	0.0	2.4	0.6	26.6	1.2	0.0	0.0	0.0	0.4	1.6	0.8	17.6	3.0	12.3	3.0	0.0	2.7	0.2	0.0	--	--	--
1969-03	0.0	0.0	7.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	24.5	1.0	0.0	2.3	0.0	0.0	0.0	0.0	1.8	3.0	1.0	0.0	0.0	0.0	16.5	0.0	31.5	0.5
1969-04	0.0	0.0	0.0	4.0	0.2	18.0	0.0	13.1	5.1	9.6	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1969-05	1.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1969-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
1969-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1969-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969-11	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	--
1969-12	0.0	11.2	6.3	4.6	0.0	0.0	0.0	0.0	0.0	40.8	0.0	0.0	39.0	1.8	24.5	26.9	59.5	4.9	0.8	35.4	10.0	14.6	0.3	6.2	0.1	11.4	0.0	0.0	37.0	0.0	6.7
1970-01	12.0	2.1	8.8	28.4	0.0	24.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	6.5	42.5	14.2	0.0	13.0	0.8	16.8	63.4	0.0	18.8	43.2	0.0	2.2	45.5	4.2
1970-02	7.4	10.4	20.2	0.3	0.3	4.6	27.0	6.6	12.8	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	3.0	0.0	0.0	0.0	--	--	--
1970-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-04	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	1.0	0.2	4.0	0.0	3.8	2.8	0.0	0.0	3.6	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1970-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1970-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1970-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7
1970-11	0.0	0.0	1.6	0.0	0.0	0.0	16.8	4.4	0.0	2.0	58.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.3	1.3	0.0	6.5	13.2	10.1	6.8	10.8	--
1970-12	4.3	11.4	6.8	18.8	10.0	8.8	1.6	18.0	0.3	14.5	0.0	17.2	10.4	0.0	0.4	46.4	0.0	5.8	25.8	2.2	0.0	0.0	1.1	0.0	0.8	2.5	4.1	0.0	1.0	5.8	7.5
1971-01	21.4	5.6	9.7	8.6	28.2	30.8	96.0	30.1	7.7	0.0	0.0	0.0	3.2	0.0	0.5	0.0	0.0	56.4	24.9	6.1	47.9	34.2	6.2	21.7	0.0	13.4	25.1	22.3	3.3	0.0	3.3
1971-02	0.0	0.0	1.3	0.0	0.0	0.0	1.5	0.0	4.3	9.0	4.7	0.0	0.7	0.0	3.0	0.0	12.1	9.7	136.3	6.3	0.0	0.0	0.0	42.2	9.1	0.0	0.0	0.0	--	--	--
1971-03	0.0	0.0	0.0	18.1	2.9	0.0	0.0	2.8	0.9	3.4	0.0	0.0	8.8	16.2	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	6.6
1971-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	11.5	0.0	0.0	0.0	0.0	0.0	--
1971-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-06	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1971-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1971-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0	0.0
1971-11	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.0	0.0	0.0	9.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1	0.0	0.0	0.0	0.0	0.0	0.0	9.5	--
1971-12	0.0	0.0	0.0	0.0	7.4	1.9	9.0	2.9	0.1	6.9	0.0	8.2	0.0	16.4	35.1	0.0	5.3	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	13.6	13.8	8.8	0.0	1.1	1.5
1972-01	0.6	0.5	0.0	0.9	0.0	2.8	8.0	26.7	0.0	8.4	0.0	0.0	4.5	40.1	71.8	4.9	1.3	2.4	0.0	0.0	0.0	10.3	0.0	0.0	0.0	7.4	0.0	2.7	0.0	0.0	8.8
1972-02	13.2	0.0	0.0	0.0	2.4	0.0	0.0	0.0	8.4	6.6	0.0	0.0	0.0	32.5	9.8	0.0	12.1	1.8	0.0	0.0	2.0	20.3	0.8	2.2	12.0	3.8	3.7	18.9	15.0	--	--
1972-03	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.6	0.0	0.0	0.0	2.4	5.1	0.0	0.0	0.0	0.0	0.0	0.0	12.0	3.0	0.0	0.0	0.0	0.0	0.5	0.0
1972-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.6	0.0	1.2	0.0	0.7	4.8	4.3	1.4	0.0	0.0	0.9	0.0	0.5	3.5	0.0	11.3	0.0	0.0	2.0	0.2	0.0	0.0	--
1972-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0
1972-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	--
1972-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1972-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7
1972-11	0.0	0.0	0.0	3.5	0.0	0.0	0.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	7.8	0.4	11.6	1.0	0.0	--
1972-12	0.0	1.1	38.1	1.8	4.4	7.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.7	1.5	25.8	26.4	6.8	2.6	29.7	27.1	1.0	0.0	0.0	0.8	13.9	0.3	0.0
1973-01	0.0	0.5	2.2	0.3	3.5	3.5	2.6	22.0	0.0	0.0	40.1	1.0	4.6	4.5	0.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	11.7	30.8	7.0	5.4	0.0	0.0	2.8	0.0	0.0
1973-02	9.5	0.5	0.0	0.0	0.0	0.0	0.4	25.8	1.5	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	14.8	0.0	2.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	--	--	--
1973-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	5.9	79.1	18.5	21.2	15.6	5.4	39.5	1.1	0.0	0.8	0.0	0.0	0.0	22.8	0.0	0.0	9.2
1973-04	0.0	0.0	0.0	12.7	0.5	0.1	14.5	1.0	0.0	9.1	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.6	0.0	0.0	--
1973-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1973-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
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1973-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1974-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1974-02	22.2	10.8	10.0	22.4	18.5	10.0	10.9	10.8	3.0	0.0	3.1	1.5	0.8	18.8	0.0	0.0	14.6	25.3	3.1	32.1	0.0	10.0	18.8	15.4	0.0	0.0	0.0	0.0	--	--	--
1974-03	0.0	0.2	8.2	0.0	13.4	12.0	18.4	17.9	5.0	0.0	0.0	16.0	0.1	3.5	24.5	0.2	0.0	0.0	0.2	0.0	2.4	0.0	15.9	2.3	2.3	0.0	7.3	3.0	0.8	18.2	17.0
1974-04	0.0	19.2	3.0	8.6	1.7	0.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.1	33.1	0.0	0.0	--
1974-05	0.2	3.0	7.5	0.0	0.0	0.0	0.0	23.2	18.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
1974-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.6	25.2	21.0	--
1974-07	0.6	0.0	0.0	1.2	0.2	0.0	0.0	0.0	3.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
1974-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
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1974-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1977-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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1977-04	--	--	--	--	--	--	--	5.0	0.0	2.1	0.0	0.5	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	3.6	0.0	--
1977-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1977-07	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
1977-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	--
1977-10	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	0.0	0.0	0.0	0.0	0.0	0.0
1977-11	0.0	0.0	0.0	0.6	0.2	2.6	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	1.1	1.8	27.7	0.0	0.0	29.2	22.0	1.2	0.0	0.8	--
1977-12	0.0	0.0	0.0	0.8	22.6	10.7	7.9	1.2	0.0	27.2	1.0	0.4	0.0	0.0	0.0	0.0	0.0	21.5	7.4	0.2	6.6	2.8	0.0	0.5	18.0	0.0	0.0	0.2	4.5	0.5	6.4
1978-01	20.6	0.0	0.0	0.0	67.7	3.0	6.6	0.1	18.2	41.3	0.1	0.7	0.0	0.2	45.3	2.2	17.5	1.0	18.8	8.3	1.0	50.6	2.7	87.9	0.8	10.3	0.0	16.3	37.9	0.7	0.1
1978-03	0.0	33.6	0.8	0.0	5.1	4.1	23.4	0.2	9.1	6.4	4.1	0.0	14.6	33.3	0.7	5.9	0.0	49.7	0.0	0.0	22.4	5.8	0.1	0.1	4.9	3.8	6.3	10.9	10.7	9.9	9.5
1978-04	0.0	0.0	0.0	0.7	60.9	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	9.3	0.9	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.6	0.2	1.6	--
1978-05	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1978-07	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1978-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
1978-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	1.4	0.6	1.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1978-12	0.0	26.4	0.0	5.5	9.9	0.4	0.5	2.9	23.0	30.9	2.2	44.3	2.5	4.7	0.0	0.0	0.3	7.7	1.8	6.9	19.5	51.6	15.6	0.0	12.7	0.0	0.0	0.0	19.2	4.3	1.5
1979-01	0.0	5.0	0.0	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	21.4	2.2	0.6	19.0	0.8	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.8	0.0	0.0
1979-02	0.0	4.5	9.5	3.6	4.3	0.0	9.9	0.0	0.0	0.0	25.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	0.0	0.0	4.2	60.9	15.9	57.3	38.9	--	--	--
1979-03	1.2	0.0	12.1	10.2	1.0	15.4	0.2	11.0	0.5	1.1	0.5	20.4	2.3	61.2	0.0	2.5	0.0	0.0	3.8	0.0	0.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.8
1979-04	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	11.5	0.0	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	--
1979-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-06	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1979-07	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-09	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1979-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.3	0.0	4.8	0.0	0.0	0.0	0.0	1.9	4.8	3.6	0.0	0.0	0.0	0.0	0.0
1979-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.8	4.3	16.4	7.1	14.6	0.2	0.0	10.1	0.0	14.9	19.0	0.0	8.0	0.1	12.9	--
1979-12	2.2	7.1	0.0	0.0	0.0	28.9	0.0	11.3	0.0	9.2	49.6	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.5	18.1	0.0	2.8	0.0	0.6	0.0	0.0	0.0	9.4	0.1
1980-01	8.5	0.0	0.8	4.5	3.0	21.2	19.4	10.2	2.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.2	1.3	41.7	2.2	0.0	0.0	0.0	0.0
1980-02	0.0	0.0	0.0	22.6	15.0	0.4	7.1	0.3	2.9	0.0	0.0	0.0	0.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	1.8	0.0	0.1	75.6	1.2	2.1	--	--
1980-03	1.3	0.0	0.0	0.0	0.8	0.0	13.5	32.9	39.8	2.8	0.0	0.0	0.2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	1.5	0.0	0.2	0.0	2.2
1980-04	0.0	15.5	3.5	1.8	19.7	25.0	0.0	25.8	0.0	0.0	0.0	0.0	4.1	9.0	14.1	13.7	0.0	69.7	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-06	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-08	0.0	0.0	0.0	0.0	0.8	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	--
1980-10	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	6.6	23.5	0.0	0.0	49.0	0.3	0.0	0.2	0.0	0.0	0.0
1980-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	18.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-12	12.1	0.0	28.7	83.7	25.8	24.6	10.9	2.3	1.2	23.5	11.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	52.2	29.4	2.8	15.0	19.9	54.5	25.3	22.4	2.7	4.2	15.2	20.7	11.6
1981-01	2.5	2.6	0.0	0.0	0.0	0.0	1.6	0.0	0.3	2.0	2.0	2.6	1.0	17.8	15.3	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	24.6	8.5	0.0	0.0	0.0
1981-02	30.4	0.6	17.5	41.0	17.6	10.5	12.5	17.5	4.2	31.5	0.5	5.8	0.0	2.2	0.0	0.0	5.2	0.4	0.0	2.6	4.8	44.7	3.3	10.7	0.0	0.5	0.0	0.0	--	--	--
1981-03	0.0	0.0	7.8	0.0	2.6	12.0	8.6	0.0	3.2	7.0	1.2	5.7	0.0	0.0	0.2	0.0	6.7	10.4	4.6	17.0	0.4	0.0	0.0	0.0	2.7	5.1	2.2	0.0	0.0	0.0	1.5
1981-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	13.0	1.2	2.7	0.0	0.2	0.1	0.0	0.0	0.0	9.9	--
1981-05	8.7	1.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1981-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0
1981-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981-09	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1981-10	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	3.6	15.7	1.5	0.0	0.0	0.0	26.5
1981-11	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	14.0	0.0	0.0	0.7	0.0	--
1981-12	45.2	0.3	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	7.8	16.4	10.2	46.7

1982-01	9.7	3.8	5.8	1.3	20.0	2.1	5.3	4.8	36.0	40.7	1.8	6.8	0.0	2.3	0.0	46.3	2.4	0.0	63.6	20.8	9.5	0.2	52.4	0.0	6.9	8.3	1.8	0.0	0.0	0.0	0.0
1982-02	0.0	0.0	0.0	0.0	0.0	39.4	34.9	0.0	25.3	9.3	0.0	15.4	37.7	56.8	4.9	1.6	1.8	0.5	2.4	27.0	0.0	0.0	0.3	3.1	0.0	0.0	0.0	0.0	--	--	--
1982-03	39.4	8.8	0.0	19.8	0.4	0.0	0.5	0.0	0.0	0.0	0.0	0.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-04	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	6.8	0.3	2.8	0.0	0.0	0.0	0.0	0.3	0.3	0.0	10.7	0.3	35.3	1.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	--
1982-05	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1982-07	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-09	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	--
1982-10	0.0	0.0	0.0	0.0	0.0	10.8	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.4	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.7	23.3	0.0	0.0	0.0	0.0	0.0	1.8	0.0	8.1	2.2	0.0	0.0	20.9	0.0	0.0	6.8	0.0	--
1982-12	0.0	1.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	107.3	17.6	2.5	1.1	7.9	8.5	0.0	0.0	6.2	27.3	32.4	16.2	0.0	9.8	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
1983-01	0.0	0.0	1.3	7.0	0.0	3.0	3.2	0.7	0.0	0.0	0.0	0.0	0.5	64.7	4.5	1.0	0.0	0.0	0.0	4.4	0.0	2.8	19.3	23.8	0.1	0.0	0.1	2.1	0.0	0.2	0.3
1983-02	0.3	0.0	22.5	0.0	0.0	1.2	9.4	57.9	110.0	70.0	57.3	0.0	5.1	0.0	32.4	8.3	5.3	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4	--	--	--
1983-03	1.1	1.0	1.7	0.3	0.0	0.0	51.8	1.7	11.1	3.4	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	0.0	0.8	0.0	12.8	0.0	0.0	0.0	0.0	0.0	0.0
1983-04	0.0	0.0	0.0	0.0	0.0	0.0	30.8	10.8	0.0	1.1	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	6.8	0.0	0.0	--
1983-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1983-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.6	0.4
1983-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1983-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	17.9	0.2	0.0	0.0	0.0	0.0	0.0	17.6	3.4	0.0	0.0	0.0	1.2	4.4	--
1983-12	0.0	6.1	1.3	0.0	49.3	0.8	0.0	0.0	0.0	17.3	0.0	0.0	0.0	18.3	34.4	28.4	5.1	0.3	9.2	0.0	23.6	1.8	0.4	0.0	0.0	77.0	7.6	0.0	0.0	0.8	1.8
1984-01	0.0	15.0	28.1	2.2	0.9	0.0	0.0	5.8	7.1	11.8	2.1	0.3	1.7	18.9	20.3	37.0	1.4	0.0	0.0	0.3	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	20.0	20.2
1984-02	4.3	22.3	1.6	8.8	42.0	9.8	5.3	38.5	0.0	0.5	2.6	0.0	0.0	0.0	0.0	1.2	0.0	0.5	0.5	0.0	28.1	10.8	7.1	36.4	1.1	0.1	7.3	2.4	0.0	--	--
1984-03	0.0	0.3	10.1	1.0	0.2	0.0	0.4	14.5	0.0	2.1	0.0	0.0	0.0	1.5	20.8	0.7	0.0	0.0	15.2	5.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	25.6	0.0	7.7
1984-04	0.0	0.0	0.0	0.9	3.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.4	0.2	0.0	0.0	1.8	0.0	0.0	7.1	--
1984-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1	2.6	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.2
1984-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.3	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	5.0	0.0	0.0	0.0	--
1984-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	--
1984-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984-11	0.0	0.0	0.0	0.0	0.0	5.4	24.5	43.6	0.0	0.4	0.0	0.0	16.6	1.1	0.0	0.0	0.0	0.0	12.3	0.2	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	--
1984-12	0.0	0.0	0.0	0.0	0.0	0.0	0.9	21.6	2.9	0.0	0.3	1.7	1.1	2.8	10.7	1.6	14.3	14.4	1.0	20.9	9.2	0.4	5.0	0.9	0.0	16.4	0.0	9.9	3.4	17.9	10.2
1985-01	0.3	18.4	0.3	0.0	0.0	0.0	0.0	3.8	6.6	0.8	0.7	0.6	0.7	0.0	26.7	0.0	0.0	3.3	1.0	0.0	30.1	1.1	28.4	68.6	4.0	2.7	3.4	8.0	0.0	0.0	12.4
1985-02	0.3	1.1	4.7	5.0	0.2	49.3	11.8	38.5	9.2	28.7	0.2	2.1	6.2	22.0	3.7	0.2	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	1.7	0.0	0.0	--	--	--
1985-03	0.0	0.8	12.0	5.3	5.3	13.1	0.0	0.0	0.0	2.2	0.1	3.7	0.1	25.3	7.4	0.6	4.6	20.3	0.1	5.6	1.7	53.6	0.3	8.3	17.1	3.7	1.2	0.0	0.0	0.0	0.0
1985-04	0.0	21.1	0.0	0.1	4.3	11.4	0.0	6.3	1.1	43.2	0.2	0.0	0.2	0.0	0.5	0.0	0.3	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	--
1985-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	--
1985-07	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.0	0.0
1985-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1985-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.2	0.0	0.0	2.1	0.0	23.4	0.0	0.0	0.0	0.0
1985-11	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.4	0.0	1.3	0.0	3.0	0.3	2.5	0.0	0.0	0.0	0.0	8.8	8.9	0.6	4.8	0.3	0.0	0.8	0.9	14.4	2.8	1.4	0.0	--
1985-12	0.0	0.5	0.0	19.3	11.0	4.0	30.5	1.5	9.6	9.6	0.0	0.0	54.5	3.9	11.0	0.0	0.0	14.7	0.5	11.3	1.2	18.5	0.2	6.8	0.8	60.3	0.0	26.2	2.2	10.5	0.0
1986-01	20.2	4.0	0.3	4.7	0.2	11.5	12.9	3.4	30.0	0.0	0.0	18.2	0.0	17.5	0.0	0.0	0.0	25.1	7.4	18.4	1.0	13.5	0.3	42.7	3.8	19.0	7.5	0.4	5.6	3.1	1.5
1986-02	1.2	0.0	0.0	11.4	3.6	78.5	4.0	3.2	48.5	4.4	2.6	11.0	0.0	19.8	0.6	0.3	0.0	0.4	0.0	0.0	0.0	7.9	24.7	0.0	0.2	56.2	3.4	0.0	--	--	--
1986-03	0.0	16.0	0.0	0.3	0.2	1.9	16.6	1.2	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.7	37.7	33.5	3.6	0.0	0.0	0.7	0.0	12.4	0.0	0.0	1.0
1986-04	0.5	1.7	6.8	0.0	2.2	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1986-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1986-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
1986-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1986-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	1.5	0.0	0.2	0.2	0.0	21.3	0.0	0.6	0.0	0.0	0.0	0.0	1.8	0.0	3.2	0.0	0.8	0.0	1.1	0.0	0.0	0.6
1986-11	0.0	0.0	0.0	14.2	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.6	69.2	13.0	0.0	0.0	0.0	17.7	0.0	0.0	0.0	0.0	--
1986-12	1.0	20.6	4.0	0.2	52.7	49.3	18.8	4.4	2.9	18.8	8.0	1.4	0.3	1.5	0.0	0.0	0.0	0.0	2.2	3.8	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	2.0	19.4
1987-01	30.1	18.0	0.6	16.4	12.5	0.0	0.0	0.0	0.0	0.0	18.8	6.0	1.0	0.0	2.0	18.1	0.3	17.5	4.5	0.0	19.5	5.1	33.4	47.2	1.0	0.0	9.0	0.8	14.7	8.4	9.8
1987-02	0.9	3.4	0.0	0.0	0.0	0.0	0.0	24.6	1.6	0.0	0.0	0.6	1.9	4.1	0.0	0.0	0.0	0.0	27.0	21.6	13.8	0.0	82.0	3.2	0.0	0.0	3.1	2.0	--	--	--
1987-03	0.2	0.0	6.6	2.8	0.0	0.0	12.8	0.0	0.0	2.6	0.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	3.0	1.0	87.3	0.2	7.8	0.0	0.0	0.0	0.0	7.2
1987-04	27.0	0.0	5.7	9.8	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1987-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	--
1987-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1987-10	0.0	0.0	1.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
1987-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.1	1.9	0.0	17.8	9.1	--
1987-12	3.1	4.9	0.0	27.3	0.0	80.1	0.0	0.0	7.4	1.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.2	1.2	21.3
1988-01	4.8	0.0	0.0	0.0	0.2	26.9	0.0	1.6	6.2	45.6	9.4	4.7	13.4	3.4	3.9	3.5	0.0	0.0	20.0	1.6	75.2	8.8	3.3	23.5	0.8	15.6	2.4	23.2	0.0	0.0	0.7
1988-02	0.0	6.9	0.0	0.0	0.0	0.0	9.2	38.7	19.0	4.1	4.6	1.7	0.4	66.3	15.6	5.8	8.5	63.7	0.0	2.2	21.4	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
1988-03	0.0	0.0	0.0	3.5	0.0	0.0	26.7	0.0	0.0	9.3	2.6	0.0	10.3	0.0	66.1	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988-04	9.2	0.0	0.0	0.0	18.6	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1988-05	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0
1988-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1988-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1988-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.4	0.0	0.0	7.6	0.0	1.5	1.0
1988-11	22.8	0.0	0.0	0.0	2.3	2.2	45.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	9.5	0.0	0.0	0.0	--
1988-12	33.9	0.0	0.0	0.0	0.0	3.3	33.1	22.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	43.2	0.0	2.5	0.0	4.0	0.0	4.3	0.0	28.6	0.0	2.2	12.4	17.7
1989-01	6.9	0.0	0.0	0.8	0.0	14.5	0.0	0.4	25.7	15.5	0.0	0.0	0.0	0.0	0.4	11.8	0.4	1.9	0.0	0.0	0.0	20.3	41.5	32.7	8.3	47.5	6.2	28.3	17.9	15.0	6.8
1989-02	12.6	29.7	0.6	17.5	0.0	15.7	16.5	0.0	2.5	0.9	0.0	0.0	0.0	0.0	0.0	23.1	78.2	6.6	3.8	1.9	6.2	13.5	2.8	0.0	0.0	21.0	3.1	0.0	--	--	--
1989-03	12.2	5.5	17.8	9.3	43.9	14.1	10.9	14.6	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	23.4	12.2	0.0	0.0	9.0	47.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
1989-04	0.0	0.0	6.9	7.2	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	9.2	0.2	0.0	37.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	4.7	0.0	--
1989-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0
1989-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1989-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989-08	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1989-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	1.0	0.0
1989-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.6	4.3	13.9	0.0	0.0	0.6	17.3	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	--
1989-12	4.7	8.3	3.3	2.2	2.0	3.0	2.7	3.1	0.5	6.3	2.7	17.1	5.0	4.6	8.1	12.6	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	--	7.0	13.3	6.3	67.1	0.0	0.0
1990-01	0.0	1.4	28.1	1.3	42.0	0.9	0.0	4.9	15.2	0.0	10.0	0.0	15.8	24.3	30.2	0.0	20.4	29.0	10.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	0.3
1990-02	0.0	0.0	0.0	9.7	0.0	15.0	1.8	0.0	0.0	2.2	0.0	26.3	0.0	9.8	0.0	25.8	7.9	0.0	0.0	0.0	0.0	0.0	2.6	5.1	0.0	5.0	5.7	0.0	--	--	--
1990-04	0.0	8.3	0.1	0.0	0.0	0.0	0.3	3.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	3.5	0.1	4.3	0.2	0.7	0.0	0.0	0.0	--
1990-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1990-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.2	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1990-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1990-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	14.3	1.4	0.0	0.0	0.0	--
1990-12	0.0	10.3	0.0	0.1	1.0	0.0	0.0	0.0	0.0	25.7	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	2.0	9.1	0.0	12.3	0.0	0.0	5.3	0.0	0.0	0.0	15.4
1991-01	1.5	0.4	9.4	7.3	3.3	33.3	0.0	0.0	4.4	2.6	10.9	1.5	19.2	0.3	0.0	0.0	7.7	6.6	0.0	19.1	4.1	0.0	28.0	0.0	0.0	0.0	5.4	1.0	13.2	4.4	0.0
1991-02	0.0	25.0	20.6	24.2	3.4	2.2	15.9	0.0	0.8	5.2	10.8	1.0	6.2	41.8	16.9	0.1	0.4	6.2	0.0	0.7	0.0	20.7	0.0	0.0	1.9	0.0	43.9	0.1	--	--	--
1991-03	0.5	0.0	4.2	0.4	14.2	31.0	2.0	44.3	59.7	8.5	32.1	7.2	0.0	0.0	8.6	8.1	10.8	0.0	0.0	4.2	13.4	7.3	0.0	0.0	0.5	66.0	0.0	0.0	0.0	0.0	0.0
1991-04	0.0	0.0	0.0	0.9	0.0	0.0	0.1	11.3	0.9	0.0	0.0	0.0	3.3	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1991-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991-06	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1991-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	4.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
1991-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	--
1991-10	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	26.0	2.1	35.0	17.1	32.2	0.3	5.3	0.0	18.8	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	--
1991-12	12.5	20.3	0.0	0.0	0.0	0.2	2.5	0.6	0.0	20.1	37.9	5.8	10.0	1.8	0.0	0.0	4.1	7.1	57.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.2	2.4	0.0	0.0
1992-01	26.8	55.3	1.8	0.0	0.0	43.6	0.0	0.7	14.7	14.6	4.3	2.0	0.0	0.0	1.7	1.2	24.0	4.5	0.0	0.0	4.5	0.0	3.5	25.8	1.1	37.6	0.0	0.0	0.0	20.8	0.0
1992-02	0.0	0.0	0.0	8.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.7	0.0	0.7	0.0	0.0	0.0	0.0	6.1	0.0	--	--
1992-03	0.0	0.0	2.4	1.0	1.5	0.0	0.0	0.0	0.0	0.0	2.6	0.0	35.8	0.5	0.0	0.0	4.7	0.0	0.0	0.0	0.0	0.0	17.2	2.0	0.2	3.7	0.0	0.0	0.0	0.0	--
1992-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	--
1992-05	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
1992-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1992-07	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1992-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992-11	0.0	0.0	7.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	0.0	18.7	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	--
1992-12	0.0	0.0	7.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	0.0	18.7	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0

1993-01	0.1	0.0	8.3	3.0	1.1	18.6	0.1	1.6	2.7	9.6	60.2	6.3	9.5	8.3	14.5	1.6	4.8	24.7	3.5	0.0	1.1	2.1	4.6	0.0	4.1	29.8	0.0	1.1	0.0	0.0	0.0
1993-02	0.0	0.0	0.0	4.1	0.3	11.5	7.1	17.5	0.5	0.2	0.0	0.0	4.4	3.7	7.9	2.0	3.6	0.4	9.4	3.5	3.6	0.0	12.5	10.5	4.1	38.8	0.2	47.2	--	--	--
1993-03	0.0	19.4	0.0	0.0	0.0	0.7	29.0	42.7	0.0	0.0	1.2	0.0	0.0	0.0	0.0	6.0	50.1	0.0	0.0	0.0	10.5	0.0	0.0	0.1	3.6	15.0	0.0	0.0	0.0	0.0	0.0
1993-04	0.0	0.0	0.0	0.0	0.0	6.8	0.0	3.0	0.0	21.5	0.0	4.6	0.0	0.0	0.0	11.6	0.0	0.0	0.0	22.3	16.6	0.6	0.0	0.0	0.0	0.0	0.6	0.0	0.0	4.3	--
1993-05	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993-06	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1993-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993-08	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	2.9	0.0
1993-09	0.0	10.7	0.2	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1993-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	30.0
1993-11	0.0	3.0	0.0	0.0	2.4	2.8	0.0	2.1	0.0	0.0	0.0	0.0	13.8	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0	--
1993-12	5.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.8	0.0	0.0	2.6	0.0	0.0	1.7	0.0	0.0	0.0	41.1	0.0	13.6	0.8	2.9	0.0	0.0	0.0	0.4	7.2	0.0	0.0
1994-01	0.0	0.2	13.0	0.0	45.4	9.5	4.1	0.0	0.0	1.6	2.1	0.0	0.0	0.0	26.6	0.0	0.5	0.0	15.2	0.0	0.0	0.0	4.6	2.5	67.4	0.0	0.4	19.8	5.8	22.9	12.6
1994-02	0.4	0.0	0.0	0.0	9.4	0.0	3.0	3.0	7.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.2	0.0	2.1	--	--	--
1994-03	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	1.9	10.9	0.4	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	11.6	5.1	0.0	17.7	0.0	2.6
1994-04	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.6	0.0	0.0	0.0	0.0	--
1994-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1994-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1994-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
1994-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4	8.2	0.0	11.4	48.3	--
1994-12	0.0	0.0	0.0	33.0	5.7	2.9	0.2	6.9	0.0	0.0	13.6	10.9	15.7	0.0	6.6	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6
1995-01	8.6	53.4	19.2	9.0	14.3	17.6	17.9	0.0	0.0	20.6	0.0	46.4	0.6	34.4	5.7	2.8	17.6	0.0	55.6	1.3	26.1	31.7	0.0	0.0	0.0	2.1	2.5	0.0	1.9	0.0	0.3
1995-02	4.0	0.0	5.8	0.4	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	9.6	0.0	1.5	2.0	0.0	12.2	29.7	59.6	0.0	0.0	4.7	--	--	--
1995-03	6.1	0.0	0.0	0.0	0.0	0.1	0.5	0.0	5.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	5.9	7.6	0.2	2.2	0.2	0.0	0.0	0.0	0.0
1995-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	35.5	32.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1995-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	--
1995-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1995-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.4	0.0	0.0	2.2	--
1995-12	0.0	0.0	0.0	1.0	0.3	0.0	0.0	16.5	67.4	1.9	17.2	66.1	0.0	0.0	9.1	0.0	0.0	0.0	0.0	3.7	0.0	6.6	0.0	83.3	12.0	24.6	0.7	0.0	0.0	0.0	11.3
1996-01	0.0	0.0	0.0	0.0	19.2	0.8	3.8	30.6	0.0	0.0	0.0	0.0	5.8	3.4	12.2	0.7	2.6	16.2	0.0	4.3	33.9	11.7	6.7	4.7	0.0	0.0	0.0	22.4	0.8	8.4	4.1
1996-02	7.5	3.2	18.4	0.6	0.0	3.6	4.6	29.6	8.8	0.0	0.0	0.0	0.0	0.0	0.0	2.7	18.0	2.1	0.0	5.6	22.8	3.8	0.0	18.6	6.7	8.2	5.2	5.8	0.0	--	--
1996-03	23.6	11.3	43.7	0.0	0.8	60.1	8.5	56.1	5.7	23.4	4.3	1.3	0.0	19.3	39.3	25.7	37.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
1996-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	8.4	0.0	0.3	0.8	0.1	1.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
1996-06	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	--
1996-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996-09	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1996-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
1996-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	0.0	0.0	0.6	1.7	0.0	--
1996-12	0.0	0.0	0.0	2.0	0.0	2.2	0.0	0.0	14.1	0.0	0.0	8.0	4.6	34.7	0.3	1.0	0.0	0.0	0.2	2.0	27.6	13.2	18.4	7.5	43.9	0.0	0.0	0.2	59.7	26.0	0.6
1997-01	0.0	0.0	0.0	0.2	10.0	0.0	0.0	0.0	0.0	23.1	0.9	5.8	0.0	1.7	0.0	8.0	0.3	0.0	4.3	11.4	4.0	7.7	26.1	1.0	0.0	0.0	2.3	33.8	11.5	18.6	13.8
1997-02	9.3	0.0	4.2	0.0	16.6	0.0	13.8	0.4	31.9	0.8	4.6	48.0	0.2	0.0	25.0	0.1	17.6	54.3	6.0	0.7	9.8	0.0	0.0	12.9	4.5	2.7	0.6	1.5	--	--	--
1997-03	1.3	23.2	6.6	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.2	0.3	2.8	3.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.4	0.0	0.0	2.9	0.3	0.0	0.0	0.0
1997-04	0.0	0.0	0.0	0.0	8.0	19.0	70.5	0.6	6.9	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1997-05	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	--
1997-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1997-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4	6.2	0.0	0.0	0.1	0.0	0.0	3.3	0.0	0.0
1997-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	75.4	1.9	0.0	0.0	0.0	0.0	2.8	0.0	4.9	0.0	18.0	11.9	--
1997-12	2.9	0.0	0.0	0.0	7.7	0.0	0.0	0.0	85.8	0.0	0.3	0.2	15.6	0.1	2.6	0.4	0.0	0.0	16.7	17.9	12.3	6.3	38.6	25.1	27.6	5.3	0.0	14.2	6.4	0.0	0.0
1998-01	32.1	0.0	0.0	11.1	0.0	0.0	0.0	4.5	1.7	0.0	20.6	8.6	22.3	20.1	74.5	0.6	12.4	35.8	1.8	0.0	0.0	0.0	31.3	62.3	3.9	1.3	0.0	0.7	0.0	10.2	1.2
1998-02	41.2	0.8	21.8	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.6	0.0	9.5	6.9	6.5	7.8	27.4	0.0	0.0	--	--	--
1998-03	0.0	1.9	0.3	0.1	0.0	0.0	0.0	0.0	0.0	2.1	7.8	10.5	0.0	16.6	10.3	23.6	0.0	0.0	0.0	0.0	0.2	1.2	6.3	3.4	0.0	0.0	4.3	0.0	0.0	0.0	0.0
1998-04	0.0	0.0	0.0	0.0	0.0	2.6	6.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1998-05	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1998-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998-08	0.3	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1998-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.3	0.0	0.0	0.8	0.3	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1998-11	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0	0.0	0.0	--
1998-12	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	11.8	14.7	5.7	24.7	16.3	0.9	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	37.1	62.2	0.0	0.0	0.0	0.0	1.0	0.0	36.9
1999-01	2.9	0.0	0.2	28.4	3.4	1.6	2.6	0.1	4.6	0.0	2.5	0.0	0.0	25.8	13.4	15.5	9.1	17.6	13.4	0.0	0.0	0.0	0.0	26.7	20.5	21.8	27.6	4.3	12.5	37.3	0.0
1999-02	22.8	22.0	34.0	6.5	0.0	1.7	24.4	0.0	2.2	21.4	0.7	0.0	47.7	0.0	0.0	0.0	0.0	40.4	19.0	2.2	10.3	31.1	0.0	0.0	24.5	36.5	17.2	11.1	--	--	--
1999-03	0.0	10.2	10.5	0.0	0.0	0.0	6.7	7.1	11.1	19.7	0.0	0.3	21.6	5.5	6.6	0.0	0.0	0.0	3.9	0.0	0.6	17.8	29.9	0.0	1.2	0.0	0.0	0.3	0.0	0.0	6.8
1999-04	0.4	5.4	12.8	0.0	6.8	4.4	0.2	0.4	0.0	1.0	0.6	6.0	0.0	0.6	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1999-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1999-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1999-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-11	0.0	0.8	1.5	0.0	0.0	33.8	0.0	0.0	0.0	1.4	0.0	0.0	1.3	12.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1999-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.0	2.4	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.1	2.2	0.0	0.0	0.0	0.0	61.7	13.3	2.8
2000-01	0.0	0.0	0.0	0.0	1.4	1.0	0.0	0.0	6.5	0.0	1.8	24.1	35.9	7.8	0.5	1.6	4.9	5.7	27.8	20.9	0.0	0.0	0.0	19.8	10.7	0.0	0.0	0.0	2.1	45.8	11.5
2000-02	43.2	13.5	6.4	17.4	0.0	0.0	3.1	0.4	0.0	0.5	12.0	0.0	62.3	22.4	4.3	35.1	4.6	31.6	0.0	0.0	0.0	4.2	0.0	0.0	20.4	1.8	3.9	3.4	0.0	--	--
2000-03	0.0	5.0	0.0	0.0	0.0	5.4	10.8	41.6	6.2	2.0	7.1	65.3	1.7	14.8	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	5.0	2.6	6.5	0.0	21.9	1.4	0.0	1.2
2000-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	33.1	50.8	0.0	19.1	0.0	2.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	--
2000-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	4.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2000-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-08	0.0	0.6	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2000-10	0.0	0.0	6.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.6	3.0	85.5
2000-11	0.0	0.0	0.0	0.0	0.0	1.4	6.3	0.0	89.0	0.0	0.0	0.0	0.0	1.0	0.0	15.8	0.0	0.0	0.0	40.4	9.4	0.0	18.4	37.5	0.5	9.2	35.0	30.6	0.0	0.0	--
2000-12	0.0	0.0	0.0	0.0	24.4	2.8	28.0	0.2	0.0	0.0	0.0	0.0	0.5	5.1	0.0	0.2	0.0	0.0	0.0	1.3	9.7	1.6	7.4	10.7	0.0	10.6	0.0	0.1	0.0	2.8	0.6
2001-01	0.0	0.0	0.0	34.1	10.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6	40.5	22.0	22.4	22.9	0.8	25.9	14.1	0.0	2.0	0.0	0.0	0.0	11.0	2.1	17.5	8.5	0.7	3.8	20.7
2001-02	1.5	3.3	0.0	0.0	6.0	1.7	16.9	23.8	0.0	17.8	0.6	8.8	5.2	15.1	0.0	1.5	7.0	65.4	1.0	0.5	0.8	18.6	16.6	1.0	1.6	0.0	17.9	1.6	--	--	--
2001-03	11.0	3.3	0.0	0.5	7.8	0.0	0.0	1.7	0.0	11.7	1.4	7.0	0.8	0.0	1.8	4.0	3.0	9.8	0.0	11.6	0.5	4.0	6.5	0.0	0.0	0.0	0.0	6.5	0.0	9.0	0.0
2001-04	0.0	1.2	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2001-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2001-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-08	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-10	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-11	0.0	2.9	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8	--
2001-12	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.3	0.6	1.0	0.0	0.0	54.6	0.0	0.0	0.7	0.1	0.8	0.0	13.0	1.4	47.4	3.8	22.9	28.4	1.0
2002-01	24.8	0.0	24.0	0.0	0.0	0.0	0.0	5.6	12.8	0.5	0.0	0.0	2.8	26.0	33.3	8.6	2.0	0.0	17.6	63.5	43.0	0.0	48.7	3.9	0.0	0.0	0.0	10.6	36.0	17.1	14.3
2002-02	36.3	14.0	28.6	20.3	0.2	0.0	0.0	32.3	0.0	0.0	14.9	16.9	0.0	0.0	0.0	0.0	0.0	9.8	28.2	14.8	0.0	0.0	61.2	1.7	0.2	0.0	0.0	0.0	--	--	--
2002-03	0.7	0.0	0.0	0.0	0.1	0.0	14.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.6	0.0	0.0	7.6	0.0	0.0	18.0	17.2	0.0	14.1	8.7	0.0	0.0	0.0	3.8	10.6
2002-04	0.0	0.0	0.0	0.0	3.2	0.0	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2002-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0
2002-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2002-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002-08	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0
2002-09	0.0	0.0	0.0	0.0	0.0	0.5	26.3	0.0	0.0	0.0	0.0	0.2	0.0	0.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2002-10	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
2002-11	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	8.7	29.6	0.0	0.0	0.0	0.0	--
2002-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9	0.4	3.2	0.0	16.9	10.3	8.2	0.0	0.0	7.3	98.3	13.0	0.0	8.8	31.2	41.0	0.0	55.9	0.0	0.0	0.0	0.0
2003-01	0.0	64.4	13.9	28.2	19.3	16.6	18.2	26.5	5.0	2.0	51.0	24.7	15.9	0.4	0.0	0.0	0.0	0.0	1.0	3.6	0.0	11.0	14.4	3.2	27.0	7.5	0.0	0.0	3.5	17.4	0.0
2003-02	50.2	12.6	24.4	5.2	1.9	4.5	1.5	6.8	11.6	1.7	11.0	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.7	10.9	1.1	3.0	0.0	--	--	--
2003-03	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	17.6	11.9	0.0	0.5	0.0	10.0	5.6	24.9	0.0	33.9	31.8	34.2	1.5	21.0	6.0	0.0
2003-04	4.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2003-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2003-07	0.0	2.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2003-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2003-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	--
2003-12	31.3	2.0	2.6	0.0	19.9	1.1	0.0	0.0	0.0	0.0	7.5	0.0	0.5	0.0	0.0	1.4	0.0	0.0	0.0	27.0	6.2	0.0	1.0	1.0	7.9	0.0	12.7	6.6	3.0	0.0	1.0

2004-01	8.4	8.9	22.5	0.0	0.0	0.0	0.0	0.0	9.6	4.0	0.0	1.8	0.0	0.0	0.0	0.0	1.0	14.7	22.8	59.6	40.7	7.3	7.8	29.4	0.0	10.8	0.0	4.5	34.1	7.5	0.6
2004-02	0.8	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.1	22.3	20.6	10.4	22.7	0.2	15.0	0.0	2.7	7.2	0.0	0.0	0.0	24.6	0.0	3.3	0.0	--	--
2004-03	1.6	11.2	1.4	4.8	0.3	0.9	0.8	0.0	0.0	0.0	0.0	0.0	0.2	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.3
2004-04	19.4	23.3	7.9	9.7	22.4	0.0	0.0	0.0	14.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.0	0.6	3.5	0.0	0.0	0.0	9.3	0.0	0.0	0.0	0.0	1.3	1.1	0.0	--
2004-05	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	--
2004-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2004-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	0.0	4.2
2004-11	1.1	0.0	0.0	0.0	0.0	0.0	1.8	0.0	6.5	0.0	2.6	46.4	0.0	5.4	2.8	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	4.0	1.2	8.3	0.0	0.0	0.0	0.6	--
2004-12	4.2	13.4	21.4	16.6	0.0	54.3	5.4	0.0	0.0	2.8	0.0	0.0	0.0	0.0	2.8	1.6	4.4	0.0	7.4	0.0	50.3	16.1	4.7	0.0	38.4	0.0	29.3	10.0	20.9	13.9	9.1
2005-01	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	2.0	37.2	10.0	2.6	17.1	0.0	23.4	20.3	0.0	5.3	0.0	6.0	0.0	0.0	0.0	16.7	0.0	15.7	0.0	5.0	0.2	6.8
2005-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.1	0.0	3.8	22.2	0.7	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	41.1	0.2	0.0	4.2	12.7	--	--	--
2005-03	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	15.6	0.0	0.0	0.0
2005-04	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	1.5	0.0	28.8	0.0	0.0	0.0	--
2005-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
2005-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2005-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.2	1.0	0.0	0.0	0.0	0.0
2005-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	0.9	4.0	0.0	0.0	--
2005-12	1.5	3.4	0.0	0.0	0.0	25.4	0.0	0.0	16.0	0.0	0.0	25.1	140.1	0.1	17.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	15.3	0.0	21.3	0.0	30.0	16.0
2006-01	99.9	131.5	29.8	0.3	16.0	0.0	0.0	0.0	0.0	0.0	89.0	0.0	37.0	8.0	4.0	68.0	17.5	2.5	0.0	0.0	0.0	19.0	79.2	0.0	0.0	16.7	25.6	40.0	6.6	0.0	0.0
2006-02	0.0	12.5	34.7	28.9	0.6	0.0	14.2	0.1	0.0	0.0	0.0	0.0	8.5	56.8	0.0	34.5	19.0	0.0	3.6	19.6	0.0	8.8	0.0	0.0	0.0	0.0	0.3	0.2	--	--	--
2006-03	0.0	13.0	0.5	7.5	44.9	25.1	4.6	33.1	0.0	26.7	18.7	2.9	0.0	1.8	0.0	2.4	7.7	2.0	13.5	0.0	0.0	5.4	0.0	0.0	0.0	2.3	4.8	4.1	10.0	4.4	13.1
2006-04	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	3.6	24.3	0.7	0.0	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.3	0.0	0.0	0.0	--
2006-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2006-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	4.5	4.8
2006-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2006-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.9	0.0	60.1	22.8	0.0	0.0	0.0	1.0	0.0	0.0	0.0	57.1	31.6	0.0	2.1	0.0	1.1	0.0	--
2006-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2007-01	9.0	46.1	71.3	9.5	7.1	8.1	2.7	9.7	1.5	3.1	0.0	0.0	3.1	49.6	43.1	1.8	1.2	21.3	19.1	77.8	15.8	26.1	11.7	78.0	0.3	2.2	0.0	46.6	3.8	0.8	29.9
2007-02	2.2	6.4	3.5	0.8	0.0	0.3	14.6	2.9	0.0	0.0	0.5	2.9	23.2	45.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	0.0	1.3	0.0	--	--
2007-03	0.3	0.0	1.3	0.0	0.9		9.0	0.0	7.7	1.0	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.5	0.0	0.0	0.0	2.3
2007-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	--
2007-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
2007-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2007-07	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2007-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2	0.0	2.8	0.5	20.8	0.0	5.5	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0
2007-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	6.4	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	--
2007-12	0.0	0.0	0.0	0.0	0.0	14.6	2.3	0.0	7.8	0.0	66.0	0.0	5.0	13.5	0.0	1.8	5.3	0.0	6.3	45.2	0.0	11.8	0.0	0.0	3.8	78.7	0.0	0.0	7.3	2.6	8.5
2008-01	11.3	0.0	0.0	47.8	18.8	2.9	55.1	0.0	23.1	3.8	2.1	16.6	16.2	12.2	11.6	0.0	12.2	4.8	4.6	0.0	0.0	16.9	57.6	69.8	14.7	12.1	24.2	33.0	28.0	4.9	0.0
2008-02	0.0	0.0	0.0	0.0	0.0	0.0	5.5	24.3	9.3	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.4	0.0	0.0	0.0	0.0	13.4	0.0	0.0	4.1	--	--
2008-03	4.2	0.0	0.0	14.8	2.1	8.4	0.0	0.0	0.0	0.0	1.3	9.7	0.0	2.4	0.0	2.7	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2008-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2008-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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2008-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	69.3	83.8	2.8	5.4	0.0	0.0
2008-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Estação: Lichinga Periodo:1960-2008

nto: Precipitação total diária (das 9 as 9 horas em mm)

Ano/Mes	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0
1960-01	21.3	1.3	1.0	0.0	8.5	28.4	1.0	2.2	0.0	2.9	0.0	0.0	0.0	0.0	0.0	1.7	2.6	29.7	0.7	5.1	0.0	0.1	12.8	3.2	13.3	0.0	29.3	22.4	0.0	27.3	5.1
1960-02	4.6	0.0	10.6	0.3	32.2	0.8	0.2	2.5	7.1	6.3	6.9	2.7	0.1	5.2	2.4	0.9	5.6	0.0	4.4	2.0	9.1	0.1	31.4	16.3	3.5	1.2	37.2	9.5	0.6	--	--
1960-03	0.0	0.0	0.0	0.5	0.2	4.1	20.0	17.9	4.5	86.6	12.1	36.6	2.0	7.3	32.6	13.3	0.0	1.6	30.0	0.8	34.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-04	4.3	0.0	0.5	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.1	0.6	0.2	0.1	0.5	0.0	0.0	0.0	0.2	0.0	12.2	0.0	0.0	1.9	2.0	0.0	0.0	0.0	--
1960-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-06	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	6.5	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1960-07	0.0	0.0	0.0	1.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	5.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1960-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-11	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	4.0	1.6	0.0	0.0	12.7	0.0	7.2	0.2	--
1960-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1	0.0	2.7	1.9	15.1	9.5	29.2	13.8	20.2	15.5	2.5	0.6	0.3	7.0	0.0	12.6	0.9	0.0	21.3	2.1	4.1	32.0	4.8
1961-01	3.2	2.1	3.0	0.6	9.0	0.0	0.8	8.0	20.7	1.5	3.2	0.0	7.4	8.7	0.3	7.0	3.7	2.3	0.0	10.9	0.0	1.1	5.2	0.6	6.3	5.4	0.0	6.0	0.0	0.0	3.1
1961-02	24.2	17.7	0.0	23.9	0.3	6.6	3.1	7.8	0.9	18.4	10.8	1.9	0.2	0.4	0.0	8.1	9.0	2.6	9.1	2.0	2.3	4.6	1.6	0.3	0.6	0.0	0.3	4.2	--	--	--
1961-03	0.0	2.3	5.7	3.4	8.5	0.0	0.9	3.6	0.0	18.3	1.9	53.9	1.0	11.8	1.0	27.8	0.0	3.9	15.0	0.6	14.0	0.1	3.5	3.1	3.0	31.0	8.7	1.7	12.0	5.3	7.2
1961-04	7.5	0.0	0.8	0.0	14.3	9.4	7.4	0.0	0.0	0.0	0.0	2.8	12.1	8.0	2.0	18.1	6.5	0.0	0.0	0.0	8.6	12.6	1.5	2.2	2.0	0.0	3.0	4.4	1.9	1.6	--
1961-05	1.0	0.0	0.0	2.6	6.6	2.8	0.0	0.8	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.4	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	3.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1961-07	0.0	0.0	0.0	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.5	3.6	1.5	0.0	0.0	0.0	0.0	0.0	0.0
1961-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.2	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961-09	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1961-10	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.6	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961-11	0.0	0.8	0.0	0.0	4.5	7.1	0.0	0.0	0.0	14.4	0.1	40.0	0.0	0.0	0.0	1.7	0.0	3.9	1.7	0.0	16.5	7.2	0.0	0.1	5.0	0.8	3.0	16.8	0.0	0.0	--
1961-12	0.0	3.0	48.6	4.0	1.3	0.0	42.8	2.3	0.5	9.6	9.6	0.6	0.1	11.0	1.3	16.4	11.6	10.0	10.3	0.0	0.0	0.0	22.3	0.0	1.3	20.5	4.3	1.8	3.1	4.3	1.5
1962-01	0.1	1.8	7.8	6.3	3.7	4.4	14.9	19.5	1.7	24.0	13.8	12.2	3.7	3.3	0.3	1.3	1.7	0.8	3.5	6.3	20.5	0.0	1.7	4.3	5.1	0.0	0.0	0.0	0.7	10.4	3.5
1962-02	0.3	11.3	44.6	0.0	4.2	24.4	3.7	0.0	2.6	0.7	33.9	0.4	11.4	17.5	0.7	1.6	0.0	0.0	10.8	1.3	10.0	23.1	2.7	0.0	0.0	9.0	1.0	0.0	--	--	--
1962-03	6.5	0.3	0.3	0.0	0.1	0.0	1.2	0.0	0.0	31.6	0.0	21.2	35.1	0.0	0.0	0.0	1.5	17.2	12.8	38.6	1.6	2.8	4.0	10.5	3.0	1.3	7.8	26.2	1.3	7.4	17.1
1962-04	5.2	43.5	0.0	6.0	0.0	1.0	0.0	0.0	0.0	1.3	8.6	2.6	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.4	0.3	0.0	14.5	15.3	0.1	1.1	0.0	0.3	22.3	0.2	--
1962-05	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	4.0	0.0	0.0	1.1	0.5	0.0	0.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1962-06	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1962-07	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1962-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1962-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1962-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	46.2	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	5.3	1.0	1.3	0.0	0.0	0.0
1962-11	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.8	9.5	5.2	4.4	0.1	0.0	0.3	0.4	7.0	0.0	0.0	26.0	0.0	0.2	7.4	0.0	25.5	0.0	0.0	18.0	7.8	16.8	1.1	--
1962-12	0.0	0.0	0.0	16.8	0.0	0.0	4.1	7.6	20.4	35.8	0.0	0.0	4.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	5.2	25.1	16.9	0.0	0.0	14.9	54.5	0.6	3.3	9.2
1963-01	12.3	4.8	17.7	14.0	1.0	37.1	36.8	3.4	17.4	0.0	2.4	6.2	16.6	13.6	0.2	0.9	0.9	12.3	45.0	0.0	0.0	0.0	17.4	9.8	7.5	0.0	0.0	0.5	0.0	1.1	43.1
1963-02	0.0	2.6	0.3	10.3	2.0	0.0	0.1	2.2	6.8	9.2	8.2	26.9	3.8	0.0	0.2	59.9	32.3	2.6	8.5	0.3	0.0	7.9	9.0	3.5	0.0	0.1	38.3	0.0	--	--	--
1963-03	4.8	1.7	1.5	4.4	3.5	5.1	0.0	9.0	3.8	2.3	1.5	0.3	8.3	1.5	0.7	15.7	7.6	7.7	27.5	2.2	0.3	0.0	0.0	0.2	8.2	0.3	0.1	2.5	40.1	29.9	2.4
1963-04	1.9	4.6	0.0	0.0	0.0	0.0	0.0	3.3	2.3	2.0	0.9	0.3	6.0	0.0	9.0	33.0	0.0	0.2	0.2	2.5	0.1	16.8	2.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0	--
1963-05	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1963-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963-09	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1963-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
1963-11	33.7	2.3	15.7	14.6	0.0	18.4	1.8	2.6	0.0	11.0	0.8	0.0	0.3	0.5	19.0	15.6	18.9	6.0	0.5	2.0	12.3	3.7	3.2	5.5	1.2	3.6	0.0	3.8	4.8	14.8	--
1963-12	4.1	0.5	0.0	15.0	0.0	7.5	0.0	2.1	0.0	8.4	0.0	1.3	4.7	0.4	0.0	0.3	44.2	4.1	4.3	7.5	4.3	1.0	19.3	11.0	7.5	0.0	12.0	45.5	5.2	8.5	4.0
1964-01	0.0	0.0	7.2	59.0	5.5	3.1	15.2	3.7	5.3	1.9	4.0	1.6	3.9	32.8	1.8	6.9	6.1	1.9	1.7	0.5	15.9	11.9	12.2	0.0	18.7	19.6	0.1	4.4	30.7	6.0	0.0
1964-02	20.2	1.0	0.3	7.4	2.1	12.4	13.9	9.0	0.0	0.0	13.9	0.3	9.2	4.5	0.2	18.5	0.0	39.1	0.6	35.3	3.9	2.4	7.1	0.0	0.0	0.0	0.0	0.0	0.0	--	--
1964-03	0.0	0.0	0.0	0.0	0.0	2.3	7.8	0.7	0.9	0.0	0.0	0.4	14.7	0.0	14.9	1.3	15.2	3.2	2.3	0.0	0.0	0.0	0.5	7.9	1.6	0.0	0.0	0.0	0.0	0.0	0.0
1964-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	1.1	0.0	0.0	--
1964-05	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1964-07	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.8	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1964-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-11	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	8.6	0.0	28.3	0.0	0.0	7.3	23.0	3.7	0.2	--
1964-12	0.5	4.8	3.4	1.3	0.5	0.4	0.0	0.7	0.0	1.9	0.0	0.0	1.2	5.7	0.0	0.0	0.0	0.0	15.2	31.5	0.8	7.0	6.7	25.9	0.2	0.9	0.6	46.7	9.8	21.7	6.9
1965-01	5.4	38.0	0.6	33.2	34.9	11.2	18.3	1.2	0.1	1.5	21.7	0.2	18.3	12.6	2.6	2.3	1.0	3.4	0.8	5.1	0.0	0.0	0.0	0.0	2.3	4.9	2.3	0.7	6.9	7.5	0.9
1965-02	21.9	4.4	0.0	3.7	2.9	31.5	23.2	2.7	4.7	14.1	9.5	0.2	0.0	0.2	14.1	11.9	25.9	6.6	22.7	14.5	49.5	0.2	0.0	5.7	1.8	0.0	0.0	31.5	--	--	--
1965-03	10.4	28.9	0.3	1.5	9.4	13.8	0.0	13.6	23.7	6.9	56.7	3.0	0.1	0.0	0.0	15.8	3.9	0.0	0.0	9.4	0.3	2.3	4.3	4.2	2.3	6.0	4.3	20.4	40.8	2.9	0.2
1965-04	9.6	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.3	0.0	0.0	0.0	0.0	1.1	0.5	0.0	--
1965-05	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	1.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0
1965-06	0.0	0.7	0.0	0.0	0.0	0.0	0.2	0.0	0.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1965-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-09	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	--
1965-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-11	0.0	2.1	8.7	0.0	0.0	0.0	0.0	0.0	10.0	19.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.9	0.0	0.0	2.4	0.2	0.0	0.0	0.0	0.2	0.0	12.1	0.0	0.0	--
1965-12	3.6	11.3	1.1	12.1	20.8	30.8	0.0	16.8	8.0	0.0	0.0	0.0	0.0	7.7	1.7	0.0	0.0	0.0	6.2	2.7	3.4	4.2	17.6	12.4	40.4	11.7	23.5	60.9	47.4	0.1	0.0
1966-01	2.5	45.5	34.3	16.5	0.0	0.0	7.8	0.6	3.2	0.0	0.0	0.0	4.8	0.6	0.1	15.4	11.0	9.0	1.4	0.0	0.0	0.0	10.8	0.4	0.3	30.6	18.4	2.1	0.0	8.4	1.3
1966-02	0.1	33.2	1.1	8.1	15.8	0.0	0.0	0.0	17.4	4.2	12.4	0.0	0.0	0.3	3.4	1.4	4.3	0.0	2.8	18.5	17.8	5.6	0.3	0.0	4.3	50.3	1.7	2.4	--	--	--
1966-03	1.0	49.3	0.0	9.5	10.2	0.0	0.0	0.0	34.2	2.0	13.6	19.0	32.7	6.1	1.9	0.4	0.0	0.0	0.0	15.1	0.0	39.8	0.1	0.0	0.0	0.2	0.0	0.0	0.0	12.3	1.6
1966-04	0.0	0.0	0.0	0.9	0.0	0.0	0.3	0.0	0.0	0.6	0.2	0.0	0.0	10.2	0.0	0.7	0.0	5.5	5.5	0.0	0.0	1.4	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1966-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	2.2	1.9	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0	7.4	0.0	0.0	0.0	0.6	0.0	0.0
1966-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	--
1966-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0	0.0	0.0	0.0	0.0
1966-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1966-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1966-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.8	4.7	0.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1966-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	3.3	2.7	0.6	34.3	0.0	0.7	4.0	22.1	1.5	13.3	0.0	10.1	2.2	10.1	0.0	0.3	4.9	25.6	0.9	--
1966-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	8.5	48.8	8.9	3.7	0.0	5.6	20.0	55.0	15.6	2.7	2.5	2.9	44.5	13.5	8.8	2.9	0.0	0.8	25.7	0.0	0.0
1967-01	0.0	0.0	16.3	0.0	13.9	27.5	0.0	0.2	0.0	0.4	1.7	0.0	0.5	2.4	8.4	10.0	24.1	2.9	0.2	5.2	5.6	0.0	5.4	27.9	0.4	10.9	7.9	20.5	0.0	0.5	1.4
1967-02	0.5	2.3	0.0	0.0	11.4	0.5	27.0	0.0	0.0	13.0	0.0	0.9	6.0	28.6	0.0	32.5	6.4	13.6	0.0	16.6	33.2	0.6	0.0	5.2	10.0	0.6	22.8	1.9	--	--	--
1967-03	11.6	3.7	5.7	4.2	1.2	4.5	0.0	0.0	2.5	2.6	11.2	0.9	28.0	8.1	10.3	0.0	0.1	41.8	2.0	0.0	5.9	0.0	35.4	9.2	0.5	0.0	0.0	7.9	3.6	5.7	0.0
1967-04	0.0	33.0	3.7	0.0	0.5	1.3	0.0	0.7	0.0	0.0	0.0	18.4	3.3	27.7	3.1	0.2	0.0	0.0	5.0	2.1	3.7	0.1	0.0	0.6	0.0	0.0	0.0	0.0	67.3	0.1	--
1967-05	4.6	0.0	0.0	0.2	9.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	28.0	1.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	4.7	0.0	0.0
1967-06	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1967-07	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
1967-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1967-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	--
1967-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
1967-11	0.0	4.4	0.0	0.0	0.0	1.4	23.3	0.3	0.0	23.2	3.7	0.0	0.0	0.0	0.0	0.0	18.5	0.0	4.2	0.4	35.9	3.8	0.0	0.0	0.0	0.0	0.7	0.0	7.6	1.0	--
1967-12	25.9	0.0	5.1	0.0	10.1	0.2	14.6	17.4	0.2	0.0	0.2	24.2	5.1	0.0	0.0	0.0	0.0	36.1	4.4	0.0	0.0	0.0	0.0	0.0	0.9	3.9	0.2	20.9	4.9	0.0	0.0
1968-01	0.0	0.8	2.0	0.0	0.0	6.2	1.1	2.4	0.3	8.7	15.0	3.0	0.4	21.5	2.4	0.1	20.3	0.9	2.4	21.0	2.6	0.0	0.0	0.0	40.3	0.0	25.7	13.5	0.0	0.1	0.0
1968-02	1.4	41.3	1.4	0.0	1.4	4.6	10.0	0.0	2.3	0.2	13.2	1.0	2.6	9.7	16.4	4.2	1.5	1.2	14.5	0.0	0.0	2.2	1.1	5.5	8.0	24.9	0.0	0.1	3.6	--	--
1968-03	1.4	0.0	0.0	8.4	0.0	3.7	11.6	38.4	0.1	14.6	10.3	9.3	41.8	0.0	0.3	0.0	0.0	0.0	0.0	0.0	3.6	0.0	2.6	0.0	0.0	2.6	1.3	0.5	0.2	0.0	0.3
1968-04	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	37.0	8.3	0.3	1.5	1.6	0.0	0.2	0.0	0.0	0.0	5.4	2.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	--
1968-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	19.2	0.0	0.0	0.0	0.0	0.0
1968-06	6.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	--
1968-07	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1968-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968-11	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	0.3	4.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	6.6	0.1	0.1	0.0	0.0	1.7	1.1	0.4	22.5	3.0	2.6	--
1968-12	0.8	15.9	0.0	0.0	0.0	0.0	0.0	0.2	7.3	0.0	34.8	9.2	7.2	25.1	52.1	0.8	6.6	2.0	13.9	1.2	7.4	4.4	0.5	16.3	0.7	1.9	0.5	8.2	9.0	0.1	56.6
1969-01	64.9	4.6	18.9	7.7	0.0	7.5	17.9	0.0	11.6	2.9	0.0	3.6	9.2	0.6	0.4	0.5	0.1	4.4	7.3	1.8	0.0	0.0	16.8	0.5	2.4	9.5	17.6	0.7	5.3	16.1	10.7
1969-02	26.3	20.4	0.0	8.8	10.9	7.9	33.1	42.9	4.9	2.3	2.4	23.4	21.0	0.0	7.6	0.0	0.0	5.9	0.9	2.2	0.2	1.4	5.1	7.0	0.4	0.3	0.4	8.0	--	--	--
1969-03	8.0	0.9	5.5	6.9	8.7	1.1	6.4	1.5	5.0	0.0	0.0	0.0	0.9	0.0	0.1	8.8	0.0	0.0	5.9	15.3	0.0	0.0	0.0	1.6	0.2	0.0	0.0	19.0	23.7	13.6	6.7
1969-04	7.0	0.1	0.1	0.0	2.1	13.9	1.0	12.0	0.5	2.3	12.1	0.7	5.3	0.0	0.0	10.8	0.0	0.8	0.0	0.8	0.0	0.4	0.0	0.0	32.3	0.0	0.0	0.0	1.2	12.8	--
1969-05	0.0	0.0	0.0	0.0	26.0	45.0	50.4	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
1969-06	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1969-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.1	0.0
1969-09	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1969-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0
1969-11	0.5	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	113.6	0.0	0.0	0.1	0.1	0.0	0.0	0.0	3.7	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	--
1969-12	2.9	0.2	9.0	0.0	22.0	17.4	0.0	4.4	1.2	0.1	1.2	25.5	2.1	88.5	1.2	11.4	2.7	19.2	33.7	0.0	0.0	4.9	2.8	8.4	7.5	6.8	5.4	0.0	3.3	9.5	0.3

1970-01	16.0	0.4	16.6	0.4	16.7	9.6	11.9	1.6	0.0	0.0	0.0	0.0	0.0	1.0	0.0	8.7	1.6	0.3	0.0	9.6	8.4	9.7	21.7	7.8	16.9	0.3	3.0	10.5	10.0	7.8	32.3
1970-02	28.4	8.5	13.5	16.3	3.2	13.2	6.0	0.0	1.7	1.4	0.7	6.4	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	43.5	6.5	--	--	--
1970-03	0.0	0.0	0.0	6.1	0.0	0.0	0.0	1.3	0.0	2.8	0.0	17.6	0.0	0.0	0.0	0.0	0.0	2.8	39.6	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0	0.0	0.2	0.0
1970-04	0.0	0.0	0.0	0.0	0.0	1.5	1.7	0.0	0.0	12.6	2.7	13.7	15.8	0.0	5.1	2.4	0.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	--
1970-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1970-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1970-10	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	2.8
1970-11	0.0	4.1	0.0	19.1	0.0	0.0	27.8	0.0	0.0	0.8	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	15.7	0.3	0.2	10.5	57.2	9.7	12.1	--
1970-12	1.7	22.7	24.1	52.2	23.6	33.0	45.0	29.0	3.8	5.7	5.7	6.9	14.7	0.6	20.1	10.9	7.5	0.8	11.1	1.5	1.2	1.9	0.0	6.8	0.6	0.0	0.0	0.0	40.0	25.2	1.5
1971-01	7.6	17.5	0.1	26.3	42.6	4.4	45.3	11.6	16.6	0.0	2.7	2.4	0.0	8.0	0.5	4.8	7.0	3.8	16.2	0.2	17.7	15.9	7.8	2.1	8.6	2.5	0.3	16.0	6.1	0.0	6.0
1971-02	1.8	0.0	0.0	0.0	0.0	3.7	2.5	2.0	12.1	0.0	1.0	0.0	4.7	4.5	39.3	2.0	3.2	43.6	18.4	1.2	0.0	0.3	7.5	13.0	0.0	3.0	48.9	0.5	--	--	--
1971-03	0.3	19.4	0.8	0.2	15.3	0.0	0.0	3.5	20.6	8.5	3.0	4.0	0.0	4.4	0.0	0.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	2.9	0.3	0.0	0.0	0.0	15.0	7.2	15.7
1971-04	0.5	0.3	0.0	1.5	1.1	0.2	8.7	0.0	0.2	0.0	11.0	6.3	0.2	9.1	4.6	0.0	0.0	0.0	0.9	0.0	0.2	0.2	0.0	0.0	0.0	3.8	2.5	0.0	0.0	0.0	--
1971-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.6	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-06	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1971-07	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1971-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.6	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.2	8.0	0.3	0.0	0.0
1971-11	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	11.1	0.0	0.6	0.0	7.0	0.5	0.0	0.0	0.0	0.0	0.0	1.1	9.7	0.0	17.4	2.0	0.0	0.0	0.0	61.2	7.2	--
1971-12	0.4	0.0	2.3	32.2	0.0	13.5	0.0	13.6	0.6	18.7	0.5	1.3	0.0	0.0	17.1	21.7	7.6	7.8	3.1	33.3	0.0	0.0	0.3	34.5	9.9	4.7	8.7	16.2	4.8	0.0	0.0
1972-01	0.3	0.0	0.4	1.1	6.5	15.8	3.6	1.9	5.5	3.4	2.0	0.3	5.6	13.9	12.9	6.4	33.7	19.3	10.8	0.0	14.0	0.0	36.8	1.6	0.0	12.3	1.8	0.8	0.0	34.9	11.7
1972-02	0.2	0.0	0.0	0.0	0.0	0.0	0.0	7.4	0.9	3.9	3.2	0.2	44.1	6.9	29.5	12.4	13.1	1.9	4.3	0.0	0.0	17.5	34.0	20.6	11.8	13.4	13.7	45.6	12.4	--	--
1972-03	5.2	19.9	0.0	12.7	2.2	8.1	4.7	0.0	0.3	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	1.5	11.7	30.3	1.3	0.0	0.0	0.0	0.2
1972-04	0.0	0.0	22.4	0.0	0.4	0.0	0.0	0.2	4.8	1.1	0.9	3.7	0.3	16.7	7.9	1.4	0.1	1.7	0.2	0.0	0.0	0.2	4.3	0.6	2.1	29.3	0.4	0.0	0.0	0.3	--
1972-05	0.0	4.4	0.5	2.1	0.0	0.0	0.0	0.0	7.8	0.0	6.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	6.9	2.8	2.3	17.3	11.0	0.0
1972-06	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	--
1972-07	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
1972-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1972-10	0.0	0.0	0.0	0.0	0.0	0.0	33.4	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
1972-11	0.0	0.2	0.3	0.2	0.0	0.0	0.0	0.0	8.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	60.2	0.0	0.1	0.6	1.6	3.0	1.8	0.6	--
1972-12	6.6	17.4	2.0	43.2	1.0	13.2	6.8	0.2	2.3	0.3	0.0	0.0	0.0	18.5	0.0	1.9	0.0	13.3	18.3	1.5	29.2	4.0	26.1	10.7	3.5	0.3	15.0	6.6	20.5	1.9	0.0
1973-01	0.5	7.9	0.3	2.1	10.2	22.3	1.8	11.8	2.5	0.0	0.0	0.8	1.9	2.3	2.6	2.3	0.0	0.4	0.0	0.0	0.0	0.0	12.3	7.8	17.2	1.1	0.0	3.9	13.1	13.6	0.0
1973-02	15.4	26.0	13.4	0.0	0.0	4.1	11.8	0.5	16.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	11.3	3.7	0.0	34.5	0.3	14.2	0.1	0.0	0.0	1.3	1.0	--	--	--
1973-03	1.7	0.0	0.0	0.0	0.7	21.4	3.5	21.7	0.1	5.2	0.6	1.0	0.0	0.0	0.0	2.5	34.1	1.3	36.8	4.4	10.2	1.2	0.9	0.0	0.1	0.3	0.0	0.1	3.2	0.0	0.0
1973-04	3.7	2.3	18.9	0.3	0.0	6.3	0.0	0.5	0.0	1.2	5.3	0.7	6.6	2.3	10.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.0	2.0	0.0	0.0	--
1973-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.9	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1973-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1973-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
1973-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.3	0.0	0.9	0.0	0.0	0.7	23.9	0.9	0.3	4.5	0.0	0.0	0.0	--
1973-12	14.0	0.0	3.9	21.7	12.0	22.3	0.6	16.0	0.0	0.0	0.2	0.5	0.7	40.0	11.7	0.3	1.6	1.4	1.1	0.0	1.7	2.1	5.3	4.8	11.1	3.7	0.0	25.2	0.0	0.0	10.3
1974-01	0.4	0.1	22.2	1.3	23.2	0.7	6.0	18.6	2.4	12.6	8.1	38.0	2.1	0.3	18.5	3.1	29.8	25.7	0.0	0.8	27.1	10.3	5.0	0.0	5.7	7.4	1.1	2.1	0.4	5.7	6.2
1974-02	17.4	0.0	12.9	0.0	14.7	17.9	1.6	3.1	23.6	2.4	2.5	9.7	0.0	0.0	9.8	12.4	7.4	16.5	16.7	0.9	3.1	3.0	17.6	18.7	22.8	5.5	0.4	23.5	--	--	--
1974-03	0.5	2.5	6.0	15.9	29.9	3.8	9.4	0.8	0.0	7.2	19.8	10.9	26.9	7.5	24.3	16.2	0.7	0.0	0.0	5.9	7.4	2.2	3.9	0.0	0.5	1.5	8.2	24.4	57.3	7.6	6.4
1974-04	17.0	42.1	31.3	13.4	6.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	13.5	1.8	1.7	9.5	0.1	7.5	0.0	0.0	0.0	0.0	9.1	0.5	0.0	0.0	--
1974-05	6.2	8.6	1.5	4.2	0.7	3.2	0.0	25.9	36.9	14.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	29.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	3.9	4.3	0.0	--
1974-07	0.0	0.0	1.0	13.1	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
1974-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974-09	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2	--
1974-10	2.5	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	2.9	19.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974-11	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	8.4	1.1	0.0	0.0	1.2	3.0	9.6	--
1974-12	0.3	0.0	0.0	0.6	3.2	20.3	0.6	7.7	41.7	14.0	9.9	12.2	2.0	8.5	3.9	5.4	17.4	12.5	0.7	0.4	0.0	0.3	0.2	0.6	8.2	11.4	8.8	30.8	0.2	25.2	1.6
1975-01	0.0	4.2	0.3	17.6	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.5	15.8	6.2	0.0	5.8	4.5	0.0	12.5	1.2	4.2	2.6	0.8	0.0	0.0	0.1	11.9	7.2	0.0	0.0
1975-02	0.0	0.6	23.6	0.3	1.1	0.7	0.0	0.0	0.0	0.0	2.5	11.6	1.4	0.0	14.7	0.0	3.7	25.2	0.0	0.0	0.0	76.7	13.0	3.5	31.7	63.1	0.0	0.0	--	--	--
1975-03	16.4	2.6	60.3	0.0	8.5	15.1	15.9	13.5	16.2	6.4	5.1	0.0	0.3	3.6	2.1	1.6	0.0	0.0	0.0	0.8	4.2	7.4	0.9	0.4	2.2	2.6	1.1	0.0	0.0	0.0	0.0
1975-04	0.0	1.6	6.0	1.4	14.5	5.1	7.3	2.8	1.7	1.6	0.2	0.0	0.0	1.6	0.0	0.0	17.2	0.3	0.0	0.0	1.5	1.2	0.0	65.7	0.0	0.0	0.0	0.0	0.2	0.8	--
1975-05	26.5	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975-06	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1975-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1975-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1975-10	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.0	3.2	0.0	5.4	1.8	15.1	0.1	0.0	1.0	0.0	1.2	0.0	0.3	5.5	0.0	0.0	0.0	0.0	0.0	0.0	--
1975-12	0.0	0.0	0.0	19.9	0.0	0.0	0.0	0.0	11.0	8.6	0.0	5.8	0.0	18.4	1.1	1.4	11.8	16.1	0.6	0.0	4.2	2.5	1.6	24.3	15.2	0.0	0.0	2.2	9.8	2.2	0.0

1976-01	5.1	3.6	10.5	5.9	40.0	0.2	16.6	16.8	0.1	3.6	23.4	19.5	4.3	5.5	3.4	3.6	2.4	2.2	21.7	4.1	22.1	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.6	0.9	3.1
1976-02	2.5	0.1	0.1	19.4	12.4	8.5	8.4	4.0	21.2	1.4	0.0	0.0	33.7	0.0	0.0	5.9	16.2	0.4	15.7	21.6	0.4	0.2	5.8	37.6	16.4	27.8	12.7	4.7	10.1	--	--
1976-03	5.5	1.9	2.7	8.9	17.1	7.1	2.9	1.0	2.1	0.2	0.7	7.7	30.4	0.0	11.1	16.6	1.3	2.8	1.1	0.1	2.4	0.0	1.2	2.4	0.0	0.0	0.4	0.0	0.0	0.0	5.5
1976-04	0.4	2.9	38.0	34.0	17.8	0.3	17.5	0.0	57.1	33.6	6.4	7.9	10.0	0.0	0.0	7.1	0.0	0.1	9.4	2.2	5.1	18.1	5.7	0.0	0.0	0.0	0.9	0.0	0.0	9.0	--
1976-05	0.0	0.0	0.0	0.0	0.0	0.3	0.3	1.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4
1976-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.2	0.0	0.2	0.0	0.0	0.0	0.0	--
1976-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1976-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	2.3	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6	9.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	--
1976-12	0.0	0.0	0.0	3.7	0.0	0.0	19.5	59.9	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.0	8.0	25.5	34.8	0.5	0.4	0.0	4.0	0.0	1.9	0.2	0.0
1977-01	0.0	14.8	2.5	5.2	73.6	25.5	5.8	1.8	4.0	0.5	0.0	0.0	0.0	0.0	4.1	31.4	1.8	10.5	3.0	4.3	4.3	9.1	3.1	0.1	0.0	1.8	17.9	2.7	17.6	3.7	0.0
1977-02	0.0	0.0	2.6	0.0	0.0	6.8	0.3	0.2	0.0	21.2	0.0	0.0	0.0	0.6	0.0	14.8	0.0	0.0	0.7	25.6	0.0	6.0	27.4	39.2	1.5	48.9	13.6	1.5	--	--	--
1977-03	0.0	22.2	1.6	2.8	1.4	17.6	50.6	0.6	1.5	3.0	1.2	3.3	0.4	16.7	5.3	0.0	18.9	1.5	6.4	33.2	0.0	0.4	0.2	3.4	0.7	0.3	14.1	3.1	0.8	3.5	12.5
1977-04	0.6	5.0	11.2	12.5	0.0	0.0	0.0	3.4	2.0	0.1	0.0	4.8	0.0	0.0	0.0	0.0	1.2	0.0	0.0	28.5	0.3	0.7	0.0	0.0	0.0	1.5	0.0	0.0	0.3	0.1	--
1977-05	0.1	10.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1977-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
1977-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.2	0.0	0.0	0.0	3.4	5.1	1.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1977-10	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-11	0.0	0.0	0.0	0.0	11.9	8.4	2.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	4.7	10.3	10.8	0.0	12.2	0.0	0.0	9.5	9.9	0.5	4.5	0.6	0.0	0.0	--
1977-12	0.0	0.0	0.0	0.0	0.4	0.0	22.7	4.4	0.0	0.0	4.7	2.1	1.1	0.0	0.0	0.0	13.0	8.4	7.4	0.0	13.3	1.4	2.2	16.2	11.4	5.1	1.6	0.0	0.2	0.1	33.2
1978-01	3.1	0.0	1.4	0.0	0.8	0.4	11.0	0.0	5.0	0.5	30.0	4.2	5.4	8.0	12.9	8.4	2.0	2.5	0.0	0.3	0.9	6.4	6.2	2.6	6.0	2.0	0.0	0.0	5.2	0.0	5.2
1978-02	10.2	0.0	3.5	11.7	13.0	3.2	8.1	11.7	4.0	9.0	0.0	22.9	8.5	95.2	10.4	0.0	0.0	22.3	0.5	0.0	11.7	0.0	2.3	0.0	12.5	0.9	0.3	3.6	--	--	--
1978-03	0.0	39.6	11.3	0.0	1.5	0.3	20.0	13.2	17.8	18.6	0.5	0.0	2.7	8.3	0.3	15.5	22.2	4.4	13.4	0.5	11.4	30.8	0.0	5.7	0.7	7.5	6.9	0.8	3.6	3.8	2.8
1978-04	3.5	4.8	0.0	3.9	3.8	0.4	0.4	0.0	0.7	16.1	1.2	14.7	0.8	1.0	0.0	0.0	9.5	0.9	4.3	0.9	0.0	0.0	0.0	2.0	0.7	2.3	0.0	0.0	0.0	0.4	--
1978-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.2	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1978-07	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978-09	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1978-10	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.3	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	40.4
1978-11	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.3	0.0	0.0	24.6	6.7	0.2	0.0	0.0	2.8	11.2	0.0	27.3	0.0	0.0	0.0	0.0	0.0	1.5	2.3	--
1978-12	2.1	0.0	0.0	6.1	0.2	3.4	0.9	11.7	0.7	17.7	0.1	19.9	0.4	37.1	0.0	4.9	3.4	1.2	3.5	47.9	15.1	0.0	10.4	4.9	10.2	13.7	6.5	15.7	0.0	22.0	0.6
1979-01	0.3	2.8	1.1	2.3	3.7	0.0	0.2	1.2	0.0	0.0	0.0	3.5	3.4	0.7	4.8	1.2	3.6	7.9	1.0	0.5	0.0	0.3	12.3	3.7	8.7	48.4	46.8	9.4	0.0	0.0	0.0
1979-02	56.7	17.2	10.1	9.0	0.4	3.8	10.5	16.3	0.0	0.0	0.3	2.1	0.6	0.0	0.0	0.0	2.9	0.0	8.8	25.0	17.7	8.7	15.5	5.9	6.7	7.9	11.9	0.0	--	--	--
1979-03	0.3	2.1	3.3	0.0	14.1	1.8	0.1	82.4	31.5	2.3	18.2	10.6	10.5	5.1	3.6	12.1	1.5	0.0	0.0	0.0	0.0	0.7	9.3	3.7	14.9	7.0	2.8	3.1	27.6	44.5	38.7
1979-04	1.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	4.6	0.5	0.7	0.0	10.5	0.0	1.5	0.0	0.0	1.1	2.3	0.0	0.0	2.2	5.7	0.7	0.0	0.2	0.0	--
1979-05	10.2	21.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1979-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1979-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-11	0.0	0.0	0.0	0.0	0.0	0.0	1.4	6.5	0.0	1.8	0.0	0.3	6.0	2.9	9.0	1.6	3.6	16.0	11.0	0.5	0.0	0.2	57.3	0.0	20.8	0.5	4.2	2.6	2.6	18.2	--
1979-12	11.9	0.0	0.0	0.0	0.0	23.0	14.6	17.2	11.6	4.6	6.6	0.4	1.6	0.2	3.3	0.0	0.0	0.0	11.7	0.2	5.2	16.6	0.0	3.5	2.6	0.0	0.0	0.0	0.0	0.6	9.9
1980-01	0.5	1.2	37.1	14.3	2.6	3.9	0.0	25.3	9.0	7.1	3.1	6.6	5.7	31.0	0.0	0.0	0.0	0.0	8.5	0.2	1.8	0.0	7.9	46.9	0.0	0.3	9.8	24.2	2.2	1.4	4.1
1980-02	10.3	10.8	24.2	14.7	0.8	0.2	0.0	23.4	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	12.7	15.6	3.5	0.0	0.0	16.7	4.0	0.3	14.5	8.4	4.1	--	--
1980-03	1.5	5.0	1.4	65.9	3.9	0.2	25.5	44.4	0.3	53.0	0.0	0.0	0.0	0.0	0.0	0.0	27.4	0.0	50.3	0.6	0.0	0.0	0.0	0.0	8.5	26.2	0.0	1.1	1.9	2.9	2.3
1980-04	2.4	4.5	6.3	2.3	3.5	10.7	0.6	0.0	5.2	6.7	0.0	4.2	2.8	35.8	10.6	19.9	4.1	0.7	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
1980-06	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-07	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-08	0.0	0.0	0.0	0.0	0.5	0.9	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	24.3	--
1980-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	34.0	0.0	8.0	4.6	4.0	0.0	1.7	0.0	0.0	1.3
1980-11	0.0	0.0	0.0	1.0	6.6	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	3.1	9.1	0.0	0.0	0.0	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-12	0.0	14.5	20.7	0.0	3.5	36.6	56.3	37.9	6.1	1.1	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	36.6	0.9	8.2	5.0	5.8	2.9	10.8	0.9	12.2	17.5	3.7	29.2	13.6
1981-01	35.9	5.4	0.0	0.0	0.0	0.0	0.0	8.6	2.1	5.5	4.7	2.3	23.1	3.7	0.0	0.0	0.0	1.6	0.0	0.0	2.0	0.0	0.0	0.0	0.4	1.4	16.9	6.0	16.5	21.2	18.1
1981-02	10.5	0.0	1.4	4.0	0.5	1.0	6.0	0.5	7.8	0.5	0.0	0.2	0.5	52.7	18.4	56.4	18.4	31.2	2.8	1.9	31.6	39.1	3.6	17.3	9.0	0.0	14.8	0.1	--	--	--
1981-03	17.9	0.0	0.0	0.0	2.7	1.6	18.5	2.3	28.9	12.1	5.5	0.0	0.0	2.0	0.0	0.0	0.4	6.5	12.0	9.2	47.7	0.0	0.0	0.1	0.5	0.6	3.6	0.0	0.5	0.0	1.1
1981-04	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	6.8	3.2	0.0	0.0	0.0	0.0	0.0	10.9	13.6	1.0	0.1	0.0	2.7	0.9	0.4	0.0	0.0	3.1	--
1981-05	6.4	2.6	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1981-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981-09	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1981-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	11.8	0.0	17.7	2.4	0.0	0.0	0.0	0.0	0.0	8.2	0.0	0.0	18.5	0.0	0.6
1981-11	2.1	3.9	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	33.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.7	5.4	0.0	0.0	8.0	15.9	--
1981-12	0.0	1.8	0.8	0.0	0.0	0.0	2.4	0.3	0.8	8.6	0.0	0.1	9.7	0.7	2.3	7.1	0.1	0.0	0.0	0.0	0.0	10.5	0.0	2.4	0.0	8.5	5.4	22.2	37.2	10.4	8.0
1982-01	9.9	0.7	0.7	20.4	0.7	0.0	0.1	0.0	20.5	5.5	0.0	10.0	0.0	0.0	10.8	0.2	0.0	0.3	2.2	6.1	17.6	0.1	9.6	0.0	7.8	5.7	0.0	0.0	0.0	70.3	0.1
1982-02	0.0	0.0	0.0	0.0	0.0	34.6	2.1	1.8	0.0	0.0	0.0	3.2	4.9	14.0	0.1	5.8	18.2	0.2	0.8	15.7	0.0	0.9	29.2	0.7	0.0	0.0	12.9	17.9	--	--	--
1982-03	3.4	0.3	0.0	60.6	2.0	20.0	3.0	0.0	0.8	5.4	0.0	15.5	13.7	3.0	2.2	53.1	0.5	2.0	1.0	0.0	0.0	0.0	0.0	0.0	34.3	3.3	2.4	0.0	16.4	1.2	8.9
1982-04	3.6	1.2	30.8	5.3	12.8	0.0	0.0	0.1	0.0	6.3	4.0	0.0	36.8	8.2	14.5	5.6	8.4	0.0	72.7	1.5	41.4	0.6	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	--
1982-05	0.0	0.0	5.9	2.6	0.0	0.0	15.5	0.8	0.0	3.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
1982-06	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1982-07	0.0	0.0	0.0	1.6	0.2	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
1982-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1982-10	0.0	0.0	0.0	0.0	0.0	3.9	0.5	4.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.1	0.0	2.4	3.9	0.0	0.0	0.0	0.0
1982-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	5.4	1.0	1.2	12.5	33.1	0.0	0.0	7.7	19.1	12.5	0.0	11.1	0.2	0.0	0.0	14.7	1.9	0.2	12.2	--
1982-12	0.0	4.5	0.0	0.0	0.0	0.0	0.0	8.9	55.0	13.3	10.4	0.7	23.5	0.0	15.3	35.5	6.3	0.9	20.3	27.1	45.0	4.1	8.6	9.0	21.5	2.6	0.4	0.0	4.0	4.1	1.0
1983-01	29.0	4.2	0.0	0.2	2.0	0.2	9.7	0.6	0.0	0.0	1.0	2.5	28.4	5.2	5.4	5.7	1.4	0.0	0.0	0.8	0.0	9.8	3.2	6.5	12.5	0.0	25.0	5.1	0.6	17.1	4.2
1983-02	28.7	0.0	3.3	1.0	0.0	21.6	0.9	4.2	2.0	36.6	22.1	0.0	14.2	36.8	10.9	9.8	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8	0.0	0.0	0.2	--	--	--
1983-03	0.0	3.4	10.5	0.0	17.9	16.9	12.2	0.1	0.0	21.9	14.3	1.8	2.5	0.4	3.0	0.0	0.0	0.0	2.8	15.1	0.8	0.0	0.1	0.0	0.0	4.9	4.1	0.0	0.0	0.0	0.0
1983-04	2.2	0.0	0.0	0.0	28.6	14.5	0.4	10.6	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.2	0.4	0.0	0.1	0.0	--
1983-05	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1983-06	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	--
1983-07	0.0	0.0	0.0	0.0	0.0	0.0	14.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
1983-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	--
1983-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	1.2	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.2	1.2	0.0	3.0	0.0	0.1	0.0	0.0	0.0	0.0	22.5	0.0	16.8	--
1983-12	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.2	4.0	16.3	15.2	0.0	53.7	10.0	8.2	3.6	0.2	0.3	5.9	6.1	16.6	15.8	0.2	3.4	0.0	9.0	5.2	3.8	0.3	28.4
1984-01	15.4	0.0	11.9	0.0	0.5	9.2	1.5	58.4	2.3	0.1	0.1	0.0	9.7	1.6	4.4	15.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7
1984-02	0.0	3.0	0.3	2.8	18.2	3.9	2.4	4.1	9.6	0.5	0.3	0.0	0.0	0.4	6.1	8.4	2.1	14.3	30.9	1.0	11.6	20.4	16.6	0.0	12.6	0.0	0.0	16.8	2.3	--	--
1984-03	6.5	3.2	0.4	0.0	2.7	0.7	2.1	0.3	8.4	1.7	0.7	0.0	0.0	0.0	17.6	24.9	3.4	0.7	0.2	0.0	0.2	3.4	0.0	0.0	0.0	0.2	0.0	11.0	1.7	17.8	44.4
1984-04	6.7	0.4	0.1	17.8	1.8	2.5	7.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.1	0.5	0.3	0.1	0.0	0.0	23.7	2.1	2.2	2.0	--
1984-05	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.4	0.0	0.0	0.0	0.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5
1984-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	--
1984-07	0.0	0.3	2.0	0.7	0.4	0.6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1984-10	0.1	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984-11	0.0	0.0	0.0	0.0	0.0	0.0	10.0	1.3	0.0	0.4	1.1	0.4	29.1	61.8	2.2	0.0	1.1	33.2	17.0	30.5	14.3	0.0	1.2	2.7	0.0	0.0	0.0	2.9	0.0	0.0	--
1984-12	0.0	0.0	0.0	0.0	0.1	2.0	14.2	13.8	0.0	30.7	11.6	8.9	0.0	1.1	1.8	21.5	7.8	25.4	13.8	27.5	11.4	0.9	0.0	8.2	5.4	2.0	0.8	14.6	6.7	9.8	2.5
1985-01	0.0	3.4	11.2	0.0	0.0	0.0	0.0	0.0	6.6	1.0	3.0	0.9	0.8	0.0	0.6	13.3	0.0	1.9	19.8	0.0	38.9	5.8	4.3	24.6	31.5	0.7	3.5	11.1	0.0	0.0	5.7
1985-02	0.4	1.5	14.6	44.2	7.4	5.0	13.4	3.4	7.7	3.2	4.5	0.6	5.7	9.9	1.0	0.0	0.0	0.1	0.0	1.3	0.0	0.0	0.0	0.0	0.0	65.4	6.1	0.0	--	--	--
1985-03	17.7	0.5	1.2	0.0	12.1	11.2	0.0	1.3	0.0	0.9	5.9	0.0	0.0	0.0	0.0	48.6	0.0	4.7	0.0	0.7	2.0	7.3	3.3	8.2	4.0	2.1	5.4	16.4	0.3	0.0	0.0
1985-04	0.0	2.6	7.0	0.6	1.7	5.5	0.7	0.0	0.0	1.8	0.0	0.0	0.0	1.5	0.0	0.0	0.3	0.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1985-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985-06	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1985-07	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
1985-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1985-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0
1985-11	0.0	0.0	0.0	0.0	0.0	5.4	2.0	89.7	12.7	3.3	4.6	10.6	0.0	0.0	0.0	0.1	6.4	0.0	12.0	17.4	2.8	10.6	1.3	0.0	3.5	3.5	35.6	0.3	20.3	3.6	--
1985-12	0.0	3.0	24.9	6.6	29.7	0.1	1.4	0.2	1.1	0.0	10.0	0.0	0.4	4.9	0.2	5.0	17.7	0.5	13.0	27.6	0.1	60.9	4.6	6.1	1.8	0.6	17.7	0.4	62.1	0.0	0.0
1986-01	11.5	2.4	16.9	2.8	18.2	0.0	23.3	0.0	2.6	4.7	2.8	26.7	0.4	1.0	0.0	0.3	14.1	0.0	11.1	21.0	10.5	28.8	1.0	0.9	35.0	11.0	11.0	0.6	15.8	8.5	11.7
1986-02	0.3	0.0	2.8	0.2	4.1	3.0	7.5	0.0	0.6	0.0	25.3	0.0	3.2	10.5	0.3	0.6	0.0	23.3	8.6	0.0	0.0	1.7	1.3	0.0	8.0	0.0	26.9	0.0	--	--	--
1986-03	0.0	3.4	1.0	0.0	2.7	3.2	23.7	18.0	12.5	0.3	0.0	0.0	14.1	0.0	0.8	0.0	0.0	0.0	0.1	0.0	2.2	14.6	2.1	0.0	0.2	2.5	0.3	5.0	0.0	8.2	0.0
1986-04	6.8	3.8	0.9	0.0	1.0	0.0	0.0	0.4	0.1	0.0	0.6	0.0	0.0	0.0	0.0	21.5	0.0	0.7	31.3	3.8	4.0	4.7	0.0	0.0	0.2	1.2	0.0	2.3	0.4	5.9	--
1986-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1986-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1986-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1986-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.3	0.0	0.0	0.0	0.0	0.0	4.3	18.8	0.0	0.0	1.2	9.3	0.0	1.6	0.0	0.0
1986-11	7.5	6.6	19.7	1.7	1.4	9.5	22.7	0.0	0.0	0.0	11.5	0.2	0.0	0.0	0.0	0.0	5.6	0.1	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.8	8.7	0.0	0.0	3.2	--
1986-12	0.0	9.7	8.6	0.6	18.3	8.3	16.8	0.0	26.6	17.6	11.3	1.3	0.5	2.4	5.2	3.3	0.0	2.6	9.7	9.9	0.0	0.0	15.2	18.2	0.2	6.8	2.2	36.7	1.2	6.0	0.0

1987-01	4.5	9.4	0.6	0.9	20.8	3.4	0.0	0.0	0.0	0.0	0.6	26.2	0.5	2.6	0.0	2.6	1.1	10.1	4.2	5.2	4.6	24.4	65.3	15.1	0.0	0.0	3.2	0.0	15.2	3.3	4.3
1987-02	7.6	6.8	0.0	0.0	0.0	6.3	29.8	1.1	34.6	3.1	11.1	10.2	1.0	2.4	11.5	0.0	3.2	0.3	6.0	0.0	8.8	6.4	26.7	5.8	2.7	0.2	0.0	0.1	--	--	--
1987-03	61.6	1.2	0.0	33.6	0.0	0.0	0.0	8.2	1.5	1.6	0.5	5.2	10.6	1.8	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	1.5	11.9	5.1	54.0	4.2	0.0	27.5	5.0	26.6
1987-04	6.5	10.9	2.0	7.6	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1987-05	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1987-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1987-10	0.0	0.0	0.0	2.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	10.3	0.0	6.7	0.0	0.0	9.7
1987-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	5.8	6.1	--
1987-12	8.5	0.0	18.6	7.4	3.6	6.8	1.0	3.2	0.3	0.0	1.2	1.5	0.4	3.4	1.1	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	3.5	23.7	0.0	0.0	0.0	1.4	3.5	5.5
1988-01	6.8	5.8	0.0	1.4	0.0	0.6	0.0	0.6	4.0	0.2	0.6	0.0	3.5	30.1	9.9	1.6	0.0	15.9	6.7	47.9	98.5	0.5	1.1	2.7	4.9	2.3	10.1	30.6	14.4	20.8	0.1
1988-02	0.0	0.0	2.1	0.0	45.7	0.6	6.6	31.6	15.8	19.8	0.8	13.6	0.5	7.6	2.1	0.7	38.9	0.2	0.2	83.7	2.7	0.6	16.9	0.0	0.0	0.0	0.8	1.9	29.6	--	--
1988-03	0.0	0.6	0.0	3.6	0.0	0.0	7.0	7.4	0.0	21.6	6.2	0.0	2.6	1.5	0.2	0.0	0.0	0.0	10.2	25.0	9.4	8.0	0.3	0.0	16.0	1.8	1.7	0.0	0.0	0.0	0.0
1988-04	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	6.4	0.0	0.0	4.2	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	5.4	1.9	--
1988-05	1.0	2.3	1.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	6.4	0.0	6.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1988-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1988-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	0.3	0.3	5.3	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.3
1988-11	0.0	0.0	0.0	5.0	9.2	0.7	0.0	0.0	0.0	11.5	1.5	5.3	0.0	0.0	26.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.6	41.8	0.0	0.4	0.0	0.0	0.3	--
1988-12	34.8	0.0	0.0	7.7	0.0	2.0	15.8	4.5	0.8	0.0	0.0	0.0	8.7	3.1	0.0	0.4	0.0	0.8	33.8	13.3	6.4	40.1	0.7	4.2	0.1	0.2	0.0	24.4	36.3	0.4	0.3
1989-01	0.0	36.1	1.8	0.0	16.8	30.9	13.4	1.0	1.0	6.0	2.4	5.6	24.2	13.2	12.0	36.8	39.4	5.8	0.8	0.0	0.0	9.0	0.2	0.2	8.2	12.4	40.8	27.7	22.5	11.1	21.1
1989-02	18.9	11.7	7.0	1.9	0.0	23.6	1.4	6.9	16.5	13.6	37.2	6.8	0.0	0.3	0.3	12.9	2.6	5.7	2.7	12.2	0.8	19.3	3.8	0.0	0.0	0.0	22.0	19.3	--	--	--
1989-03	22.2	0.0	30.4	6.8	0.0	75.2	66.3	25.3	4.3	0.0	5.2	0.0	0.2	0.0	0.1	0.0	0.0	0.4	91.5	19.9	2.2	1.2	42.3	25.8	0.4	27.6	9.7	3.7	0.4	1.9	23.7
1989-04	33.6	41.3	11.5	0.6	21.8	5.2	0.7	3.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	4.2	0.0	12.0	--
1989-05	0.0	0.0	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0
1989-06	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1989-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
1989-08	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1989-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	2.2	0.0
1989-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.1	1.7	0.0	0.0	1.3	0.3	4.2	0.4	0.5	0.9	1.0	25.2	0.5	1.7	3.1	24.7	0.0	7.9	--
1989-12	20.4	10.7	15.1	0.5	0.0	21.1	1.8	0.0	17.1	1.5	0.2	0.0	0.0	1.5	0.1	35.1	16.9	21.4	2.7	41.1	0.0	0.0	0.0	1.5	0.0	12.0	32.0	0.0	1.8	20.2	37.7
1990-01	0.2	12.4	2.3	2.5	16.5	7.6	4.7	0.0	0.0	0.0	2.7	1.9	9.8	5.9	12.6	18.1	0.5	20.2	16.1	17.8	11.3	0.0	25.0	11.5	0.0	0.0	7.9	8.3	0.6	0.0	0.5
1990-02	0.0	0.4	0.1	1.5	2.2	4.6	8.1	57.0	2.8	10.8	0.0	19.1	0.0	0.4	6.2	16.3	42.0	0.2	0.1	0.0	0.0	3.0	20.5	14.2	0.6	26.3	12.2	0.1	--	--	--
1990-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	1.0	4.0	0.0	0.0	0.0	0.0	0.0	19.2	2.4	0.8	10.4	1.2	78.8	0.4
1990-04	0.0	0.0	0.3	1.3	1.9	1.6	15.2	34.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	23.3	6.0	5.8	0.0	0.0	0.0	0.0	--
1990-05	0.2	1.7	11.6	0.8	1.6	0.0	0.0	0.0	0.0	0.0	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1990-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1990-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	14.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1990-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990-11	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.6	0.8	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	--
1990-12	2.8	0.0	0.0	21.5	0.0	0.0	0.0	0.0	23.2	0.0	45.1	0.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6	0.0	0.0	0.0	5.1	1.9	0.0	0.0	9.9	13.7
1991-01	5.4	1.5	5.3	16.4	26.8	1.9	3.4	6.2	0.0	0.0	1.5	7.4	26.6	0.7	0.0	0.8	0.9	20.8	0.1	2.1	0.9	1.6	0.0	7.7	0.0	3.4	27.8	0.6	11.1	26.6	6.5
1991-02	68.3	2.0	0.0	4.8	0.0	4.2	0.3	0.0	0.0	27.7	30.8	3.0	5.9	1.0	3.0	0.0	0.0	3.7	0.0	0.0	0.0	4.0	0.7	0.4	1.8	0.0	10.4	4.9	--	--	--
1991-03	0.0	0.0	6.3	15.0	35.6	5.2	0.9	1.8	58.6	1.6	0.1	6.1	0.0	0.0	0.0	2.3	10.0	9.2	18.6	0.0	1.2	56.5	2.5	2.1	4.0	2.0	15.7	6.1	0.0	0.7	18.6
1991-04	13.0	0.0	0.0	0.0	0.3	0.0	1.2	3.1	2.8	0.0	0.0	0.7	9.1	0.8	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	3.6	0.0	0.0	0.0	0.0	0.0	0.0	--
1991-05	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	2.1	1.7	6.1	0.7	0.0	0.0	0.0	0.0	0.0	2.2	2.9	3.3	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1991-07	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1991-10	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	5.7	0.1	3.6	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991-11	0.0	0.0	0.0	0.5	0.0	9.2	0.0	1.2	0.0	0.0	0.0	1.2	0.0	28.6	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	14.9	0.0	0.0	13.3	19.2	0.0	0.4	25.8	--
1991-12	0.3	10.3	0.8	0.0	0.0	0.0	0.3	0.2	0.0	0.0	12.7	12.5	0.1	6.1	19.4	10.2	0.6	0.0	24.1	8.0	0.0	0.0	0.0	4.5	28.0	0.0	2.0	10.6	16.4	28.0	6.1
1992-01	30.1	31.6	0.2	0.0	0.0	2.4	1.0	6.0	16.0	19.8	0.0	7.8	10.9	1.2	14.7	1.8	1.1	0.0	25.8	0.6	5.5	0.0	4.5	0.0	39.8	86.5	0.4	0.0	0.0	7.2	3.9
1992-02	4.9	1.4	6.2	6.8	1.5	0.7	0.6	0.5	0.5	0.0	7.5	0.5	0.0	0.0	0.0	10.6	0.3	3.8	0.0	0.0	29.2	0.1	0.0	8.3	1.1	0.0	0.0	0.0	24.6	--	--
1992-03	7.0	2.2	0.0	0.0	38.8	0.5	0.0	17.4	0.0	0.0	0.0	0.0	13.7	1.6	0.0	0.5	0.0	0.0	1.4	0.2	8.9	0.0	0.4	6.8	4.4	1.4	0.0	2.1	4.8	9.8	0.0
1992-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	2.8	0.0	--
1992-05	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.3	3.1	0.0	0.0	0.0	0.0	0.8	0.0	0.7	1.0	0.0	0.0	0.0	13.5	0.0	58.4	0.0	0.0	0.0	0.0	0.0	0.0
1992-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1992-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
1992-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1992-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992-11	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	29.3	0.0	1.8	4.3	4.7	11.8	0.3	0.2	0.4	0.0	0.0	9.1	0.0	0.0	0.0	--
1992-12	0.0	0.4	18.3	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	3.4	7.6	3.9	4.5	0.2	4.0	28.8	0.0	0.0	6.8	17.6	38.8	13.6	0.0	0.0	0.0
1993-01	2.3	3.6	0.1	6.1	5.5	1.2	0.0	0.0	5.0	7.8	0.0	30.1	18.2	10.7	23.7	6.0	0.0	3.0	1.4	0.0	0.0	0.6	8.7	27.0	12.3	25.6	3.4	0.9	13.5	2.7	23.1
1993-02	0.4	4.1	0.0	6.5	41.4	14.3	0.8	0.5	0.1	0.3	18.8	17.5	1.0	1.4	54.4	7.1	0.0	0.0	5.6	5.3	6.2	1.2	23.3	24.3	14.4	15.4	9.5	10.3	--	--	--
1993-03	11.8	17.7	4.0	0.8	0.8	2.8	2.5	4.7	1.3	0.0	6.8	0.0	0.0	5.9	52.0	14.3	6.1	4.3	1.9	2.7	1.3	15.6	1.3	0.9	0.4	2.1	2.6	0.1	23.1	0.0	0.4
1993-04	21.1	0.3	0.0	0.0	9.9	2.9	21.0	13.1	20.0	28.3	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	9.1	0.7	11.4	0.2	2.3	0.0	0.0	0.5	0.2	0.0	1.5	4.1	--
1993-05	2.8	0.2	0.0	0.0	4.2	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.4	2.1	0.0	0.0	0.9	0.0	0.0	0.0
1993-06	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	2.1	0.3	0.0	0.0	0.0	--
1993-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
1993-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1993-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	5.5
1993-11	18.8	2.2	0.0	0.0	0.7	0.0	0.7	0.0	0.0	11.0	3.2	1.0	13.9	4.2	0.0	2.6	0.0	0.0	19.3	0.0	4.8	0.0	2.3	31.7	0.0	0.0	0.0	1.0	0.0	0.0	--
1993-12	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.1	0.0	0.0	2.8	0.0	1.9	27.0	0.0	0.3	0.1	0.0	1.8	81.5	3.7	17.9	0.0	1.4	19.8	0.0	0.7	5.5	0.6	2.0	0.0
1994-01	2.9	0.1	0.0	0.0	7.6	3.8	7.0	0.0	0.0	7.3	14.4	0.3	0.0	2.8	1.7	0.8	1.4	10.0	12.9	34.4	14.8	17.3	0.0	16.3	24.6	47.6	0.5	6.9	0.0	34.1	2.3
1994-02	0.8	38.5	0.0	24.1	6.8	0.1	15.5	6.2	0.9	1.0	8.2	1.0	0.0	0.0	0.0	0.0	0.0	3.4	4.0	9.2	0.0	12.1	0.0	0.0	1.4	16.7	2.9	0.7	--	--	--
1994-03	3.1	0.0	0.0	0.1	3.6	0.0	0.0	0.0	33.1	0.0	3.7	1.2	2.2	2.0	0.7	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.8	5.0	6.6	0.0
1994-04	0.8	3.2	9.2	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2	0.0	0.0	0.0	0.0	--
1994-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994-06	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1994-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
1994-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1994-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.6	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.2	0.2	0.3	0.0	0.0	7.8
1994-11	2.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.8	29.0	2.7	0.0	16.2	--
1994-12	0.0	0.6	0.3	0.3	1.0	2.5	0.0	6.0	3.5	0.0	0.0	0.4	4.9	0.2	0.7	0.0	0.0	0.0	0.0	0.0	4.2	10.0	0.0	0.0	0.0	0.0	3.2	0.0	1.7	0.0	7.8
1995-01	4.0	2.5	57.8	25.7	6.2	29.3	1.4	0.0	0.0	27.4	2.5	19.5	0.0	0.2	1.7	0.0	8.5	0.0	5.2	5.9	3.3	8.9	3.0	0.0	0.0	0.6	5.5	3.2	6.0	0.5	17.6
1995-02	9.8	3.2	0.4	14.1	0.0	1.0	14.6	18.0	0.0	5.5	2.6	5.3	0.0	0.0	0.0	0.0	0.0	5.4	19.5	5.6	2.4	14.3	2.2	15.6	12.1	0.0	8.0	64.3	--	--	--
1995-04	0.0	4.5	4.1	0.0	0.0	0.0	0.0	0.0	0.9	1.6	0.0	4.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1995-05	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1995-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1995-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	1.8	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.3	3.2	0.0	--
1995-12	0.0	0.0	0.2	0.0	2.8	0.0	0.0	6.6	0.7	0.0	0.2	5.7	0.8	27.3	1.2	0.0	0.1	0.0	0.4	10.3	40.0	23.5	3.5	6.9	23.6	2.7	4.4	1.8	0.0	0.2	2.2
1996-01	1.2	2.9	7.7	8.9	4.0	4.6	0.2	1.2	7.6	2.2	0.4	0.0	16.7	30.6	14.4	2.2	0.0	7.4	0.0	0.0	43.0	10.2	0.0	0.0	0.0	13.5	0.0	40.2	2.1	0.4	0.2
1996-02	21.6	21.3	23.8	0.0	1.4	0.1	2.3	6.6	2.5	0.0	9.7	0.0	11.4	0.0	2.0	6.8	1.8	0.7	1.3	32.3	6.4	0.8	0.0	0.2	2.8	12.6	0.3	50.8	0.5	--	--
1996-03	0.3	4.0	0.6	4.3	0.2	19.4	0.3	29.5	0.4	56.3	23.0	22.3	1.7	6.1	7.8	47.0	22.8	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.5	0.0
1996-04	0.0	0.0	44.3	0.3	6.6	0.2	0.0	7.0	0.0	6.8	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	0.0	0.7	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1996-05	0.0	0.0	0.0	0.0	0.2	2.1	0.0	0.0	0.0	0.0	0.2	2.2	0.0	0.0	0.0	0.0	1.6	0.0	0.7	0.9	8.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
1996-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1996-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996-09	0.0	0.0	11.4	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1996-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	3.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996-11	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1996-12	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	22.3	0.4	0.0	2.6	13.9	0.0	1.7	7.0	5.2	14.4	2.6	0.0	21.2	27.8	8.7	0.0	7.6	1.4	2.1	0.8	0.0	1.3	5.1
1997-01	0.0	0.0	8.1	8.2	1.6	16.8	4.1	0.0	0.0	5.0	0.0	5.3	4.7	39.2	11.3	3.6	11.5	5.7	12.3	28.4	0.0	1.2	6.5	0.5	13.7	0.0	13.0	5.7	0.0	17.8	0.0
1997-02	16.5	0.0	14.2	5.5	4.4	1.2	13.6	2.3	7.5	1.4	0.0	4.6	0.0	0.0	2.3	2.0	1.3	8.1	5.3	12.5	16.2	0.5	2.9	0.0	0.4	0.0	1.5	5.1	--	--	--
1997-03	7.2	2.0	0.4	0.0	0.2	0.0	0.9	0.0	0.0	0.2	4.6	3.2	11.3	4.8	8.7	2.8	1.4	3.8	0.8	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.0	3.0	0.3	0.0	2.0
1997-04	0.0	0.0	22.6	26.3	1.0	12.9	24.0	0.4	48.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	21.9	0.0	0.0	0.0	0.0	0.0	0.0	--
1997-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1997-07	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1997-10	0.0	0.0	0.0	0.0	0.0	0.0	41.0	0.0	0.1	0.0	0.0	0.0	0.0	0.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.5	23.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997-11	0.0	1.0	0.0	0.0	0.1	0.2	0.5	4.2	0.0	0.0	0.0	0.0	0.3	7.2	1.6	0.0	0.0	1.8	10.4	64.7	0.0	12.4	2.9	2.9	0.8	0.0	0.0	1.4	0.0	0.0	--
1997-12	0.0	11.6	0.0	12.3	3.7	21.8	0.0	1.8	22.0	1.2	28.9	10.6	22.7	0.1	23.3	19.1	1.7	16.3	9.5	61.5	31.8	7.0	4.2	1.0	64.0	10.0	2.9	10.5	0.0	0.3	0.0

1998-01	3.8	0.6	0.0	6.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.6	11.7	21.0	50.7	33.0	0.2	27.0	5.2	0.0	0.0	0.0	57.9	31.0	0.0	25.5	0.0	0.0	0.0	0.0	11.4
1998-02	3.4	2.5	0.6	0.0	0.0	0.0	0.0	3.4	2.3	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4	0.0	0.0	6.0	0.0	1.2	5.9	0.0	2.5	2.1	12.1	--	--	--
1998-03	0.9	0.9	2.1	0.0	9.7	0.0	0.0	19.3	8.8	0.0	0.5	24.1	0.0	22.7	0.0	0.0	0.0	0.6	0.0	0.0	11.9	5.4	0.2	0.0	0.3	0.0	0.4	0.0	0.0	0.0	48.7
1998-04	0.3	0.0	28.0	3.1	0.0	8.4	14.9	0.0	5.7	8.5	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1998-05	0.0	0.0	0.0	0.6	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1998-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1998-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	31.2	0.0	0.0	0.0	20.2	23.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
1998-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	6.5	0.6	0.0	0.0	0.0	0.5	--
1998-12	0.0	0.0	0.0	0.0	0.1	0.3	11.1	0.9	12.0	0.5	1.5	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	2.1	26.6	0.2	0.0	0.0	0.0	0.0	6.0	0.0
1999-01	31.8	12.7	0.8	7.4	14.2	0.0	0.6	34.1	27.0	0.8	18.8	0.0	0.0	0.2	14.5	12.2	3.7	13.7	7.1	30.4	7.4	3.3	43.0	3.7	6.6	1.2	4.2	4.1	63.5	3.1	0.5
1999-02	3.6	11.4	33.8	46.5	0.0	12.1	0.0	0.1	0.0	1.1	1.6	7.3	18.7	0.4	19.1	29.7	1.8	13.4	16.9	3.5	2.6	21.2	0.4	4.9	24.1	0.0	13.8	3.4	--	--	--
1999-03	1.2	14.0	27.3	11.0	0.5	35.1	48.5	2.0	36.9	6.8	6.1	10.2	14.5	0.0	1.7	23.0	45.1	49.3	24.9	0.7	10.9	92.4	0.0	12.5	12.5	8.5	1.0	4.6	39.7	17.4	0.7
1999-04	0.6	11.5	7.0	16.3	10.9	5.2	4.0	5.8	1.0	1.4	20.6	3.9	0.4	0.7	0.7	0.0	0.9	0.3	0.0	1.1	0.4	0.8	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.6	--
1999-05	0.0	0.0	4.2	0.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.0	--
1999-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	--
1999-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	6.0	5.8	32.6	2.0	1.0	0.0	0.0	5.9	0.0	0.0	0.0	2.8	6.5	17.8	1.7	0.0	2.5	7.5	0.0	0.0
2000-01	49.3	27.8	25.0	1.6	1.7	23.1	0.0	6.2	0.0	0.4	47.8	19.5	29.6	3.0	10.8	22.3	26.3	0.0	8.1	5.1	8.5	0.4	0.0	2.1	0.0	0.0	0.0	0.6	20.3	31.8	3.9
2000-02	0.5	44.2	4.4	0.0	6.4	0.0	13.5	5.9	0.0	7.5	7.0	5.1	5.2	20.7	4.3	8.6	5.7	6.5	14.1	20.9	0.0	13.6	0.0	0.0	0.0	0.0	2.6	4.6	0.0	--	--
2000-03	2.9	1.7	0.0	57.1	18.5	0.0	3.5	26.6	4.5	3.3	6.7	0.4	15.7	19.6	19.4	7.8	0.0	6.6	8.7	0.0	2.6	2.7	3.2	20.7	3.5	1.4	0.0	0.0	0.0	2.9	5.7
2000-04	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	9.3	0.4	6.5	0.0	0.0	2.7	0.0	0.0	0.8	0.0	0.0	0.0	0.0	6.7	0.3	0.6	0.0	0.0	1.2	0.7	--
2000-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2000-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2000-10	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4
2000-11	0.0	50.1	0.0	0.0	0.0	9.3	0.0	1.2	1.3	0.6	1.4	0.0	4.3	11.0	0.0	1.8	2.2	49.1	5.2	29.5	6.8	0.0	0.8	3.9	0.0	4.8	16.9	3.3	0.2	16.0	--
2000-12	0.0	1.6	0.0	48.2	0.7	1.7	0.5	0.0	28.6	0.0	0.0	0.0	7.1	3.3	24.8	0.7	13.0	16.7	0.0	7.8	0.7	14.1	0.2	29.6	4.9	6.6	1.9	0.9	6.0	0.0	0.0
2001-01	6.7	1.8	4.7	14.7	0.0	0.0	7.2	13.2	2.0	0.0	1.8	18.7	5.4	5.0	10.7	3.7	5.5	14.3	46.4	7.3	0.0	1.4	1.9	1.0	0.0	0.0	1.6	1.5	0.8	0.0	5.7
2001-02	25.9	25.1	3.2	0.0	0.3	1.8	28.9	20.9	10.5	3.0	0.3	4.8	4.4	3.3	3.3	3.0	25.2	5.8	0.0	1.6	0.0	9.3	2.1	10.3	14.5	29.9	3.3	6.5	--	--	--
2001-03	12.5	0.0	12.5	3.6	10.0	3.4	3.7	4.0	4.6	2.5	24.4	19.6	2.2	0.0	2.0	1.0	4.9	18.3	0.4	21.6	0.4	32.6	7.3	4.3	39.5	0.0	58.1	3.6	57.9	2.8	2.1
2001-04	25.9	0.8	2.1	0.0	2.2	0.0	0.5	0.0	0.0	0.0	0.0	0.4	4.6	0.6	0.0	0.0	0.0	2.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2001-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	0.0	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
2001-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2001-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-08	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2001-10	0.0	0.0	0.0	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.7	0.0	0.0	3.5	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6
2001-12	1.2	0.0	0.0	0.0	2.1	7.2	0.0	0.0	0.2	0.6	12.7	54.0	0.0	0.0	0.0	0.0	0.0	0.6	21.0	8.1	0.0	0.0	0.0	15.7	38.7	9.9	2.5	25.2	0.3	13.3	4.2
2002-01	--	0.0	28.8	0.4	0.0	9.9	20.5	2.0	0.0	6.7	4.7	4.8	51.6	37.6	46.0	34.4	34.4	5.0	44.8	45.6	0.0	0.0	93.9	0.0	0.8	0.0	0.1	29.3	15.8	21.4	11.6
2002-02	28.2	9.6	82.2	0.0	3.7	0.0	0.8	4.7	0.0	26.8	55.2	1.8	0.0	0.0	0.0	0.4	8.9	9.8	15.7	88.8	0.3	0.0	1.5	0.0	7.2	4.3	3.0	9.6	--	--	--
2002-03	0.1	0.9	0.6	0.0	3.0	0.0	0.0	14.0	32.2	0.0	0.0	0.0	0.0	0.0	8.4	21.0	0.0	7.0	10.3	0.8	0.0	7.5	9.5	5.4	3.7	3.7	1.0	0.0	0.0	20.9	3.3
2002-04	16.6	1.3	1.4	19.5	11.1	0.6	3.5	1.3	14.3	0.7	0.0	0.0	0.0	0.0	0.3	0.6	2.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2002-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.7	0.0
2002-06	0.0	0.0	0.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2002-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
2002-09	0.0	0.0	0.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2002-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002-11	0.0	0.0	0.0	0.0	0.0	0.0	0.2	20.4	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.8	0.0	3.2	0.0	6.1	0.0	0.0	0.0	32.6	--
2002-12	0.0	0.0	0.8	5.3	0.0	0.0	0.0	3.4	0.0	0.0	19.3	8.2	15.9	14.0	8.5	10.7	1.9	1.2	42.7	8.6	0.7	0.0	4.6	0.8	4.2	2.8	43.5	1.3	0.0	7.3	9.6
2003-01	4.9	6.5	47.0	61.5	26.7	0.6	11.7	11.2	33.3	0.0	17.4	16.2	13.4	3.8	0.0	0.0	7.8	17.0	0.8	19.9	7.2	0.5	14.8	0.9	0.0	30.3	0.0	42.7	4.5	0.0	1.6
2003-02	29.6	0.0	7.2	55.3	0.5	1.5	0.0	0.0	1.8	8.4	33.5	5.5	8.7	32.9	0.0	0.0	0.6	39.0	0.6	7.8	0.0	5.0	12.5	0.0	10.8	5.6	0.0	0.0	--	--	--
2003-03	0.0	0.0	0.0	0.8	12.0	0.0	0.0	0.0	28.1	10.4	1.0	0.0	0.0	0.1	15.2	8.3	13.4	0.2	0.0	8.2	7.2	52.3	38.8	1.0	0.6	33.7	46.6	11.4	22.4	20.3	19.3
2003-04	22.9	2.3	3.0	0.3	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2003-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2003-07	0.0	0.0	0.0	0.0	0.1	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2003-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	32.4	0.2	1.0	1.2	0.0	0.0	0.0	0.0	0.0	44.6	0.0	0.3	30.7	0.0	--
2003-12	42.3	5.4	3.0	0.4	10.1	0.0	1.1	1.4	0.0	0.0	3.0	0.8	14.2	7.1	37.7	0.2	14.1	2.8	6.6	4.6	0.2	0.0	10.2	2.0	17.1	1.7	19.5	0.3	19.2	24.3	0.0
2004-01	1.8	1.7	3.5	9.1	0.0	0.0	0.0	12.1	0.5	1.0	13.2	5.8	3.1	2.7	10.7	0.0	0.4	8.6	83.5	10.3	8.3	9.2	5.6	0.0	0.0	15.8	0.0	6.6	30.9	5.6	4.6
2004-02	7.7	0.8	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	1.3	27.5	1.9	1.1	8.7	0.0	2.2	0.1	28.2	15.8	27.3	1.7	1.4	3.5	3.1	13.4	1.3	--	--
2004-03	6.3	33.4	0.0	0.0	0.3	2.5	0.3	3.5	0.0	0.0	0.0	1.1	28.6	0.6	12.3	1.0	0.0	0.0	0.0	0.7	0.0	1.7	0.2	2.7	5.8	1.6	0.0	0.0	0.0	0.0	21.6
2004-04	8.0	5.9	6.5	1.3	0.0	17.4	0.0	0.0	62.5	13.2	1.6	0.0	0.0	0.0	0.0	0.1	3.9	0.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.2	0.6	0.3	--
2004-05	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004-06	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	--
2004-07	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004-08	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2004-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	0.7	--	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	12.4
2004-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.1	0.0	0.0	1.6	0.0	0.0	0.0	41.3	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.4	14.1	0.2	6.4	--
2004-12	3.4	0.0	2.2	3.2	1.0	0.0	7.1	0.8	0.0	24.6	0.0	0.0	0.0	5.4	23.8	19.8	1.8	1.2	19.0	18.8	15.8	3.5	27.6	9.8	16.8	0.0	24.4	50.2	40.4	0.5	7.5
2005-01	37.1	4.1	0.0	3.3	6.7	28.8	2.2	7.6	2.2	31.2	0.5	10.5	33.1	5.5	2.7	2.0	0.6	7.5	12.7	17.8	0.0	0.0	0.4	0.0	6.0	0.0	43.9	0.7	0.0	1.2	1.6
2005-02	0.0	7.0	0.0	0.0	8.6	0.0	0.0	1.7	3.5	0.5	17.0	1.5	5.3	18.9	0.0	0.0	0.6	16.2	0.0	9.7	0.0	0.8	5.6	0.0	0.0	3.3	19.9	3.5	--	--	--
2005-03	26.5	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.2	0.0	16.5	60.5	0.0	1.7	4.4	0.0	0.3	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.9	42.7	0.0	0.0
2005-04	0.0	2.2	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	42.1	0.0	0.0	25.4	0.0	0.0	0.0	--
2005-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.4	12.7	0.0	0.0	0.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-07	0.0	0.0	0.0	0.0	4.4	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
2005-08	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	--
2005-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	1.0	0.0	0.0	0.0
2005-11	0.0	0.0	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.1	2.6	0.0	--
2005-12	0.0	3.8	129.4	0.0	8.7	0.0	0.0	3.2	0.0	0.6	0.0	0.0	1.2	0.1	13.1	6.0	0.1	13.2	1.8	1.4	0.0	35.2	0.0	0.0	0.6	9.3	0.0	51.9	40.4	7.1	0.6
2006-01	29.0	1.2	6.8	1.8	2.0	1.6	33.6	0.0	0.5	0.1	20.7	0.1	26.8	14.6	27.3	33.0	0.3	0.8	0.2	2.5	3.6	0.0	6.8	0.0	0.5	4.3	4.7	24.7	9.6	0.3	0.0
2006-02	0.0	10.7	1.0	13.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.1	10.2	22.3	17.9	6.4	0.1	22.5	10.3	33.5	14.6	16.7	0.0	0.0	3.5	18.2	4.3	--	--	--
2006-03	9.4	28.8	4.7	0.6	31.9	45.3	28.0	8.1	0.3	69.8	0.0	29.3	0.0	14.8	0.0	0.0	4.6	0.1	9.3	0.0	0.0	1.3	0.0	0.5	0.1	8.7	7.3	0.0	3.8	0.0	11.5
2006-04	0.6	1.6	13.7	3.6	0.4	1.3	0.8	4.7	0.3	5.8	3.6	0.1	0.5	0.0	10.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	--
2006-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	11.8	0.0	0.0	0.2	0.1	0.3	0.0	0.0	0.0	0.0
2006-06	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	--
2006-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2006-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	21.2	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	7.1	0.3	0.0	0.0	0.0
2006-11	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.6	11.3	19.9	6.8	5.7	6.8	0.2	0.0	0.0	0.0	0.0	0.0	20.5	0.0	0.6	25.7	0.0	0.0	0.0	--
2006-12	0.1	0.5	7.8	0.2	0.0	1.1	0.0	3.0	29.7	13.7	0.2	33.3	20.4	1.3	17.6	0.0	1.1	0.5	15.8	32.8	15.9	0.0	7.5	0.0	8.1	17.8	17.7	2.8	5.1	25.7	0.0
2007-01	11.3	27.6	31.9	19.1	8.4	0.0	0.0	1.3	0.3	14.5	0.0	3.2	87.6	36.8	3.2	2.4	0.0	6.9	3.4	42.3	6.6	2.2	0.0	3.7	0.2	14.4	0.0	34.1	14.8	27.2	25.9
2007-02	5.4	0.6	7.9	7.9	8.0	0.9	0.1	0.0	0.0	0.0	2.4	7.7	5.0	45.7	0.0	0.0	10.5	1.0	1.6	0.0	7.3	0.8	0.0	0.0	21.3	0.0	9.0	2.5	--	--	--
2007-03	8.4	2.2	15.3	0.2	0.0	0.0	13.0	13.7	5.6	3.5	19.9	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.2	1.3	0.0	18.4	0.0	0.0	0.3	0.0	0.0	0.0
2007-04	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	1.6	0.7	0.3	0.0	0.0	0.6	1.3	0.0	0.6	0.0	7.1	0.7	0.0	1.1	0.3	0.4	0.0	0.0	0.0	--
2007-05	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.5	0.7	0.0	0.0	0.3	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
2007-06	0.0	0.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2007-07	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
2007-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	24.6	6.9	0.0	0.0	0.0	3.2	5.6	8.4	0.2	0.2	1.1	2.6
2007-11	0.0	0.2	0.2	0.0	1.1	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.5	--
2007-12	0.0	4.5	0.3	0.0	0.0	0.0	3.7	46.8	4.7	14.7	0.9	1.6	0.3	0.2	1.3	26.1	0.1	30.3	32.6	51.6	2.0	18.5	20.8	18.2	2.4	0.0	23.2	5.0	5.0	4.7	31.4
2008-01	1.5	1.0	12.5	31.6	7.6	2.1	2.3	7.2	1.1	57.0	26.6	13.9	8.7	6.5	3.6	0.0	10.0	28.8	0.0	0.8	55.7	0.5	2.6	6.2	18.9	5.5	23.3	29.8	39.3	1.1	19.5
2008-02	9.2	12.4	0.0	4.4	1.8	2.2	2.7	3.8	45.0	17.6	2.0	5.4	0.0	0.0	0.0	0.0	1.1	0.4	32.8	11.5	29.1	1.0	0.0	0.0	2.0	3.4	2.5	1.7	3.5	--	--
2008-03	16.3	0.9	0.0	0.8	0.8	0.0	0.0	1.8	0.0	0.0	0.1	1.7	17.4	0.0	0.0	6.5	41.6	0.4	5.2	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008-04	0.0	0.0	0.0	0.0	0.0	0.0	5.9	10.7	0.0	0.0	0.0	0.0	0.0	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	--
2008-05	4.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	21.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008-07																															
2008-08																															
2008-09																															
2008-10																															
2008-11																															
2008-12																															

Estação: Mandimba   Periodo:1960-2008

nto: Precipitação total diária (das 9 as 9 horas em mm)

Ano/Mes	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0
1960-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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1973-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1973-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1973-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1973-04	1.2	16.4	0.0	7.0	0.2	2.8	0.0	0.0	0.0	22.1	0.0	0.3	21.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	--
1973-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	--
1973-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1973-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1973-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0
1973-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	3.4	0.0	35.6	1.1	0.0	0.0	0.0	0.0	--
1973-12	0.0	0.0	0.0	0.0	0.0	3.2	1.7	7.5	0.0	0.0	0.0	50.0	0.0	3.4	0.0	0.1	21.4	0.0	9.8	6.4	0.0	0.0	21.1	29.8	0.2	33.8	0.0	12.6	0.0	18.1	0.0
1974-01	0.0	1.3	9.5	54.9	10.9	0.0	1.4	2.4	15.7	12.8	2.5	27.6	25.4	0.0	1.2	0.0	0.0	4.1	1.3	14.5	7.2	8.0	3.3	1.7	2.2	23.6	7.9	2.1	0.7	15.8	17.2
1974-02	58.6	7.2	11.4	1.0	29.2	10.9	3.0	7.9	5.8	0.0	0.9	6.7	0.0	0.0	0.0	12.2	23.1	0.7	1.0	18.2	12.6	5.2	3.6	3.6	7.3	13.8	70.0	13.5	--	--	--
1974-03	0.0	9.3	9.5	36.4	18.3	3.3	0.0	0.9	2.3	1.2	0.0	0.0	13.7	76.9	18.9	13.8	5.3	0.0	0.0	2.0	26.5	10.0	1.4	0.0	0.0	8.9	0.7	36.0	37.2	16.2	57.0
1974-04	20.8	3.9	7.9	26.1	6.2	4.1	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.8	15.4	0.0	0.0	--
1974-05	23.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
1974-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	8.4	0.0	0.0	--
1974-07	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
1974-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1974-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974-11	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.0	0.0	0.0	0.0	0.0	4.0	6.7	0.0	0.0	0.0	0.9	28.5	8.1	--
1974-12	0.0	0.0	0.0	0.0	0.0	45.8	6.6	47.6	9.7	--	10.9	3.5	3.0	9.7	0.0	4.8	1.6	0.0	0.0	0.0	2.8	0.0	0.0	0.0	44.5	0.0	0.0	1.6	1.9	0.0	0.6
1975-01	0.0	0.6	17.0	38.9	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29,,2	18.9	0.0	0.0	11.7	22.2	5.1	23.0	21.7	29.5	22.7	0.0	0.6	0.0	0.0	1.3	0.0	7.4	0.0
1975-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.6	0.0	8.2	0.0	20.2	19.8	74.2	0.0	34.9	2.9	4.1	12.8	3.8	10.8	50.0	0.5	--	--	--
1975-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	11.9	1.4	0.0	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975-04	0.0	0.0	5.8	30.0	14.2	0.0	12.0	0.0	0.4	0.0	0.0	0.0	0.0	0.9	0.0	11.0	0.0	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1975-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1975-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1975-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1975-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1975-10	0.0	0.0	0.0	7.6	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975-11	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	7.1	1.0	0.0	0.0	0.0	0.0	0.0	--
1975-12	0.0	0.0	0.0	2.3	0.0	5.3	7.5	0.0	15.8	0.0	5.1	23.2	0.0	0.0	0.0	0.0	46.6	6.6	4.2	3.2	81.3	0.0	0.0	0.0	27.5	0.0	7.1	6.4	2.1	3.5	2.0
1976-01	76.7	0.0	2.3	0.0	4.1	23.7	0.0	13.0	109.3	10.0	24.7	--	--	12.5	0.0	26.7	13.5	1.4	26.6	0.1	6.4	4.2	6.0	0.0	0.0	0.0	0.0	25.2	49.9	0.7	0.0
1976-02	28.1	0.3	3.5	0.0	20.9	0.3	11.2	13.3	16.1	1.0	1.2	48.4	7.2	2.2	11.6	2.0	3.1	0.0	31.0	--	23.8	0.0	44.6	2.2	--	0.0	0.0	2.1	2.1	--	--
1976-03	0.0	0.0	62.2	43.1	39.3	33.2	4.0	5.2	2.3	5.3	12.4	18.7	20.6	0.0	10.5	7.7	18.0	38.4	1.1	0.1	12.6	3.3	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-04	0.0	0.2	25.5	118.9	40.1	0.0	12.1	0.0	30.2	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	7.9	17.7	13.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1976-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1976-06	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1976-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1976-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	--	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976-11	0.0	0.0	0.0	0.0	8.4	0.0	--	6.1	0.0	2.2	6.2	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1976-12	0.0	0.0	0.0	0.0	0.0	0.0	10.5	28.2	3.9	0.0	24.1	0.3	0.0	0.0	0.0	0.0	--	--	--	--	0.0	0.0	19.7	19.4	0.0	4.7	0.0	0.0	28.9	7.9	0.0
1977-01	0.0	0.0	35.4	8.1	78.5	9.8	8.8	1.8	14.7	1.6	0.0	0.0	0.0	0.0	0.0	41.3	55.0	23.4	0.0	0.0	0.0	12.9	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-02	0.0	48.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	0.0	21.9	0.0	0.0	0.0	0.0	--	--	--
1977-03	0.0	15.3	3.4	13.0	4.8	0.0	17.3	0.0	0.0	0.0	16.3	0.0	0.0	10.1	0.0	0.0	0.0	0.0	0.0	18.9	0.0	0.0	0.0	0.0	0.0	0.0	3.1	39.2	4.0	8.0	0.0
1977-04	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1977-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1977-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1977-08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1977-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977-11	0.0	0.0	0.0	0.0	0.0	12.8	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	3.9	0.0	0.0	10.7	0.0	50.4	0.0	44.1	6.8	--
1977-12	--	--	--	--	--	--	28.2	--	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0	0.0	9.0	0.0	4.0	0.0	0.0	0.0	41.9	0.0	0.0	0.0	42.2	0.0	41.6	0.0
1978-01	0.0	0.0	11.1	14.3	4.3	0.0	0.0	0.0	78.7	2.3	39.0	0.0	0.0	58.6	59.3	17.3	0.0	15.2	0.0	14.6	26.0	0.0	92.5	0.0	0.0	0.0	27.3	0.0	0.0	0.0	10.6
1978-02	3.0	--	--	18.7	21.5	40.0	40.0	0.0	47.5	14.5	--	--	34.5	29.6	--	--	--	42.1	4.2	0.0	--	5.8	--	0.0	0.0	0.0	0.0	0.0	--	--	--
1978-03	--	52.1	--	--	--	49.0	20.0	2.9	30.0	--	--	--	20.5	2.3	4.1	11.9	6.9	20.6	18.7	20.0	1.1	34.0	6.7	1.2	29.3	--	2.4	5.7	10.0	13.3	9.8
1978-04	--	--	--	9.7	53.2	--	3.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41.5	9.3	--	--	--	--	--	--
1978-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1978-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1978-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1978-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1978-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1978-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1978-11	--	--	--	--	--	--	--	--	--	19.8	--	--	--	--	--	32.6	--	--	--	--	2.3	--	7.9	4.5	--	--	--	--	--	--	--
1978-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1979-10	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	6.0	5.8	7.8	6.0	30.9	6.0	5.8	7,,2	6.3	8.2	5.4	6.2	7.4	9.5	7.6	0.0	6.8	5.9	4.8	--
1979-12	1.0	7.6	10.5	30.7	33.0	6.2	0.7	6.5	0.0	0.0	25.6	30.0	20.0	0.9	0.7	0.0	0.0	0.0	1.7	1.5	2.6	3.2	0.0	0.0	0.0	0.0	0.0	--	--	--	--
1980-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1980-02	0.0	0.0	1.0	0.9	5.4	0.0	1.3	0.0	0.0	0.0	10.4	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	0.0	7.7	10.7	10.3	114.7	--	--
1980-03	1.6	0.0	0.0	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	3.8	--	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.8
1980-04	0.0	39.3	6.8	0.0	0.0	0.0	1.4	32.6	2.1	3.6	0.0	0.0	23.4	28.1	1.3	49.3	1.5	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-06	0.0	0.0	0.0	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1980-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1980-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	--	--	--
1980-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1980-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1980-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1981-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4	--	--	--	--	--	--
1981-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	--	--	6.5	0.0	0.0	0.0	0.0	0.0	0.0	16.1	0.0	6.1	0.0	6.1	18.1	0.0	0.4	16.5	22.1
1982-01	2.4	0.0	14.2	0.0	1.6	0.4	2.4	8.5	17.2	24.0	0.0	17.4	0.0	18.4	0.0	17.0	0.0	15.0	0.0	0.0	0.0	0.0	6.1	0.0	8.3	1.6	6.0	0.0	0.0	0.0	1.8
1982-02	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	18.4	17.0	15.0	0.0	0.0	2.1	5.3	0.0	4.0	0.0	0.0	0.0	19.4	0.0	0.0	0.0	20.6	--	--	--
1982-03	50.8	0.0	0.0	20.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-04	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	24.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	25.4	8.4	0.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	--
1982-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1982-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1982-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1982-09	0.0	0.0	0.0	0.0	0.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1982-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1982-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	2.7	0.0	60.7	74.6	0.0	0.0	0.0	0.0	0.0	0.0	25.6	0.0	0.0	0.0	36.7	0.0	10.8	20.6	0.0	--
1982-12	0.0	17.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	24.8	10.4	0.0	19.5	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.1	0.0	0.0	--	--	--	0.0	0.0

1983-01	0.0	0.0	0.0	20.7	0.0	0.0	65.4	0.0	0.0	4.1	0.0	0.0	0.0	40.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.1	10.8	0.0	30.1	0.0	0.0
1983-02	5.9	0.0	0.0	--	0.0	0.0	7.3	10.0	25.8	31.0	35.8	0.0	14.7	3.9	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	--	--	--
1983-03	2.3	55.6	20.7	30.3	15.8	35.7	0.0	0.0	6.3	9.9	13.7	12.3	12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983-04	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0	0.0	13.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
1983-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2008-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Precipitation Data in Niasa (Monthly)

República de Moçambique

Instituto Nacional de Meteorologia

Caixa Postal 256 - MAPUTO

Teleg.: OBSERTOR - Telefs.: 490064-490148-492530 - Fax: 491150 - Telex: SMMMP 6-259

Nº69-09/INF-DAD

Maputo,25 de Março de 2009

Ao
JICA STUDY TEAM
Oriental Consultants,Ltd

MAPUTO

Estação: Cuamba

Periodo:1960 - 2008

Elemento: Precipitação total mensal (das 9 as 9 horas em mm)

ANO	JAN	FEV	MAR	ABR	MAI	JUN	JUL	AGO	SET	OUT	NOV	DEZ
1960	92.9	205.0	122.3	19.5	44.2	23.1	2.6	0.0	7.2	10.0	67.2	64.9
1961	192.4	97.7	368.4	96.3	2.4	1.0	6.4	9.4	0.0	1.3	98.5	157.7
1962	329.2	146.5	200.3	18.9	3.8	11.7	0.8	1.1	0.8	30.3	82.2	358.9
1963	221.2	431.6	139.6	11.2	0.9	0.6	0.0	0.0	0.0	4.0	147.8	209.4
1964	238.3	195.6	46.3	21.7	3.2	0.6	1.4	0.0	0.3	0.0	107.1	146.5
1965	283.9	144.0	261.6	42.7	0.9	4.7	0.2	0.2	11.2	3.1	124.5	184.4
1966	162.3	396.9	44.0	31.7	12.5	5.7	2.8	0.0	0.0	12.6	56.7	129.7
1967	273.5	84.5	359.8	71.4	4.3	0.2	3.1	1.3	6.7	9.7	79.9	179.5
1968	234.7	291.6	50.4	116.6	11.4	14.8	0.0	0.0	0.0	12.0	78.5	70.4
1969	309.5	193.0	107.7	75.1	0.4	0.0	1.0	0.6	1.0	0.0	41.9	340.1
1970	369.4	96.7	18.5	19.6	0.2	9.8	0.0	0.0	0.0	10.7	13.4	225.5
1971	50.6	228.1	66.9	27.4	2.1	0.5	1.3	0.0	0.0	9.6	42.6	132.9
1972	202.1	165.5	32.1	32.6	5.5	0.2	0.0	0.0	0.0	6.4	35.2	205.4
1973	143.4	56.7	220.9	40.9	0.0	0.9	12.1	0.0	0.0	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--
1977	--	--	--	--	0.0	0.1	0.4	0.1	10.4	37.0	91.7	140.4
1978	459.9	--	275.4	77.8	0.3	10.4	2.9	0.0	0.0	0.4	16.0	294.3
1979	68.3	237.7	174.1	64.3	0.0	2.9	0.7	1.2	0.1	19.0	112.4	143.7
1980	120.0	133.5	96.6	211.8	0.0	0.7	1.4	1.3	16.0	97.5	34.3	503.4
1981	81.6	264.0	98.9	27.3	11.9	1.2	0.7	0.0	3.2	54.4	25.4	147.8
1982	352.6	260.4	69.6	58.8	3.3	0.0	1.3	0.4	2.2	43.9	70.0	241.2
1983	139.0	395.8	112.9	63.5	0.2	4.2	20.0	0.0	0.0	27.4	45.7	283.5
1984	211.9	231.2	105.5	15.8	4.9	8.2	11.8	0.0	0.6	0.0	105.7	167.5
1985	221.9	187.0	192.4	92.6	0.0	9.8	2.3	0.9	3.1	28.8	54.0	308.6
1986	272.2	281.6	130.1	14.6	1.6	1.0	0.3	0.0	0.0	36.9	127.0	52.7
1987	294.7	189.8	160.9	44.8	0.3	3.2	0.0	0.8	0.0	4.5	33.9	155.5
1988	298.7	275.4	125.7	31.2	2.8	1.7	0.0	0.0	0.0	33.5	83.8	208.5
1989	302.8	256.2	223.9	67.2	2.6	0.0	1.2	0.4	13.2	16.0	65.4	180.7
1990	246.4	116.9	--	28.6	--	0.0	0.0	1.4	75.8	0.1	18.4	97.6
1991	183.6	148.0	323.0	17.7	0.6	2.1	5.0	0.1	23.1	21.8	153.6	191.5
1992	288.5	19.5	71.6	5.1	2.7	2.7	0.2	0.0	0.0	0.1	48.5	184.3
1993	221.3	193.0	178.3	91.9	281.4	184.4	218.4	242.3	258.3	30.4	38.1	76.2
1994	254.2	27.4	88.8	8.9	0.0	1.5	0.3	0.8	--	2.8	79.3	108.9
1995	389.6	157.6	53.7	70.1	0.0	0.1	0.7	0.4	0.0	0.0	58.6	321.7
1996	192.3	175.8	362.1	--	11.4	0.3	0.0	0.0	0.1	0.9	7.4	266.2
1997	184.5	265.5	46.1	121.4	1.3	1.8	4.8	0.0	0.1	23.0	120.5	286.0
1998	357.0	137.9	88.6	10.7	1.7	0.0	0.0	1.9	0.0	9.4	10.9	216.5
1999	291.8	375.7	159.8	40.1	0.0	0.0	5.1	3.6	12.2	0.0	51.8	161.3
2000	229.8	290.5	199.0	112.2	5.7	0.0	7.7	3.5	2.4	97.4	294.5	106.0
2001	269.6	234.2	101.9	16.6	21.6	0.0	0.0	4.6	1.8	21.1	186.9	--
2002	395.1	279.4	155.8	17.4	3.6	2.1	0.0	7.0	28.7	1.0	48.3	308.4
2003	374.7	151.3	211.0	4.5	0.0	0.0	3.6	0.2	0.0	0.0	39.0	132.7
2004	296.0	189.5	44.4	114.0	8.8	1.8	1.2	0.7	2.2	7.5	84.5	327.0
2005	199.0	142.0	31.6	39.4	27.2	0.0	0.0	0.0	3.6	6.8	14.9	319.5
2006	690.6	242.4	248.9	54.0	0.0	0.0	24.2	17.9	0.0	194.7	--	--
2007	598.3	117.7	69.7	18.3	5.3	0.2	0.1	0.0	0.5	49.7	26.0	280.4
2008	504.3	123.2	54.9	0.3	0.0	1.3	0.0	--	--	--	166.0	--

Estação: Lichinga Periodo:1960 - 2008

Elemento: Precipitação total mensal (das 9 as 9 horas em mm)

ANO	JAN	FEV	MAR	ABR	MAI	JUN	JUL	AGO	SET	OUT	NOV	DEZ
1960	219.9	203.7	304.2	26.6	15.6	7.6	2.1	0.0	8.1	0.0	34.2	215.2
1961	120.1	160.9	249.2	126.7	22.6	9.6	17.5	4.6	0.1	2.3	123.6	242.1
1962	177.3	215.2	249.4	125.9	7.0	1.8	2.2	0.0	0.0	70.0	130.9	244.0
1963	322.0	235.0	193.1	87.1	3.6	0.0	7.7	0.0	1.4	13.2	216.6	222.7
1964	281.6	201.3	73.7	9.0	0.2	0.6	3.5	3.6	0.0	1.3	73.6	194.3
1965	237.9	303.4	285.4	27.0	3.0	2.4	0.8	0.0	3.2	0.1	57.9	344.4
1966	225.0	205.4	249.0	33.1	29.8	2.7	5.8	0.0	0.0	14.7	139.8	275.8
1967	194.2	233.6	206.6	170.8	59.4	1.3	1.1	0.7	0.2	8.3	138.6	174.3
1968	190.7	172.0	151.1	58.2	25.7	11.4	2.9	0.2	0.0	4.9	53.6	228.7
1969	243.5	240.6	139.8	116.2	122.7	3.3	0.0	5.1	13.1	2.2	141.6	291.6
1970	222.8	161.5	76.1	64.7	0.0	0.0	0.0	0.0	0.0	5.6	158.7	397.8
1971	300.6	213.2	131.1	51.3	4.4	1.3	0.4	0.0	0.0	42.0	118.1	252.8
1972	257.3	297.0	111.3	99.0	62.6	3.7	4.5	1.4	0.0	38.4	93.9	264.3
1973	138.7	156.2	151.0	63.0	0.0	2.2	0.9	0.0	0.0	0.9	38.1	212.2
1974	284.9	264.1	307.6	156.9	135.0	9.0	21.8	0.0	13.3	26.0	26.4	248.6
1975	98.6	273.4	187.2	130.7	27.7	2.3	0.0	0.2	0.5	3.0	42.4	156.7
1976	223.1	287.2	133.1	283.5	5.5	2.0	0.6	0.0	0.0	10.3	39.8	164.3
1977	249.1	210.9	227.2	72.2	53.8	0.0	0.3	0.4	16.5	6.2	86.5	148.9
1978	130.4	255.5	264.2	72.3	0.0	12.4	0.1	0.0	2.0	48.1	77.7	260.3
1979	167.8	229.0	351.8	39.9	32.1	1.3	2.2	0.0	1.6	7.0	167.0	145.3
1980	254.7	166.5	322.3	121.0	0.6	0.5	0.6	1.6	24.9	58.6	42.6	327.3
1981	175.4	330.2	173.7	43.4	18.6	0.3	0.0	0.0	0.2	60.0	79.1	139.3
1982	199.3	163.0	253.0	254.3	31.2	3.0	3.8	0.0	0.0	20.1	133.1	322.0
1983	180.3	231.3	132.7	59.4	4.4	6.1	17.1	0.0	0.3	5.5	48.4	206.9
1984	148.4	188.6	152.2	80.0	2.9	2.2	6.0	0.0	0.4	10.5	209.2	245.5
1985	188.6	195.4	153.8	22.7	18.9	1.2	4.9	9.0	5.8	6.2	245.7	300.6
1986	294.6	128.2	114.9	89.6	10.0	3.2	0.0	0.0	0.0	37.3	102.0	239.2
1987	228.1	185.7	264.4	28.7	0.2	0.5	0.0	0.0	0.0	42.6	23.9	95.6
1988	321.6	323.0	123.1	24.4	27.7	0.0	0.0	0.0	0.0	24.9	131.4	238.8
1989	400.4	247.4	486.7	137.3	2.3	0.2	2.4	1.9	1.1	12.8	106.5	312.4
1990	216.9	248.7	120.9	109.0	25.9	0.0	0.0	0.0	16.8	0.0	42.8	140.0
1991	214.0	176.9	280.7	47.5	24.4	0.4	9.1	0.0	0.0	14.3	120.3	201.2
1992	318.8	109.1	121.9	9.0	87.8	0.0	0.4	0.6	0.0	4.1	65.1	152.9
1993	242.5	284.1	188.2	147.9	13.9	3.1	0.0	7.7	0.0	11.2	117.4	168.0
1994	271.8	153.5	85.9	56.7	0.0	1.2	0.5	2.9	0.0	13.3	64.8	47.3
1995	246.4	223.9	--	28.9	23.0	0.0	0.7	0.0	0.0	0.0	12.4	--
1996	221.8	220.0	257.6	86.6	67.6	1.1	0.2	0.0	188.4	5.2	0.7	146.6
1997	224.2	129.3	65.1	166.2	106.2	0.0	1.9	0.0	0.0	67.8	112.4	399.8
1998	286.5	61.5	156.5	71.9	4.8	0.0	0.0	0.0	0.0	81.4	9.5	70.1
1999	370.6	291.4	558.0	94.5	30.9	15.3	0.5	6.6	0.2	6.2	110.1	94.4
2000	375.2	201.3	245.7	32.8	0.0	1.7	3.7	0.0	0.0	13.4	219.7	219.6
2001	183.0	247.2	359.8	39.9	12.5	0.0	0.0	1.4	0.0	24.7	--	217.5
2002	550.1	371.2	153.3	73.4	2.0	3.8	0.0	0.5	2.8	1.4	64.4	215.3
2003	402.2	266.8	351.3	30.6	0.0	0.0	4.5	1.3	0.0	0.0	113.4	249.3
2004	254.6	175.8	124.2	126.1	7.0	3.8	2.1	1.9	1.4	36.1	74.8	328.5
2005	269.9	123.6	160.5	93.4	70.1	11.7	7.9	1.5	11.9	7.6	--	327.7
2006	257.4	221.7	318.2	49.1	15.8	0.2	0.4	0.2	0.0	33.3	279.7	101.1
2007	129.3	155.5	111.3	17.8	6.0	0.8	3.3	0.0	0.0	53.0	9.5	355.9
2008	425.2	195.5	97.2	31.4	28.1	0.0	--	--	--	--	--	--

Estação: Mandimba Periodo:1960 - 2008

Elemento: Precipitação total mensal (das 9 as 9 horas em mm)

ANO	JAN	FEV	MAR	ABR	MAI	JUN	JUL	AGO	SET	OUT	NOV	DEZ
1960	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--
1973	--	--	--	73.9	0.0	0.6	--	0.0	0.0	3.7	49.3	219.1
1974	280.7	327.4	405.7	99.5	46.5	22.5	2.6	0.0	0.0	0.0	59.9	194.6
1975	258.6	274.7	48.6	79.6	0.5	--	--	--	--	15.1	12.8	249.4
1976	437.7	226.2	343.8	292.6		0.0	0.0	0.0	0.0	23.1	26.5	30.9
1977	347.7	75.5	157.3	6.8	0.0	--	--	0.0	0.0	0.0	136.0	167.3
1978	471.1	301.4	390.9	117.6	--	--	0.0	--	--	0.0	67.1	--
1979	--	--	--	--	--	--	--	--	--	8.0	147.1	--
1980	--	173.0	--	194.0	0.0	0.0	0.0	--	0.0	--	--	--
1981	--	--	--	--	--	--	--	--	--	--	--	--
1982	159.3	144.0	74.2	94.6	--	--	--	1.7	--	--	236.0	--
1983	173.1	143.2	202.6	24.1	0.0	--	--	--	--	--	--	--
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2008	--	--	--	--	--	--	--	--	--	--	--	--

Appendix-C
CBR results

TECNICA ENGENHEIROS CONSULTORES LDA.

PROJECT: FEASIBILITY STUDY FOR UPGRADING THE CUAMBA LICHINGA RO.

MATERIALS INVESTIGATION

GENERAL DATA FROM BORROW PITS

SECTION OF THE ROAD : LICHINGA – MADIMBA

Ref.	Location	GRADING ANALYSIS							ATTERBERG LIMITS			Mod. Aashto		C.B.R.		
	Chainage (km)	< 19.0 mm	< 13.2 mm	< 4.75 mm	< 2.00 mm	< 0.425 mm	< 0.075 mm	GM	LL	PI	LS	M.D.D. (T/m³)	O.M.C. (%)	Proctor (90%)	NRD (95%)	MOD (100%)
741	55+200	100	98,6	78,4	64,9	58,1	40,0	1,4	44	28	6,8	1,773	8,6	1	6	11
751	66+000	69,4	61,5	50,6	44,2	22,5	8,0	2,3	26	10	n/d	2,099	8,3	15	31	69
737	100+000	92,1		85,8	82,5	78,9	66,4	0,7	36	18	6,4	1,876	9,0	12	20	10
742	122+000		100	97,3	96,0	85,3	56,3	0,6	37	19	6,6	1,698	10,1	1	1	3
743	150+000	96,9		95,7	93,5	74,2	43,8	0,9	28	11	3,8	2,007	8,6	12	24	41

Appendix-D

Bench Mark Coordinate

Appendix-D Bench Mark Coordinate

Bench Mark coodination between Mandimba to Lichinga

WGS.84 UTM ZONE 37			
POINT ID	EASTING	NORTHING	ELEVATION(m)
ML1	-135881.823	-8414368.383	784.924
ML2	-131941.165	-8417241.448	843.661
ML3	-127798.922	-8420112.503	924.076
ML4	-124416.621	-8423390.845	913.389
ML5	-122575.512	-8428019.484	923.189
ML6	-120236.183	-8432259.205	959.286
ML7	-119594.277	-8437239.909	898.640
ML8	-118062.335	-8441900.914	983.777
ML9	-116778.788	-8446404.671	1043.076
ML10	-115663.658	-8450808.927	1061.736
ML11	-114165.616	-8455332.026	1085.030
ML12	-113062.048	-8459839.914	1133.247
ML13	-110552.604	-8463116.266	1142.397
ML14	-109726.887	-8467762.377	1113.226
ML15	-108026.213	-8471456.485	1083.698
ML16	-104511.991	-8473287.564	1088.110
ML17	-100941.630	-8475500.187	1146.360
ML18	-96730.195	-8475988.227	1199.576
ML19	-94679.575	-8480251.625	1178.054
ML20	-95655.552	-8484604.938	1099.047
ML21	-94590.740	-8489148.455	1204.989
ML22	-94389.167	-8493145.685	1189.584
ML23	-95135.006	-8497214.443	1175.150
ML24	-95609.992	-8501267.120	1194.224
ML25	-94943.353	-8505565.213	1207.845
ML26	-93883.441	-8508227.361	1197.182
ML27	-92968.737	-8512742.862	1255.076
ML28	-92684.249	-8515815.797	1302.750
ML29	-92454.934	-8518659.081	1331.119
ML30	-93645.797	-8522455.619	1382.862

Appendix-E

Mechanistic Analysis

MECHANISTIC ANALYSIS DETAILS FOR THE NAMPULA CUAMBA ROAD PAVEMENT - RR91/242

PAVEMENT STRUCTURE

30 mm	S2
200 mm	G3
250 mm	C4
250 mm	G7
Semi-infi.	S2

Road Categor : **B**

Design Class of traffic: **T6**

Pavement T pe: **Granular Base**

Input Values

La er Nr	Thickness (mm)	Poisson Coef.	E-Modulus (Mpa) Phase-I	E-Modulus (Mpa) Phase-II	E-Modulus (Mpa) Phase-III
2	200	0.35	400	400	300
3	250	0.25	1,500	600	300
4	250	0.35	150	150	150
5	1/2 INF.	0.35	30	30	30

Critical Parameters

Stresses ($\delta1$ / $\delta3$ KPa) & Strains (ε)

Phase-I	Phase-II	Phase-III
(400.4/89.8)	(388.2/89.3)	(381.4/80.7)
1.05E-04	1.4E-04	(79.1/-19.4)
1.97E-04	2.63E-04	3.16E-04
3.2E-04	3.9E-04	4.7E-04

Anal ysis

Layer Life (E80's)

La er Nr	Phase-I	Phase-II	Phase-III
2	1.00E+09	1.00E+09	1.00E+09
3	1.09E+07	1.25E+06	5.00E+07
4	5.58E+10	3.13E+09	5.11E+08
5	4.45E+08	6.11E+07	1.00E+07
	1.09E+07	**1.25E+06**	**1.00E+07**

Structural Life (E80's)

Wet: **2.22E+07**

(sum of minimum of each phase)

Deflection (mm)

Inicial	*Final*
0.6753	***0.8631***

MECHANISTIC ANALYSIS DETAILS FOR THE NAMPULA CUAMBA ROAD PAVEMENT- THEYSE

PAVEMENT STRUCTURE

30 mm	S2
200 mm	G3
250 mm	C4
250 mm	G7
Semi-infi.	S2

Road Categor : **B**

Design Class of traffic: **T6**

Pavement T pe: **Granular Base**

Input Values

La er Nr	Thickness (mm)	Poisson Coef.	E-Modulus (Mpa)		
			Phase-I	Phase-II	Phase-III
2	200	0.35	400	400	300
3	250	0.25	1,500	600	300
4	250	0.35	150	150	150
5	1/2 INF.	0.35	30	30	30

Critical Parameters

Stresses (δ1 / δ3 KPa) & Strains (ε)		
Phase-I	Phase-II	Phase-III
(400.4/89.8)	(388.2/89.3)	(381.4/80.7)
1.05E-04	1.4E-04	(118.1/-22.92)
1.97E-04	2.63E-04	3.16E-04
3.2E-04	3.9E-04	4.7E-04

Anal ysis

La er Nr	Layer Life (E80's)		
	Phase-I	Phase-II	Phase-III
2	1.06E+10	1.41E+10	5.75E+09
3	4.08E+06	1.20E+06	3.85E+07
4	2.67E+10	1.50E+09	2.45E+08
5	2.13E+08	2.92E+07	4.79E+06
	4.08E+06	**1.20E+06**	**4.79E+06**

Structural Life (E80's)

Wet: **1.01E+07**

(sum of minimum of each phase)

Deflection (mm)

Inicial	*Final*
0.6753	***0.8631***

S2 Sub-grade

N13-Cuamba-Lichinga Road

PHASE 1

```
ELSYM5 3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)
     ELASTIC SYSTEM   1 - 2s-cm-1
                 ELASTIC POISSONS          LAYER
                 MODULUS   RATIO           THICKNESS
     1              400.     0.350         200.000 MM
     2             1500.     0.250         249.999 MM
     3              150.     0.350         249.999 MM
     4               30.     0.350         SEMI-INFINITE
    TWO     LOAD(S),EACH LOAD AS FOLLOWS
    TOTAL LOAD.....          20.00 KN
    LOAD STRESS....       559.87KPA
    LOAD RADIUS....        106.63 MM
             LOCATED AT
    LOAD      X           Y
      1     0.000      0.000
      2   349.999      0.000
    RESULTS REQUESTED FOR SYSTEM LOCATION(S)
    DEPTH(S)
    Z=     0.00 100.00 201.00 325.00 449.00 451.00 575.00 701.00
    X-Y POINT(S)
    X=        0.00     175.00
    Y=        0.00       0.00
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 2s-cm-1
              Z=     0.00    LAYER NO    1
              X=            0.00         175.00
              Y=            0.00            0.00
          NORMAL STRESSES
           SXX -0.4809E+03 0.4630E+02
           SYY -0.4865E+03-0.6062E+02
           SZZ -0.5624E+03 0.1143E+02
          SHEAR STRESSES
           SXY    0.0000E+00 0.0000E+00
           SXZ -0.6515E-05-0.1010E-11
           SYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1-0.4809E+03 0.4630E+02
           PS 2-0.4865E+03 0.1143E+02
           PS 3-0.5624E+03-0.6062E+02
         THETA    0.1530E+04 0.2889E+01
    DEV. STRESS    0.8148E+02 0.1069E+03
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.4074E+02 0.5346E+02
           PSS2 0.2795E+01 0.1743E+02
           PSS3 0.3795E+02 0.3603E+02
          DISPLACEMENTS
           UX      0.1773E-01-0.3655E-09
           UY      0.0000E+00 0.0000E+00
           UZ      0.6753E+00 0.5228E+00
          NORMAL STRAINS
           EXX -0.2846E-03 0.1589E-03
           EYY -0.3035E-03-0.2022E-03
           EZZ -0.5597E-03 0.4113E-04
          SHEAR STRAINS
           EXY    0.0000E+00 0.0000E+00
           EXZ -0.4399E-10-0.6821E-17
           EYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1-0.2846E-03 0.1589E-03
           PE 2-0.3035E-03 0.4113E-04
           PE 3-0.5597E-03-0.2022E-03
          PRINCIPAL SHEAR STRAINS
           PSE1 0.2751E-03 0.3610E-03
           PSE2 0.1887E-04 0.1177E-03
           PSE3 0.2563E-03 0.2433E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 2s-cm-1
              Z= 100.00    LAYER NO    1
              X=           0.00        175.00
              Y=           0.00          0.00
           NORMAL STRESSES
            SXX -0.9752E+02-0.1725E+03
            SYY -0.8979E+02-0.5580E+02
            SZZ -0.4002E+03-0.9953E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.7626E+01 0.1973E-03
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1-0.8979E+02-0.5580E+02
            PS 2-0.9733E+02-0.9953E+02
            PS 3-0.4004E+03-0.1725E+03
          THETA    0.5876E+03 0.3278E+03
    DEV. STRESS    0.3106E+03 0.1167E+03
               (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.1553E+03 0.5835E+02
            PSS2 0.3768E+01 0.2186E+02
            PSS3 0.1516E+03 0.3649E+02
           DISPLACEMENTS
            UX     0.8763E-02-0.3474E-07
            UY     0.0000E+00 0.0000E+00
            UZ     0.5894E+00 0.5298E+00
           NORMAL STRAINS
            EXX    0.1851E-03-0.2955E-03
            EYY    0.2112E-03 0.9857E-04
            EZZ -0.8371E-03-0.4907E-04
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.5150E-04 0.1332E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.2112E-03 0.9857E-04
            PE 2 0.1857E-03-0.4907E-04
            PE 3-0.8377E-03-0.2955E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.1049E-02 0.3941E-03
            PSE2 0.2545E-04 0.1476E-03
            PSE3 0.1023E-02 0.2464E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-1

```
        Z= 201.00   LAYER NO   2
        X=          0.00       175.00
        Y=          0.00         0.00
      NORMAL STRESSES
       SXX -0.8732E+02-0.1405E+03
       SYY -0.8601E+02-0.9062E+02
       SZZ -0.2094E+03-0.1204E+03
      SHEAR STRESSES
       SXY   0.0000E+00 0.0000E+00
       SXZ   0.1995E+02 0.4663E-03
       SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
       PS 1-0.8415E+02-0.9062E+02
       PS 2-0.8601E+02-0.1204E+03
       PS 3-0.2125E+03-0.1405E+03
     THETA   0.3827E+03 0.3515E+03
 DEV. STRESS   0.1284E+03 0.4993E+02
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
       PSS1 0.6420E+02 0.2496E+02
       PSS2 0.9334E+00 0.1488E+02
       PSS3 0.6326E+02 0.1008E+02
      DISPLACEMENTS
       UX     0.6340E-02 0.1197E-07
       UY     0.0000E+00 0.0000E+00
       UZ     0.5305E+00 0.5174E+00
      NORMAL STRAINS
       EXX -0.8991E-05-0.5856E-04
       EYY -0.7898E-05-0.1693E-04
       EZZ -0.1107E-03-0.4175E-04
      SHEAR STRAINS
       EXY   0.0000E+00 0.0000E+00
       EXZ   0.3327E-04 0.7775E-09
       EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
       PE 1-0.6341E-05-0.1693E-04
       PE 2-0.7898E-05-0.4175E-04
       PE 3-0.1134E-03-0.5856E-04
      PRINCIPAL SHEAR STRAINS
       PSE1 0.1070E-03 0.4163E-04
       PSE2 0.1556E-05 0.2481E-04
       PSE3 0.1055E-03 0.1681E-04
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 2s-cm-1
             Z= 325.00    LAYER NO    2
             X=           0.00         175.00
             Y=           0.00           0.00
          NORMAL STRESSES
           SXX    0.2139E+02 0.1541E+02
           SYY    0.3544E+02 0.3917E+02
           SZZ -0.7565E+02-0.6709E+02
          SHEAR STRESSES
           SXY    0.0000E+00 0.0000E+00
           SXZ    0.2724E+02 0.4701E-03
           SYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1 0.3544E+02 0.3917E+02
           PS 2 0.2852E+02 0.1541E+02
           PS 3-0.8277E+02-0.6709E+02
         THETA    0.1881E+02 0.1251E+02
    DEV. STRESS    0.1182E+03 0.1063E+03
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.5911E+02 0.5313E+02
           PSS2 0.3463E+01 0.1188E+02
           PSS3 0.5564E+02 0.4125E+02
          DISPLACEMENTS
           UX    -0.3218E-02-0.3672E-07
           UY     0.0000E+00 0.0000E+00
           UZ     0.5206E+00 0.5111E+00
          NORMAL STRAINS
           EXX    0.2097E-04 0.1493E-04
           EYY    0.3269E-04 0.3474E-04
           EZZ -0.5993E-04-0.5385E-04
          SHEAR STRAINS
           EXY    0.0000E+00 0.0000E+00
           EXZ    0.4542E-04 0.7838E-09
           EYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.3269E-04 0.3474E-04
           PE 2 0.2691E-04 0.1493E-04
           PE 3-0.6587E-04-0.5385E-04
          PRINCIPAL SHEAR STRAINS
           PSE1 0.9856E-04 0.8859E-04
           PSE2 0.5775E-05 0.1981E-04
           PSE3 0.9278E-04 0.6878E-04
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-1

```
          Z= 449.00   LAYER NO   2
          X=         0.00       175.00
          Y=         0.00         0.00
        NORMAL STRESSES
         SXX   0.1437E+03 0.1579E+03
         SYY   0.1763E+03 0.1910E+03
         SZZ -0.2258E+02-0.2390E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.6546E+01 0.9776E-04
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.1763E+03 0.1910E+03
         PS 2 0.1439E+03 0.1579E+03
         PS 3-0.2284E+02-0.2390E+02
       THETA -0.2974E+03-0.3250E+03
 DEV. STRESS   0.1992E+03 0.2149E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.9959E+02 0.1074E+03
         PSS2 0.1622E+02 0.1656E+02
         PSS3 0.8338E+02 0.9089E+02
        DISPLACEMENTS
         UX   -0.1346E-01-0.1483E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.5134E+00 0.5037E+00
        NORMAL STRAINS
         EXX   0.7017E-04 0.7744E-04
         EYY   0.9743E-04 0.1050E-03
         EZZ -0.6842E-04-0.7411E-04
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.1091E-04 0.1630E-09
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.9743E-04 0.1050E-03
         PE 2 0.7039E-04 0.7744E-04
         PE 3-0.6863E-04-0.7411E-04
        PRINCIPAL SHEAR STRAINS
         PSE1 0.1661E-03 0.1792E-03
         PSE2 0.2704E-04 0.2761E-04
         PSE3 0.1390E-03 0.1515E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-1

```
          Z= 451.00   LAYER NO   3
          X=        0.00      175.00
          Y=        0.00        0.00
        NORMAL STRESSES
         SXX   0.5885E+01 0.6884E+01
         SYY   0.8923E+01 0.9959E+01
         SZZ -0.2239E+02-0.2370E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.6234E+01 0.1127E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.8923E+01 0.9959E+01
         PS 2 0.7198E+01 0.6884E+01
         PS 3-0.2370E+02-0.2370E+02
       THETA   0.7579E+01 0.6861E+01
  DEV. STRESS   0.3262E+02 0.3366E+02
           (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.1631E+02 0.1683E+02
         PSS2 0.8625E+00 0.1538E+01
         PSS3 0.1545E+02 0.1529E+02
        DISPLACEMENTS
         UX   -0.1356E-01-0.1855E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.5131E+00 0.5034E+00
        NORMAL STRAINS
         EXX   0.7068E-04 0.7800E-04
         EYY   0.9804E-04 0.1057E-03
         EZZ -0.1839E-03-0.1974E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.1123E-03 0.2030E-08
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.9804E-04 0.1057E-03
         PE 2 0.8251E-04 0.7800E-04
         PE 3-0.1957E-03-0.1974E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.2938E-03 0.3031E-03
         PSE2 0.1553E-04 0.2769E-04
         PSE3 0.2782E-03 0.2754E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-1

Z= 575.00 LAYER NO 3

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX 0.1100E+02 0.1261E+02

SYY 0.1288E+02 0.1405E+02

SZZ -0.1355E+02-0.1414E+02

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.3916E+01 0.7275E-04

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1 0.1288E+02 0.1405E+02

PS 2 0.1161E+02 0.1261E+02

PS 3-0.1416E+02-0.1414E+02

THETA -0.1033E+02-0.1252E+02

DEV. STRESS 0.2704E+02 0.2819E+02

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.1352E+02 0.1410E+02

PSS2 0.6321E+00 0.7235E+00

PSS3 0.1289E+02 0.1337E+02

DISPLACEMENTS

UX -0.1467E-01-0.2050E-06

UY 0.0000E+00 0.0000E+00

UZ 0.4931E+00 0.4819E+00

NORMAL STRAINS

EXX 0.7496E-04 0.8428E-04

EYY 0.9183E-04 0.9731E-04

EZZ -0.1461E-03-0.1565E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.7053E-04 0.1310E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.9183E-04 0.9731E-04

PE 2 0.8045E-04 0.8428E-04

PE 3-0.1516E-03-0.1565E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.2434E-03 0.2539E-03

PSE2 0.1138E-04 0.1303E-04

PSE3 0.2321E-03 0.2408E-03

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 2s-cm-1
          Z= 701.00   LAYER NO   4
          X=        0.00      175.00
          Y=        0.00        0.00
        NORMAL STRESSES
         SXX -0.2634E+00 0.1885E+00
         SYY   0.1487E+00 0.4741E+00
         SZZ -0.9314E+01-0.9365E+01
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.1204E+01 0.2194E-04
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.1487E+00 0.4741E+00
         PS 2-0.1059E+00 0.1885E+00
         PS 3-0.9471E+01-0.9365E+01
       THETA   0.9428E+01 0.8703E+01
   DEV. STRESS   0.9620E+01 0.9839E+01
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.4810E+01 0.4920E+01
         PSS2 0.1273E+00 0.1428E+00
         PSS3 0.4683E+01 0.4777E+01
        DISPLACEMENTS
         UX   -0.1921E-01-0.3017E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.4746E+00 0.4621E+00
        NORMAL STRAINS
         EXX   0.9819E-04 0.1101E-03
         EYY   0.1167E-03 0.1229E-03
         EZZ -0.3093E-03-0.3200E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.1084E-03 0.1976E-08
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.1167E-03 0.1229E-03
         PE 2 0.1053E-03 0.1101E-03
         PE 3-0.3163E-03-0.3200E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.4331E-03 0.4430E-03
         PSE2 0.1146E-04 0.1286E-04
         PSE3 0.4216E-03 0.4301E-03
```

PHASE 2

```
ELSYM5 3/72 - 3,    ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)
    ELASTIC SYSTEM    1 - 2s-cm-2
                 ELASTIC  POISSONS         LAYER
                 MODULUS   RATIO           THICKNESS
     1              400.      0.350         200.000 MM
     2              600.      0.250         249.999 MM
     3              150.      0.350         249.999 MM
     4               30.      0.350        SEMI-INFINITE
    TWO     LOAD(S),EACH LOAD AS FOLLOWS
    TOTAL LOAD.....          20.00 KN
    LOAD STRESS....       559.87KPA
    LOAD RADIUS....        106.63 MM
              LOCATED AT
    LOAD       X            Y
     1       0.000       0.000
     2   349.999       0.000
    RESULTS REQUESTED FOR SYSTEM LOCATION(S)
    DEPTH(S)
    Z=     0.00 100.00 201.00 325.00 449.00 451.00 575.00 701.00
    X-Y POINT(S)
    X=         0.00       175.00
    Y=         0.00         0.00
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-2

```
          Z=     0.00   LAYER NO    1
          X=          0.00       175.00
          Y=          0.00         0.00
        NORMAL STRESSES
         SXX -0.5078E+03 0.2568E+02
         SYY -0.5214E+03-0.9521E+02
         SZZ -0.5624E+03 0.1143E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.5290E-05 0.2008E-13
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1-0.5078E+03 0.2568E+02
         PS 2-0.5214E+03 0.1143E+02
         PS 3-0.5624E+03-0.9521E+02
        THETA   0.1592E+04 0.5809E+02
  DEV. STRESS   0.5457E+02 0.1209E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.2728E+02 0.6045E+02
         PSS2 0.6788E+01 0.7124E+01
         PSS3 0.2050E+02 0.5332E+02
        DISPLACEMENTS
         UX     0.2275E-01-0.6765E-09
         UY     0.0000E+00 0.0000E+00
         UZ     0.7322E+00 0.5854E+00
        NORMAL STRAINS
         EXX -0.3214E-03 0.1376E-03
         EYY -0.3672E-03-0.2706E-03
         EZZ -0.5056E-03 0.8946E-04
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.3572E-10 0.1356E-18
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1-0.3214E-03 0.1376E-03
         PE 2-0.3672E-03 0.8946E-04
         PE 3-0.5056E-03-0.2706E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.1842E-03 0.4082E-03
         PSE2 0.4584E-04 0.4811E-04
         PSE3 0.1384E-03 0.3601E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM

```
LOAD(S)
   ELASTIC SYSTEM    1 - 2s-cm-2
            Z= 100.00    LAYER NO    1
            X=          0.00        175.00
            Y=          0.00          0.00
         NORMAL STRESSES
          SXX -0.9630E+02-0.1702E+03
          SYY -0.8927E+02-0.5743E+02
          SZZ -0.3879E+03-0.9626E+02
         SHEAR STRESSES
          SXY    0.0000E+00 0.0000E+00
          SXZ    0.9719E+01 0.2301E-03
          SYZ    0.0000E+00 0.0000E+00
         PRINCIPAL STRESSES
          PS 1-0.8927E+02-0.5743E+02
          PS 2-0.9597E+02-0.9626E+02
          PS 3-0.3882E+03-0.1702E+03
        THETA    0.5735E+03 0.3239E+03
   DEV. STRESS    0.2989E+03 0.1128E+03
             (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
         PRINCIPAL SHEAR STRESSES
          PSS1 0.1495E+03 0.5639E+02
          PSS2 0.3351E+01 0.1942E+02
          PSS3 0.1461E+03 0.3697E+02
         DISPLACEMENTS
          UX      0.9004E-02-0.3105E-07
          UY      0.0000E+00 0.0000E+00
          UZ      0.6498E+00 0.5951E+00
         NORMAL STRAINS
          EXX    0.1768E-03-0.2911E-03
          EYY    0.2006E-03 0.8963E-04
          EZZ -0.8077E-03-0.4151E-04
         SHEAR STRAINS
          EXY    0.0000E+00 0.0000E+00
          EXZ    0.6563E-04 0.1554E-08
          EYZ    0.0000E+00 0.0000E+00
         PRINCIPAL STRAINS
          PE 1 0.2006E-03 0.8963E-04
          PE 2 0.1779E-03-0.4151E-04
          PE 3-0.8088E-03-0.2911E-03
         PRINCIPAL SHEAR STRAINS
          PSE1 0.1009E-02 0.3808E-03
          PSE2 0.2263E-04 0.1311E-03
          PSE3 0.9867E-03 0.2496E-03
```

ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM

LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-2

Z= 201.00 LAYER NO 2

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.2394E+02-0.6887E+02

SYY -0.1210E+02-0.1392E+02

SZZ -0.1852E+03-0.1142E+03

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.2094E+02 0.4436E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1-0.1210E+02-0.1392E+02

PS 2-0.2126E+02-0.6887E+02

PS 3-0.1879E+03-0.1142E+03

THETA 0.2213E+03 0.1970E+03

DEV. STRESS 0.1758E+03 0.1003E+03

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.8791E+02 0.5015E+02

PSS2 0.4584E+01 0.2747E+02

PSS3 0.8332E+02 0.2268E+02

DISPLACEMENTS

UX 0.2139E-02-0.3751E-07

UY 0.0000E+00 0.0000E+00

UZ 0.5923E+00 0.5815E+00

NORMAL STRAINS

EXX 0.4234E-04-0.6141E-04

EYY 0.6703E-04 0.5311E-04

EZZ -0.2938E-03-0.1560E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.8730E-04 0.1849E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.6703E-04 0.5311E-04

PE 2 0.4792E-04-0.6141E-04

PE 3-0.2994E-03-0.1560E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.3664E-03 0.2091E-03

PSE2 0.1911E-04 0.1145E-03

PSE3 0.3473E-03 0.9455E-04

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM

LOAD(S)
ELASTIC SYSTEM 1 - 2s-cm-2

```
           Z= 325.00   LAYER NO   2
           X=        0.00      175.00
           Y=        0.00        0.00
         NORMAL STRESSES
          SXX   0.1672E+02 0.1192E+02
          SYY   0.2962E+02 0.3264E+02
          SZZ -0.7251E+02-0.6761E+02
         SHEAR STRESSES
          SXY   0.0000E+00 0.0000E+00
          SXZ   0.2163E+02 0.3706E-03
          SYZ   0.0000E+00 0.0000E+00
         PRINCIPAL STRESSES
          PS 1 0.2962E+02 0.3264E+02
          PS 2 0.2168E+02 0.1192E+02
          PS 3-0.7748E+02-0.6761E+02
        THETA   0.2618E+02 0.2305E+02
  DEV. STRESS   0.1071E+03 0.1002E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
         PRINCIPAL SHEAR STRESSES
          PSS1 0.5355E+02 0.5012E+02
          PSS2 0.3967E+01 0.1036E+02
          PSS3 0.4958E+02 0.3976E+02
         DISPLACEMENTS
          UX   -0.7182E-02-0.8224E-07
          UY    0.0000E+00 0.0000E+00
          UZ    0.5672E+00 0.5633E+00
         NORMAL STRAINS
          EXX   0.4575E-04 0.3444E-04
          EYY   0.7264E-04 0.7764E-04
          EZZ -0.1402E-03-0.1313E-03
         SHEAR STRAINS
          EXY   0.0000E+00 0.0000E+00
          EXZ   0.9015E-04 0.1545E-08
          EYZ   0.0000E+00 0.0000E+00
         PRINCIPAL STRAINS
          PE 1 0.7264E-04 0.7764E-04
          PE 2 0.5610E-04 0.3444E-04
          PE 3-0.1506E-03-0.1313E-03
         PRINCIPAL SHEAR STRAINS
          PSE1 0.2232E-03 0.2089E-03
          PSE2 0.1654E-04 0.4320E-04
          PSE3 0.2067E-03 0.1657E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM

LOAD(S)
ELASTIC SYSTEM 1 - 2s-cm-2
Z= 449.00 LAYER NO 2
X= 0.00 175.00
Y= 0.00 0.00
NORMAL STRESSES
SXX 0.7071E+02 0.7823E+02
SYY 0.8999E+02 0.9809E+02
SZZ -0.2944E+02-0.3152E+02
SHEAR STRESSES
SXY 0.0000E+00 0.0000E+00
SXZ 0.8840E+01 0.1348E-03
SYZ 0.0000E+00 0.0000E+00
PRINCIPAL STRESSES
PS 1 0.8999E+02 0.9809E+02
PS 2 0.7149E+02 0.7823E+02
PS 3-0.3022E+02-0.3152E+02
THETA -0.1313E+03-0.1448E+03
DEV. STRESS 0.1202E+03 0.1296E+03
(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
PRINCIPAL SHEAR STRESSES
PSS1 0.6011E+02 0.6480E+02
PSS2 0.9253E+01 0.9931E+01
PSS3 0.5085E+02 0.5487E+02
DISPLACEMENTS
UX -0.1777E-01-0.2023E-06
UY 0.0000E+00 0.0000E+00
UZ 0.5525E+00 0.5480E+00
NORMAL STRAINS
EXX 0.9267E-04 0.1027E-03
EYY 0.1329E-03 0.1441E-03
EZZ -0.1161E-03-0.1261E-03
SHEAR STRAINS
EXY 0.0000E+00 0.0000E+00
EXZ 0.3685E-04 0.5620E-09
EYZ 0.0000E+00 0.0000E+00
PRINCIPAL STRAINS
PE 1 0.1329E-03 0.1441E-03
PE 2 0.9428E-04 0.1027E-03
PE 3-0.1177E-03-0.1261E-03
PRINCIPAL SHEAR STRAINS
PSE1 0.2506E-03 0.2701E-03
PSE2 0.3857E-04 0.4140E-04
PSE3 0.2120E-03 0.2287E-03

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM

LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-2

```
        Z= 451.00   LAYER NO   3
        X=        0.00       175.00
        Y=        0.00         0.00
      NORMAL STRESSES
        SXX   0.8188E+01 0.9476E+01
        SYY   0.1266E+02 0.1407E+02
        SZZ -0.2917E+02-0.3124E+02
      SHEAR STRESSES
        SXY   0.0000E+00 0.0000E+00
        SXZ   0.8650E+01 0.1625E-03
        SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
        PS 1 0.1266E+02 0.1407E+02
        PS 2 0.1009E+02 0.9476E+01
        PS 3-0.3108E+02-0.3124E+02
      THETA   0.8325E+01 0.7687E+01
  DEV. STRESS   0.4373E+02 0.4531E+02
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
        PSS1 0.2187E+02 0.2266E+02
        PSS2 0.1282E+01 0.2299E+01
        PSS3 0.2058E+02 0.2036E+02
      DISPLACEMENTS
        UX   -0.1787E-01-0.2534E-06
        UY    0.0000E+00 0.0000E+00
        UZ    0.5521E+00 0.5477E+00
      NORMAL STRAINS
        EXX   0.9316E-04 0.1033E-03
        EYY   0.1334E-03 0.1447E-03
        EZZ -0.2432E-03-0.2633E-03
      SHEAR STRAINS
        EXY   0.0000E+00 0.0000E+00
        EXZ   0.1558E-03 0.2927E-08
        EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
        PE 1 0.1334E-03 0.1447E-03
        PE 2 0.1103E-03 0.1033E-03
        PE 3-0.2604E-03-0.2633E-03
      PRINCIPAL SHEAR STRAINS
        PSE1 0.3938E-03 0.4080E-03
        PSE2 0.2309E-04 0.4140E-04
        PSE3 0.3707E-03 0.3666E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM

```
LOAD(S)
   ELASTIC SYSTEM    1 - 2s-cm-2
            Z= 575.00    LAYER NO    3
            X=           0.00         175.00
            Y=           0.00           0.00
          NORMAL STRESSES
           SXX    0.1406E+02 0.1626E+02
           SYY    0.1675E+02 0.1837E+02
           SZZ -0.1670E+02-0.1777E+02
          SHEAR STRESSES
           SXY    0.0000E+00 0.0000E+00
           SXZ    0.5360E+01 0.1028E-03
           SYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1 0.1675E+02 0.1837E+02
           PS 2 0.1497E+02 0.1626E+02
           PS 3-0.1761E+02-0.1777E+02
         THETA -0.1411E+02-0.1686E+02
   DEV. STRESS    0.3436E+02 0.3614E+02
              (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.1718E+02 0.1807E+02
           PSS2 0.8894E+00 0.1058E+01
           PSS3 0.1629E+02 0.1701E+02
          DISPLACEMENTS
           UX    -0.1841E-01-0.2657E-06
           UY     0.0000E+00 0.0000E+00
           UZ     0.5264E+00 0.5196E+00
          NORMAL STRAINS
           EXX    0.9369E-04 0.1070E-03
           EYY    0.1179E-03 0.1261E-03
           EZZ -0.1833E-03-0.1993E-03
          SHEAR STRAINS
           EXY    0.0000E+00 0.0000E+00
           EXZ    0.9653E-04 0.1851E-08
           EYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.1179E-03 0.1261E-03
           PE 2 0.1019E-03 0.1070E-03
           PE 3-0.1915E-03-0.1993E-03
          PRINCIPAL SHEAR STRAINS
           PSE1 0.3094E-03 0.3254E-03
           PSE2 0.1602E-04 0.1906E-04
           PSE3 0.2934E-03 0.3063E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM

LOAD(S)
ELASTIC SYSTEM 1 - 2s-cm-2
Z= 701.00 LAYER NO 4
X= 0.00 175.00
Y= 0.00 0.00
NORMAL STRESSES
SXX 0.4406E-01 0.5705E+00
SYY 0.6275E+00 0.9823E+00
SZZ -0.1085E+02-0.1116E+02
SHEAR STRESSES
SXY 0.0000E+00 0.0000E+00
SXZ 0.1576E+01 0.2966E-04
SYZ 0.0000E+00 0.0000E+00
PRINCIPAL STRESSES
PS 1 0.6275E+00 0.9823E+00
PS 2 0.2673E+00 0.5705E+00
PS 3-0.1108E+02-0.1116E+02
THETA 0.1018E+02 0.9608E+01
DEV. STRESS 0.1170E+02 0.1214E+02
(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
PRINCIPAL SHEAR STRESSES
PSS1 0.5852E+01 0.6071E+01
PSS2 0.1801E+00 0.2059E+00
PSS3 0.5671E+01 0.5865E+01
DISPLACEMENTS
UX -0.2375E-01-0.3835E-06
UY 0.0000E+00 0.0000E+00
UZ 0.5034E+00 0.4948E+00
NORMAL STRAINS
EXX 0.1208E-03 0.1378E-03
EYY 0.1471E-03 0.1564E-03
EZZ -0.3697E-03-0.3903E-03
SHEAR STRAINS
EXY 0.0000E+00 0.0000E+00
EXZ 0.1419E-03 0.2670E-08
EYZ 0.0000E+00 0.0000E+00
PRINCIPAL STRAINS
PE 1 0.1471E-03 0.1564E-03
PE 2 0.1309E-03 0.1378E-03
PE 3-0.3798E-03-0.3903E-03
PRINCIPAL SHEAR STRAINS
PSE1 0.5269E-03 0.5467E-03
PSE2 0.1622E-04 0.1854E-04
PSE3 0.5107E-03 0.5281E-03

PHASE 3

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-3

	ELASTIC MODULUS	POISSONS RATIO	LAYER THICKNESS
1	300.	0.350	200.000 MM
2	300.	0.250	249.999 MM
3	150.	0.350	249.999 MM
4	30.	0.350	SEMI-INFINITE

TWO LOAD(S),EACH LOAD AS FOLLOWS

TOTAL LOAD..... 20.00 KN

LOAD STRESS.... 559.87KPA

LOAD RADIUS.... 106.63 MM

LOCATED AT

LOAD	X	Y
1	0.000	0.000
2	349.999	0.000

RESULTS REQUESTED FOR SYSTEM LOCATION(S)

DEPTH(S)

Z= 0.00 100.00 201.00 325.00 449.00 451.00 575.00 701.00

X-Y POINT(S)

X= 0.00 175.00

Y= 0.00 0.00

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 2s-cm-3
          Z=     0.00   LAYER NO   1
          X=          0.00        175.00
          Y=          0.00          0.00
        NORMAL STRESSES
         SXX -0.5122E+03 0.2643E+02
         SYY -0.5298E+03-0.1026E+03
         SZZ -0.5624E+03 0.1143E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.3988E-04-0.7534E-12
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1-0.5122E+03 0.2643E+02
         PS 2-0.5298E+03 0.1143E+02
         PS 3-0.5624E+03-0.1026E+03
       THETA   0.1604E+04 0.6472E+02
  DEV. STRESS   0.5020E+02 0.1290E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.2510E+02 0.6451E+02
         PSS2 0.8814E+01 0.7500E+01
         PSS3 0.1629E+02 0.5701E+02
        DISPLACEMENTS
         UX     0.2952E-01-0.4905E-09
         UY     0.0000E+00 0.0000E+00
         UZ     0.8631E+00 0.6762E+00
        NORMAL STRAINS
         EXX -0.4332E-03 0.1945E-03
         EYY -0.5126E-03-0.3863E-03
         EZZ -0.6592E-03 0.1270E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.3591E-09-0.6783E-17
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1-0.4332E-03 0.1945E-03
         PE 2-0.5126E-03 0.1270E-03
         PE 3-0.6592E-03-0.3863E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.2260E-03 0.5808E-03
         PSE2 0.7936E-04 0.6753E-04
         PSE3 0.1466E-03 0.5133E-03
```

```
ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM  1 - 2s-cm-3
Z= 100.00  LAYER NO  1
X=       0.00     175.00
Y=       0.00       0.00
NORMAL STRESSES
SXX -0.8815E+02-0.1607E+03
SYY -0.8067E+02-0.4958E+02
SZZ -0.3811E+03-0.9511E+02
SHEAR STRESSES
SXY  0.0000E+00 0.0000E+00
SXZ  0.9797E+01 0.2433E-03
SYZ  0.0000E+00 0.0000E+00
PRINCIPAL STRESSES
PS 1-0.8067E+02-0.4958E+02
PS 2-0.8783E+02-0.9511E+02
PS 3-0.3814E+03-0.1607E+03
THETA  0.5499E+03 0.3054E+03
DEV. STRESS  0.3007E+03 0.1111E+03
(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
PRINCIPAL SHEAR STRESSES
PSS1 0.1504E+03 0.5555E+02
PSS2 0.3577E+01 0.2276E+02
PSS3 0.1468E+03 0.3278E+02
DISPLACEMENTS
UX   0.9142E-02-0.4657E-07
UY   0.0000E+00 0.0000E+00
UZ   0.7538E+00 0.6886E+00
NORMAL STRAINS
EXX  0.2450E-03-0.3669E-03
EYY  0.2787E-03 0.1332E-03
EZZ -0.1074E-02-0.7177E-04
SHEAR STRAINS
EXY  0.0000E+00 0.0000E+00
EXZ  0.8821E-04 0.2191E-08
EYZ  0.0000E+00 0.0000E+00
PRINCIPAL STRAINS
PE 1 0.2787E-03 0.1332E-03
PE 2 0.2464E-03-0.7177E-04
PE 3-0.1075E-02-0.3669E-03
PRINCIPAL SHEAR STRAINS
PSE1 0.1354E-02 0.5002E-03
PSE2 0.3221E-04 0.2050E-03
PSE3 0.1322E-02 0.2952E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-3

Z= 201.00 LAYER NO 2

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.9218E+01-0.4980E+02

SYY 0.5189E+01 0.3767E+01

SZZ -0.1742E+03-0.1140E+03

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.1933E+02 0.4082E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1 0.5189E+01 0.3767E+01

PS 2-0.6984E+01-0.4980E+02

PS 3-0.1764E+03-0.1140E+03

THETA 0.1782E+03 0.1600E+03

DEV. STRESS 0.1816E+03 0.1178E+03

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.9081E+02 0.5888E+02

PSS2 0.6087E+01 0.2678E+02

PSS3 0.8472E+02 0.3210E+02

DISPLACEMENTS

UX -0.2533E-02-0.1048E-06

UY 0.0000E+00 0.0000E+00

UZ 0.6759E+00 0.6673E+00

NORMAL STRAINS

EXX 0.1102E-03-0.7417E-04

EYY 0.1702E-03 0.1491E-03

EZZ -0.5776E-03-0.3418E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.1611E-03 0.3403E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.1702E-03 0.1491E-03

PE 2 0.1195E-03-0.7417E-04

PE 3-0.5869E-03-0.3418E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.7571E-03 0.4909E-03

PSE2 0.5075E-04 0.2233E-03

PSE3 0.7063E-03 0.2676E-03

```
   ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
   ELASTIC SYSTEM    1 - 2s-cm-3
            Z= 325.00    LAYER NO    2
            X=           0.00        175.00
            Y=           0.00           0.00
          NORMAL STRESSES
           SXX    0.7738E+01 0.2712E+01
           SYY    0.1938E+02 0.2138E+02
           SZZ -0.7505E+02-0.7263E+02
          SHEAR STRESSES
           SXY    0.0000E+00 0.0000E+00
           SXZ    0.1877E+02 0.3167E-03
           SYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1 0.1938E+02 0.2138E+02
           PS 2 0.1180E+02 0.2712E+01
           PS 3-0.7911E+02-0.7263E+02
         THETA    0.4794E+02 0.4853E+02
   DEV. STRESS    0.9849E+02 0.9400E+02
               (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.4925E+02 0.4700E+02
           PSS2 0.3792E+01 0.9333E+01
           PSS3 0.4545E+02 0.3767E+02
          DISPLACEMENTS
           UX    -0.1106E-01-0.1369E-06
           UY      0.0000E+00 0.0000E+00
           UZ     0.6268E+00 0.6291E+00
          NORMAL STRAINS
           EXX    0.7222E-04 0.5177E-04
           EYY    0.1207E-03 0.1296E-03
           EZZ -0.2729E-03-0.2623E-03
          SHEAR STRAINS
           EXY    0.0000E+00 0.0000E+00
           EXZ    0.1565E-03 0.2640E-08
           EYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.1207E-03 0.1296E-03
           PE 2 0.8914E-04 0.5177E-04
           PE 3-0.2898E-03-0.2623E-03
          PRINCIPAL SHEAR STRAINS
           PSE1 0.4106E-03 0.3919E-03
           PSE2 0.3161E-04 0.7781E-04
           PSE3 0.3790E-03 0.3140E-03
```

```
ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM   1 - 2s-cm-3
         Z= 449.00   LAYER NO   2
         X=        0.00      175.00
         Y=        0.00        0.00
       NORMAL STRESSES
        SXX   0.3373E+02 0.3763E+02
        SYY   0.4572E+02 0.5014E+02
        SZZ -0.3636E+02-0.3926E+02
       SHEAR STRESSES
        SXY   0.0000E+00 0.0000E+00
        SXZ   0.1085E+02 0.1677E-03
        SYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRESSES
        PS 1 0.4572E+02 0.5014E+02
        PS 2 0.3537E+02 0.3763E+02
        PS 3-0.3800E+02-0.3926E+02
      THETA -0.4310E+02-0.4850E+02
DEV. STRESS   0.8372E+02 0.8940E+02
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
       PRINCIPAL SHEAR STRESSES
        PSS1 0.4186E+02 0.4470E+02
        PSS2 0.5176E+01 0.6254E+01
        PSS3 0.3668E+02 0.3844E+02
       DISPLACEMENTS
        UX   -0.2009E-01-0.2375E-06
        UY    0.0000E+00 0.0000E+00
        UZ    0.5998E+00 0.6011E+00
       NORMAL STRAINS
        EXX   0.1047E-03 0.1164E-03
        EYY   0.1547E-03 0.1686E-03
        EZZ -0.1875E-03-0.2041E-03
       SHEAR STRAINS
        EXY   0.0000E+00 0.0000E+00
        EXZ   0.9045E-04 0.1398E-08
        EYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRAINS
        PE 1 0.1547E-03 0.1686E-03
        PE 2 0.1115E-03 0.1164E-03
        PE 3-0.1943E-03-0.2041E-03
       PRINCIPAL SHEAR STRAINS
        PSE1 0.3490E-03 0.3727E-03
        PSE2 0.4315E-04 0.5214E-04
        PSE3 0.3058E-03 0.3205E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-3

```
          Z= 451.00   LAYER NO   3
          X=        0.00       175.00
          Y=        0.00         0.00
        NORMAL STRESSES
         SXX   0.7829E+01 0.9133E+01
         SYY   0.1338E+02 0.1490E+02
         SZZ -0.3602E+02-0.3891E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.1073E+02 0.2049E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.1338E+02 0.1490E+02
         PS 2 0.1031E+02 0.9133E+01
         PS 3-0.3850E+02-0.3891E+02
       THETA   0.1481E+02 0.1487E+02
 DEV. STRESS   0.5187E+02 0.5381E+02
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.2594E+02 0.2691E+02
         PSS2 0.1531E+01 0.2885E+01
         PSS3 0.2441E+02 0.2402E+02
        DISPLACEMENTS
         UX   -0.2017E-01-0.2955E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.5993E+00 0.6006E+00
        NORMAL STRAINS
         EXX   0.1051E-03 0.1170E-03
         EYY   0.1550E-03 0.1689E-03
         EZZ -0.2897E-03-0.3156E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.1932E-03 0.3690E-08
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.1550E-03 0.1689E-03
         PE 2 0.1274E-03 0.1170E-03
         PE 3-0.3121E-03-0.3156E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.4671E-03 0.4845E-03
         PSE2 0.2757E-04 0.5195E-04
         PSE3 0.4395E-03 0.4326E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 2s-cm-3
          Z= 575.00   LAYER NO   3
          X=         0.00       175.00
          Y=         0.00         0.00
        NORMAL STRESSES
         SXX   0.1571E+02 0.1836E+02
         SYY   0.1913E+02 0.2108E+02
         SZZ -0.2025E+02-0.2184E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.6783E+01 0.1323E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.1913E+02 0.2108E+02
         PS 2 0.1695E+02 0.1836E+02
         PS 3-0.2149E+02-0.2184E+02
       THETA -0.1459E+02-0.1760E+02
DEV. STRESS   0.4062E+02 0.4292E+02
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.2031E+02 0.2146E+02
         PSS2 0.1091E+01 0.1360E+01
         PSS3 0.1922E+02 0.2010E+02
        DISPLACEMENTS
         UX   -0.2118E-01-0.3136E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.5688E+00 0.5671E+00
        NORMAL STRAINS
         EXX   0.1074E-03 0.1242E-03
         EYY   0.1382E-03 0.1487E-03
         EZZ -0.2164E-03-0.2378E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.1221E-03 0.2383E-08
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.1382E-03 0.1487E-03
         PE 2 0.1185E-03 0.1242E-03
         PE 3-0.2275E-03-0.2378E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.3657E-03 0.3865E-03
         PSE2 0.1965E-04 0.2449E-04
         PSE3 0.3461E-03 0.3620E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 2s-cm-3

```
        Z= 701.00   LAYER NO   4
        X=        0.00      175.00
        Y=        0.00        0.00
      NORMAL STRESSES
       SXX   0.8730E-01 0.6711E+00
       SYY   0.8517E+00 0.1215E+01
       SZZ -0.1276E+02-0.1336E+02
      SHEAR STRESSES
       SXY   0.0000E+00 0.0000E+00
       SXZ   0.1976E+01 0.3794E-04
       SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
       PS 1 0.8517E+00 0.1215E+01
       PS 2 0.3844E+00 0.6711E+00
       PS 3-0.1306E+02-0.1336E+02
     THETA   0.1182E+02 0.1148E+02
 DEV. STRESS   0.1391E+02 0.1458E+02
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
       PSS1 0.6955E+01 0.7290E+01
       PSS2 0.2336E+00 0.2720E+00
       PSS3 0.6722E+01 0.7018E+01
      DISPLACEMENTS
       UX   -0.2799E-01-0.4634E-06
       UY    0.0000E+00 0.0000E+00
       UZ    0.5417E+00 0.5374E+00
      NORMAL STRAINS
       EXX   0.1419E-03 0.1642E-03
       EYY   0.1763E-03 0.1887E-03
       EZZ -0.4365E-03-0.4677E-03
      SHEAR STRAINS
       EXY   0.0000E+00 0.0000E+00
       EXZ   0.1779E-03 0.3416E-08
       EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
       PE 1 0.1763E-03 0.1887E-03
       PE 2 0.1553E-03 0.1642E-03
       PE 3-0.4499E-03-0.4677E-03
      PRINCIPAL SHEAR STRAINS
       PSE1 0.6263E-03 0.6564E-03
       PSE2 0.2104E-04 0.2449E-04
       PSE3 0.6052E-03 0.6319E-03
```

MECHANISTIC ANALYSIS DETAILS FOR THE NAMPULA CUAMBA ROAD PAVEMENT - RR91/242

PAVEMENT STRUCTURE

30 mm	S2
200 mm	G3
200 mm	C4
250 mm	G7
Semi-infi.	S3

Road Categor : **B**

Design Class of traffic: **T6**

Pavement T pe: **Granular Base**

Input Values

La er Nr	Thickness (mm)	Poisson Coef.	E-Modulus (Mpa) Phase-I	E-Modulus (Mpa) Phase-II	E-Modulus (Mpa) Phase-III
2	200	0.35	400	400	300
3	200	0.25	1,500	600	300
4	250	0.35	150	150	150
5	1/2 INF.	0.35	50	50	50

Critical Parameters

Stresses (δ1 / δ3 KPa) & Strains (ε) Phase-I	Phase-II	Phase-III
(399.1/88.9)	(387.2/85.6)	(380.9/76.2)
1.19E-04	1.6E-04	(89.6/-22.8)
2.47E-04	3.16E-04	3.73E-04
3.1E-04	3.6E-04	4.2E-04

Anal ysis

La er Nr	Layer Life (E80's) Phase-I	Phase-II	Phase-III
2	1.00E+09	1.00E+09	1.00E+09
3	1.04E+07	1.36E+06	5.00E+07
4	5.83E+09	5.00E+08	9.61E+07
5	6.42E+08	1.36E+08	2.94E+07
	1.04E+07	**1.36E+06**	**2.94E+07**

Structural Life (E80's)

Wet: **4.12E+07**

(sum of minimum of each phase)

Deflection (mm)

Inicial	*Final*
0.5543	***0.7146***

MECHANISTIC ANALYSIS DETAILS FOR THE NAMPULA CUAMBA ROAD PAVEMENT- THEYSE

PAVEMENT STRUCTURE

Thickness	Material
30 mm	S2
200 mm	G3
200 mm	C4
250 mm	G7
Semi-infi.	S3

Road Categor : **B**

Design Class of traffic: **T6**

Pavement T pe: **Granular Base**

Input Values

La er Nr	Thickness (mm)	Poisson Coef.	E-Modulus (Mpa)		
			Phase-I	Phase-II	Phase-III
2	200	0.35	400	400	300
3	200	0.25	1,500	600	300
4	250	0.35	150	150	150
5	1/2 INF.	0.35	50	50	50

Critical Parameters

Stresses (δ1 / δ3 KPa) & Strains (ε)		
Phase-I	Phase-II	Phase-III
(399.1/88.9)	(387.2/85.6)	(380.9/76.2)
1.19E-04	1.6E-04	(89.6/-22.8)
2.47E-04	3.16E-04	3.73E-04
3.1E-04	3.6E-04	4.2E-04

Anal ysis

La er Nr	Layer Life (E80's)		
	Phase-I	Phase-II	Phase-III
2	9.85E+09	9.08E+09	3.35E+09
3	2.42E+06	1.30E+06	4.20E+07
4	2.79E+09	2.39E+08	4.60E+07
5	3.07E+08	6.49E+07	1.41E+07
	2.42E+06	**1.30E+06**	**1.41E+07**

Structural Life (E80's)

Wet: **1.78E+07**

(sum of minimum of each phase)

Deflection (mm)

Inicial	*Final*
0.5543	***0.7146***

S3 Sub-grade

N13-Cuamba-Lichinga Road

PHASE 1

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-1

	ELASTIC MODULUS	POISSONS RATIO	LAYER THICKNESS
1	400.	0.350	200.000 MM
2	1500.	0.250	200.000 MM
3	150.	0.350	249.999 MM
4	50.	0.350	SEMI-INFINITE

TWO LOAD(S),EACH LOAD AS FOLLOWS

TOTAL LOAD..... 20.00 KN

LOAD STRESS.... 559.87KPA

LOAD RADIUS.... 106.63 MM

LOCATED AT

LOAD	X	Y
1	0.000	0.000
2	349.999	0.000

RESULTS REQUESTED FOR SYSTEM LOCATION(S)

DEPTH(S)

Z= 0.00 100.00 201.00 300.00 399.00 401.00 525.00 651.00

X-Y POINT(S)

X= 0.00 175.00

Y= 0.00 0.00

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 3s-cm-1
         Z=    0.00   LAYER NO   1
         X=         0.00       175.00
         Y=         0.00         0.00
       NORMAL STRESSES
        SXX -0.4828E+03 0.4190E+02
        SYY -0.4903E+03-0.6660E+02
        SZZ -0.5624E+03 0.1143E+02
       SHEAR STRESSES
        SXY   0.0000E+00 0.0000E+00
        SXZ   0.5721E-05 0.4630E-12
        SYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRESSES
        PS 1-0.4828E+03 0.4190E+02
        PS 2-0.4903E+03 0.1143E+02
        PS 3-0.5624E+03-0.6660E+02
      THETA   0.1535E+04 0.1326E+02
DEV. STRESS   0.7961E+02 0.1085E+03
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
       PRINCIPAL SHEAR STRESSES
        PSS1 0.3980E+02 0.5425E+02
        PSS2 0.3744E+01 0.1524E+02
        PSS3 0.3606E+02 0.3902E+02
       DISPLACEMENTS
        UX     0.1813E-01 0.6242E-09
        UY     0.0000E+00 0.0000E+00
        UZ     0.5543E+00 0.4152E+00
       NORMAL STRAINS
        EXX -0.2860E-03 0.1531E-03
        EYY -0.3113E-03-0.2133E-03
        EZZ -0.5548E-03 0.5021E-04
       SHEAR STRAINS
        EXY   0.0000E+00 0.0000E+00
        EXZ   0.3864E-10 0.3127E-17
        EYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRAINS
        PE 1-0.2860E-03 0.1531E-03
        PE 2-0.3113E-03 0.5021E-04
        PE 3-0.5548E-03-0.2133E-03
       PRINCIPAL SHEAR STRAINS
        PSE1 0.2688E-03 0.3664E-03
        PSE2 0.2528E-04 0.1029E-03
        PSE3 0.2435E-03 0.2635E-03
```

```
ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
  ELASTIC SYSTEM   1 - 3s-cm-1
         Z= 100.00   LAYER NO   1
         X=          0.00       175.00
         Y=          0.00         0.00
       NORMAL STRESSES
        SXX -0.9566E+02-0.1718E+03
        SYY -0.8889E+02-0.5600E+02
        SZZ -0.3988E+03-0.9796E+02
       SHEAR STRESSES
        SXY   0.0000E+00 0.0000E+00
        SXZ   0.9117E+01 0.2038E-03
        SYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRESSES
        PS 1-0.8889E+02-0.5600E+02
        PS 2-0.9539E+02-0.9796E+02
        PS 3-0.3991E+03-0.1718E+03
      THETA   0.5834E+03 0.3258E+03
  DEV. STRESS   0.3102E+03 0.1158E+03
           (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
       PRINCIPAL SHEAR STRESSES
        PSS1 0.1551E+03 0.5791E+02
        PSS2 0.3250E+01 0.2098E+02
        PSS3 0.1519E+03 0.3693E+02
       DISPLACEMENTS
        UX     0.8312E-02-0.3327E-07
        UY     0.0000E+00 0.0000E+00
        UZ     0.4686E+00 0.4228E+00
       NORMAL STRAINS
        EXX   0.1877E-03-0.2950E-03
        EYY   0.2105E-03 0.9609E-04
        EZZ -0.8359E-03-0.4557E-04
       SHEAR STRAINS
        EXY   0.0000E+00 0.0000E+00
        EXZ   0.6157E-04 0.1377E-08
        EYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRAINS
        PE 1 0.2105E-03 0.9609E-04
        PE 2 0.1886E-03-0.4557E-04
        PE 3-0.8369E-03-0.2950E-03
       PRINCIPAL SHEAR STRAINS
        PSE1 0.1047E-02 0.3911E-03
        PSE2 0.2195E-04 0.1417E-03
        PSE3 0.1025E-02 0.2494E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-1

```
          Z= 201.00   LAYER NO   2
          X=        0.00       175.00
          Y=        0.00         0.00
        NORMAL STRESSES
         SXX -0.7843E+02-0.1316E+03
         SYY -0.8041E+02-0.8635E+02
         SZZ -0.2047E+03-0.1154E+03
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.2189E+02 0.4912E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1-0.7475E+02-0.8635E+02
         PS 2-0.8041E+02-0.1154E+03
         PS 3-0.2084E+03-0.1316E+03
       THETA   0.3635E+03 0.3334E+03
DEV. STRESS   0.1336E+03 0.4527E+02
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.6682E+02 0.2263E+02
         PSS2 0.2831E+01 0.1453E+02
         PSS3 0.6399E+02 0.8103E+01
        DISPLACEMENTS
         UX     0.5471E-02 0.1159E-07
         UY     0.0000E+00 0.0000E+00
         UZ     0.4099E+00 0.4108E+00
        NORMAL STRAINS
         EXX -0.4773E-05-0.5414E-04
         EYY -0.6419E-05-0.1640E-04
         EZZ -0.1100E-03-0.4063E-04
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.3650E-04 0.8190E-09
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1-0.1699E-05-0.1640E-04
         PE 2-0.6419E-05-0.4063E-04
         PE 3-0.1131E-03-0.5414E-04
        PRINCIPAL SHEAR STRAINS
         PSE1 0.1114E-03 0.3774E-04
         PSE2 0.4720E-05 0.2423E-04
         PSE3 0.1067E-03 0.1351E-04
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 3s-cm-1
          Z= 300.00   LAYER NO   2
          X=          0.00        175.00
          Y=          0.00          0.00
        NORMAL STRESSES
         SXX   0.2810E+02 0.1966E+02
         SYY   0.4513E+02 0.4975E+02
         SZZ -0.8492E+02-0.7099E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.2780E+02 0.5493E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.4513E+02 0.4975E+02
         PS 2 0.3457E+02 0.1966E+02
         PS 3-0.9139E+02-0.7099E+02
       THETA   0.1168E+02 0.1587E+01
  DEV. STRESS   0.1365E+03 0.1207E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.6826E+02 0.6037E+02
         PSS2 0.5279E+01 0.1504E+02
         PSS3 0.6298E+02 0.4532E+02
        DISPLACEMENTS
         UX   -0.3735E-02-0.4437E-07
         UY    0.0000E+00 0.0000E+00
         UZ    0.4014E+00 0.4056E+00
        NORMAL STRAINS
         EXX   0.2538E-04 0.1665E-04
         EYY   0.3957E-04 0.4174E-04
         EZZ -0.6885E-04-0.5892E-04
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.4636E-04 0.9158E-09
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.3957E-04 0.4174E-04
         PE 2 0.3077E-04 0.1665E-04
         PE 3-0.7424E-04-0.5892E-04
        PRINCIPAL SHEAR STRAINS
         PSE1 0.1138E-03 0.1007E-03
         PSE2 0.8802E-05 0.2509E-04
         PSE3 0.1050E-03 0.7558E-04
```

```
   ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
   ELASTIC SYSTEM    1 - 3s-cm-1
            Z= 399.00    LAYER NO    2
            X=           0.00         175.00
            Y=           0.00           0.00
          NORMAL STRESSES
           SXX    0.1503E+03 0.1607E+03
           SYY    0.1930E+03 0.2095E+03
           SZZ -0.3207E+02-0.3412E+02
          SHEAR STRESSES
           SXY    0.0000E+00 0.0000E+00
           SXZ    0.7772E+01 0.1295E-03
           SYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1 0.1930E+03 0.2095E+03
           PS 2 0.1506E+03 0.1607E+03
           PS 3-0.3240E+02-0.3412E+02
         THETA -0.3112E+03-0.3361E+03
   DEV. STRESS    0.2254E+03 0.2436E+03
             (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.1127E+03 0.1218E+03
           PSS2 0.2118E+02 0.2437E+02
           PSS3 0.9151E+02 0.9743E+02
          DISPLACEMENTS
           UX    -0.1364E-01-0.1673E-06
           UY      0.0000E+00 0.0000E+00
           UZ     0.3947E+00 0.3988E+00
          NORMAL STRAINS
           EXX    0.7341E-04 0.7797E-04
           EYY    0.1090E-03 0.1186E-03
           EZZ -0.7863E-04-0.8449E-04
          SHEAR STRAINS
           EXY    0.0000E+00 0.0000E+00
           EXZ    0.1296E-04 0.2160E-09
           EYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.1090E-03 0.1186E-03
           PE 2 0.7368E-04 0.7797E-04
           PE 3-0.7890E-04-0.8449E-04
          PRINCIPAL SHEAR STRAINS
           PSE1 0.1879E-03 0.2031E-03
           PSE2 0.3532E-04 0.4064E-04
           PSE3 0.1526E-03 0.1625E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 3s-cm-1
             Z= 401.00    LAYER NO    3
             X=            0.00         175.00
             Y=            0.00           0.00
           NORMAL STRESSES
            SXX    0.2075E+01 0.2341E+01
            SYY    0.6048E+01 0.6871E+01
            SZZ -0.3181E+02-0.3387E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.7412E+01 0.1488E-03
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1 0.6048E+01 0.6871E+01
            PS 2 0.3625E+01 0.2341E+01
            PS 3-0.3336E+02-0.3387E+02
          THETA    0.2369E+02 0.2466E+02
    DEV. STRESS    0.3941E+02 0.4074E+02
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.1971E+02 0.2037E+02
            PSS2 0.1211E+01 0.2265E+01
            PSS3 0.1849E+02 0.1811E+02
           DISPLACEMENTS
            UX    -0.1375E-01-0.2091E-06
            UY     0.0000E+00 0.0000E+00
            UZ     0.3944E+00 0.3985E+00
           NORMAL STRAINS
            EXX    0.7399E-04 0.7864E-04
            EYY    0.1098E-03 0.1194E-03
            EZZ -0.2311E-03-0.2474E-03
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.1335E-03 0.2680E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.1098E-03 0.1194E-03
            PE 2 0.8795E-04 0.7864E-04
            PE 3-0.2451E-03-0.2474E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.3549E-03 0.3668E-03
            PSE2 0.2181E-04 0.4079E-04
            PSE3 0.3331E-03 0.3260E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-1

```
        Z= 525.00   LAYER NO   3
        X=        0.00      175.00
        Y=        0.00        0.00
      NORMAL STRESSES
       SXX   0.7133E+01 0.8748E+01
       SYY   0.9556E+01 0.1077E+02
       SZZ -0.2015E+02-0.2175E+02
      SHEAR STRESSES
       SXY   0.0000E+00 0.0000E+00
       SXZ   0.4985E+01 0.9781E-04
       SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
       PS 1 0.9556E+01 0.1077E+02
       PS 2 0.8015E+01 0.8748E+01
       PS 3-0.2103E+02-0.2175E+02
      THETA   0.3457E+01 0.2237E+01
 DEV. STRESS   0.3058E+02 0.3252E+02
         (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
       PSS1 0.1529E+02 0.1626E+02
       PSS2 0.7703E+00 0.1011E+01
       PSS3 0.1452E+02 0.1525E+02
      DISPLACEMENTS
       UX   -0.1420E-01-0.2152E-06
       UY    0.0000E+00 0.0000E+00
       UZ    0.3699E+00 0.3718E+00
      NORMAL STRAINS
       EXX   0.7230E-04 0.8399E-04
       EYY   0.9411E-04 0.1022E-03
       EZZ -0.1733E-03-0.1907E-03
      SHEAR STRAINS
       EXY   0.0000E+00 0.0000E+00
       EXZ   0.8977E-04 0.1761E-08
       EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
       PE 1 0.9411E-04 0.1022E-03
       PE 2 0.8024E-04 0.8399E-04
       PE 3-0.1813E-03-0.1907E-03
      PRINCIPAL SHEAR STRAINS
       PSE1 0.2754E-03 0.2929E-03
       PSE2 0.1387E-04 0.1821E-04
       PSE3 0.2615E-03 0.2746E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-1

Z= 651.00 LAYER NO 4

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.2968E+00 0.2531E+00

SYY 0.5043E+00 0.8317E+00

SZZ -0.1413E+02-0.1504E+02

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.2115E+01 0.4069E-04

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1 0.5043E+00 0.8317E+00

PS 2 0.1943E-01 0.2531E+00

PS 3-0.1444E+02-0.1504E+02

THETA 0.1392E+02 0.1395E+02

DEV. STRESS 0.1495E+02 0.1587E+02

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.7473E+01 0.7934E+01

PSS2 0.2424E+00 0.2893E+00

PSS3 0.7231E+01 0.7645E+01

DISPLACEMENTS

UX -0.1765E-01-0.2951E-06

UY 0.0000E+00 0.0000E+00

UZ 0.3489E+00 0.3487E+00

NORMAL STRAINS

EXX 0.8946E-04 0.1045E-03

EYY 0.1111E-03 0.1202E-03

EZZ -0.2841E-03-0.3085E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.1143E-03 0.2198E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.1111E-03 0.1202E-03

PE 2 0.9800E-04 0.1045E-03

PE 3-0.2926E-03-0.3085E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.4037E-03 0.4286E-03

PSE2 0.1310E-04 0.1563E-04

PSE3 0.3906E-03 0.4130E-03

PHASE 2

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-2

	ELASTIC MODULUS	POISSONS RATIO	LAYER THICKNESS
1	400.	0.350	200.000 MM
2	600.	0.250	200.000 MM
3	150.	0.350	249.999 MM
4	50.	0.350	SEMI-INFINITE

TWO LOAD(S),EACH LOAD AS FOLLOWS

TOTAL LOAD..... 20.00 KN

LOAD STRESS.... 559.87KPA

LOAD RADIUS.... 106.63 MM

LOCATED AT

LOAD	X	Y
1	0.000	0.000
2	349.999	0.000

RESULTS REQUESTED FOR SYSTEM LOCATION(S)

DEPTH(S)

Z= 0.00 100.00 201.00 300.00 399.00 401.00 525.00 651.00

X-Y POINT(S)

X= 0.00 175.00

Y= 0.00 0.00

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-2

```
          Z=    0.00   LAYER NO   1
          X=          0.00        175.00
          Y=          0.00          0.00
        NORMAL STRESSES
          SXX -0.5061E+03 0.2583E+02
          SYY -0.5213E+03-0.9641E+02
          SZZ -0.5624E+03 0.1143E+02
        SHEAR STRESSES
          SXY   0.0000E+00 0.0000E+00
          SXZ   0.1074E-04 0.9510E-12
          SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
          PS 1-0.5061E+03 0.2583E+02
          PS 2-0.5213E+03 0.1143E+02
          PS 3-0.5624E+03-0.9641E+02
        THETA   0.1590E+04 0.5915E+02
DEV. STRESS   0.5622E+02 0.1222E+03
             (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
          PSS1 0.2811E+02 0.6112E+02
          PSS2 0.7554E+01 0.7196E+01
          PSS3 0.2056E+02 0.5392E+02
        DISPLACEMENTS
          UX     0.2204E-01 0.2477E-09
          UY     0.0000E+00 0.0000E+00
          UZ     0.5986E+00 0.4643E+00
        NORMAL STRAINS
          EXX -0.3173E-03 0.1390E-03
          EYY -0.3683E-03-0.2737E-03
          EZZ -0.5072E-03 0.9038E-04
        SHEAR STRAINS
          EXY   0.0000E+00 0.0000E+00
          EXZ   0.7249E-10 0.6422E-17
          EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
          PE 1-0.3173E-03 0.1390E-03
          PE 2-0.3683E-03 0.9038E-04
          PE 3-0.5072E-03-0.2737E-03
        PRINCIPAL SHEAR STRAINS
          PSE1 0.1898E-03 0.4127E-03
          PSE2 0.5101E-04 0.4860E-04
          PSE3 0.1388E-03 0.3641E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 3s-cm-2
              Z= 100.00    LAYER NO    1
              X=           0.00        175.00
              Y=           0.00          0.00
           NORMAL STRESSES
            SXX -0.9205E+02-0.1664E+03
            SYY -0.8561E+02-0.5427E+02
            SZZ -0.3868E+03-0.9506E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.1071E+02 0.2367E-03
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1-0.8561E+02-0.5427E+02
            PS 2-0.9167E+02-0.9506E+02
            PS 3-0.3872E+03-0.1664E+03
          THETA    0.5645E+03 0.3158E+03
    DEV. STRESS    0.3016E+03 0.1122E+03
               (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.1508E+03 0.5608E+02
            PSS2 0.3028E+01 0.2040E+02
            PSS3 0.1478E+03 0.3568E+02
           DISPLACEMENTS
            UX     0.7772E-02-0.3253E-07
            UY     0.0000E+00 0.0000E+00
            UZ     0.5159E+00 0.4738E+00
           NORMAL STRAINS
            EXX    0.1833E-03-0.2855E-03
            EYY    0.2051E-03 0.9317E-04
            EZZ -0.8119E-03-0.4456E-04
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.7235E-04 0.1599E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.2051E-03 0.9317E-04
            PE 2 0.1846E-03-0.4456E-04
            PE 3-0.8132E-03-0.2855E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.1018E-02 0.3787E-03
            PSE2 0.2044E-04 0.1377E-03
            PSE3 0.9978E-03 0.2410E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-2

Z= 201.00 LAYER NO 2

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.1670E+02-0.6087E+02

SYY -0.5096E+01-0.6809E+01

SZZ -0.1820E+03-0.1108E+03

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.2183E+02 0.4566E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1-0.5096E+01-0.6809E+01

PS 2-0.1387E+02-0.6087E+02

PS 3-0.1848E+03-0.1108E+03

THETA 0.2038E+03 0.1785E+03

DEV. STRESS 0.1797E+03 0.1040E+03

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.8986E+02 0.5200E+02

PSS2 0.4385E+01 0.2703E+02

PSS3 0.8547E+02 0.2497E+02

DISPLACEMENTS

UX 0.5608E-03-0.4246E-07

UY 0.0000E+00 0.0000E+00

UZ 0.4579E+00 0.4599E+00

NORMAL STRAINS

EXX 0.5013E-04-0.5247E-04

EYY 0.7432E-04 0.6021E-04

EZZ -0.2943E-03-0.1565E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.9101E-04 0.1903E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.7432E-04 0.6021E-04

PE 2 0.5604E-04-0.5247E-04

PE 3-0.3003E-03-0.1565E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.3746E-03 0.2168E-03

PSE2 0.1828E-04 0.1127E-03

PSE3 0.3563E-03 0.1041E-03

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 3s-cm-2
              Z= 300.00    LAYER NO    2
              X=           0.00         175.00
              Y=           0.00           0.00
           NORMAL STRESSES
            SXX    0.2066E+02 0.1321E+02
            SYY    0.3599E+02 0.3942E+02
            SZZ -0.8236E+02-0.7310E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.2178E+02 0.4252E-03
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1 0.3599E+02 0.3942E+02
            PS 2 0.2507E+02 0.1321E+02
            PS 3-0.8678E+02-0.7310E+02
          THETA    0.2572E+02 0.2046E+02
    DEV. STRESS    0.1228E+03 0.1125E+03
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.6138E+02 0.5626E+02
            PSS2 0.5456E+01 0.1310E+02
            PSS3 0.5593E+02 0.4315E+02
           DISPLACEMENTS
            UX    -0.7981E-02-0.9574E-07
            UY      0.0000E+00 0.0000E+00
            UZ      0.4365E+00 0.4447E+00
           NORMAL STRAINS
            EXX    0.5378E-04 0.3607E-04
            EYY    0.8572E-04 0.9069E-04
            EZZ -0.1609E-03-0.1438E-03
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.9080E-04 0.1772E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.8572E-04 0.9069E-04
            PE 2 0.6298E-04 0.3607E-04
            PE 3-0.1701E-03-0.1438E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.2559E-03 0.2345E-03
            PSE2 0.2274E-04 0.5462E-04
            PSE3 0.2331E-03 0.1799E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-2

Z= 399.00 LAYER NO 2

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX 0.7176E+02 0.7583E+02

SYY 0.9619E+02 0.1044E+03

SZZ -0.4001E+02-0.4248E+02

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.9996E+01 0.1719E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1 0.9619E+02 0.1044E+03

PS 2 0.7264E+02 0.7583E+02

PS 3-0.4089E+02-0.4248E+02

THETA -0.1279E+03-0.1378E+03

DEV. STRESS 0.1371E+03 0.1469E+03

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.6854E+02 0.7346E+02

PSS2 0.1177E+02 0.1430E+02

PSS3 0.5677E+02 0.5915E+02

DISPLACEMENTS

UX -0.1772E-01-0.2257E-06

UY 0.0000E+00 0.0000E+00

UZ 0.4226E+00 0.4308E+00

NORMAL STRAINS

EXX 0.9623E-04 0.1006E-03

EYY 0.1472E-03 0.1602E-03

EZZ -0.1367E-03-0.1460E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.4167E-04 0.7164E-09

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.1472E-03 0.1602E-03

PE 2 0.9808E-04 0.1006E-03

PE 3-0.1386E-03-0.1460E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.2857E-03 0.3062E-03

PSE2 0.4908E-04 0.5963E-04

PSE3 0.2366E-03 0.2466E-03

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-2

```
        Z= 401.00   LAYER NO   3
        X=       0.00      175.00
        Y=       0.00        0.00
      NORMAL STRESSES
       SXX   0.4013E+01 0.4229E+01
       SYY   0.9682E+01 0.1086E+02
       SZZ -0.3965E+02-0.4214E+02
      SHEAR STRESSES
       SXY   0.0000E+00 0.0000E+00
       SXZ   0.9788E+01 0.2064E-03
       SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
       PS 1 0.9682E+01 0.1086E+02
       PS 2 0.6107E+01 0.4229E+01
       PS 3-0.4175E+02-0.4214E+02
     THETA   0.2596E+02 0.2706E+02
DEV. STRESS   0.5143E+02 0.5300E+02
         (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
       PSS1 0.2571E+02 0.2650E+02
       PSS2 0.1787E+01 0.3313E+01
       PSS3 0.2393E+02 0.2319E+02
      DISPLACEMENTS
       UX   -0.1782E-01-0.2825E-06
       UY    0.0000E+00 0.0000E+00
       UZ    0.4222E+00 0.4304E+00
      NORMAL STRAINS
       EXX   0.9673E-04 0.1012E-03
       EYY   0.1478E-03 0.1609E-03
       EZZ -0.2964E-03-0.3163E-03
      SHEAR STRAINS
       EXY   0.0000E+00 0.0000E+00
       EXZ   0.1763E-03 0.3716E-08
       EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
       PE 1 0.1478E-03 0.1609E-03
       PE 2 0.1156E-03 0.1012E-03
       PE 3-0.3153E-03-0.3163E-03
      PRINCIPAL SHEAR STRAINS
       PSE1 0.4631E-03 0.4772E-03
       PSE2 0.3219E-04 0.5966E-04
       PSE3 0.4309E-03 0.4175E-03
```

```
ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM   1 - 3s-cm-2
        Z= 525.00   LAYER NO   3
        X=          0.00        175.00
        Y=          0.00          0.00
      NORMAL STRESSES
       SXX   0.9294E+01 0.1126E+02
       SYY   0.1261E+02 0.1410E+02
       SZZ -0.2389E+02-0.2595E+02
      SHEAR STRESSES
       SXY   0.0000E+00 0.0000E+00
       SXZ   0.6422E+01 0.1310E-03
       SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
       PS 1 0.1261E+02 0.1410E+02
       PS 2 0.1049E+02 0.1126E+02
       PS 3-0.2509E+02-0.2595E+02
     THETA   0.1981E+01 0.5822E+00
DEV. STRESS   0.3770E+02 0.4005E+02
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
       PSS1 0.1885E+02 0.2003E+02
       PSS2 0.1059E+01 0.1422E+01
       PSS3 0.1779E+02 0.1860E+02
      DISPLACEMENTS
       UX   -0.1732E-01-0.2707E-06
       UY    0.0000E+00 0.0000E+00
       UZ    0.3916E+00 0.3970E+00
      NORMAL STRAINS
       EXX   0.8831E-04 0.1027E-03
       EYY   0.1182E-03 0.1284E-03
       EZZ -0.2105E-03-0.2323E-03
      SHEAR STRAINS
       EXY   0.0000E+00 0.0000E+00
       EXZ   0.1157E-03 0.2359E-08
       EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
       PE 1 0.1182E-03 0.1284E-03
       PE 2 0.9911E-04 0.1027E-03
       PE 3-0.2213E-03-0.2323E-03
      PRINCIPAL SHEAR STRAINS
       PSE1 0.3395E-03 0.3606E-03
       PSE2 0.1908E-04 0.2562E-04
       PSE3 0.3204E-03 0.3350E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 3s-cm-2
              Z= 651.00    LAYER NO    4
              X=            0.00         175.00
              Y=            0.00            0.00
           NORMAL STRESSES
            SXX    0.9819E-01 0.7379E+00
            SYY    0.1164E+01 0.1525E+01
            SZZ -0.1605E+02-0.1722E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.2618E+01 0.5188E-04
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1 0.1164E+01 0.1525E+01
            PS 2 0.5120E+00 0.7379E+00
            PS 3-0.1646E+02-0.1722E+02
          THETA    0.1479E+02 0.1496E+02
    DEV. STRESS    0.1763E+02 0.1874E+02
                 (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.8814E+01 0.9372E+01
            PSS2 0.3258E+00 0.3935E+00
            PSS3 0.8488E+01 0.8979E+01
           DISPLACEMENTS
            UX    -0.2096E-01-0.3578E-06
            UY      0.0000E+00 0.0000E+00
            UZ     0.3666E+00 0.3694E+00
           NORMAL STRAINS
            EXX    0.1062E-03 0.1247E-03
            EYY    0.1350E-03 0.1459E-03
            EZZ -0.3300E-03-0.3604E-03
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.1414E-03 0.2803E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.1350E-03 0.1459E-03
            PE 2 0.1174E-03 0.1247E-03
            PE 3-0.3412E-03-0.3604E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.4762E-03 0.5063E-03
            PSE2 0.1760E-04 0.2126E-04
            PSE3 0.4586E-03 0.4851E-03
```

PHASE 3

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-3

	ELASTIC MODULUS	POISSONS RATIO	LAYER THICKNESS
1	300.	0.350	200.000 MM
2	300.	0.250	200.000 MM
3	150.	0.350	249.999 MM
4	50.	0.350	SEMI-INFINITE

TWO LOAD(S),EACH LOAD AS FOLLOWS

TOTAL LOAD..... 20.00 KN

LOAD STRESS.... 559.87KPA

LOAD RADIUS.... 106.63 MM

LOCATED AT

LOAD	X	Y
1	0.000	0.000
2	349.999	0.000

RESULTS REQUESTED FOR SYSTEM LOCATION(S)

DEPTH(S)

Z= 0.00 100.00 201.00 300.00 399.00 401.00 525.00 651.00

X-Y POINT(S)

X= 0.00 175.00

Y= 0.00 0.00

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 3s-cm-3
          Z=     0.00   LAYER NO   1
          X=          0.00        175.00
          Y=          0.00          0.00
        NORMAL STRESSES
         SXX -0.5079E+03 0.3022E+02
         SYY -0.5263E+03-0.9951E+02
         SZZ -0.5624E+03 0.1143E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.4863E-04 0.1561E-12
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1-0.5079E+03 0.3022E+02
         PS 2-0.5263E+03 0.1143E+02
         PS 3-0.5624E+03-0.9951E+02
       THETA   0.1597E+04 0.5786E+02
DEV. STRESS   0.5446E+02 0.1297E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.2723E+02 0.6487E+02
         PSS2 0.9203E+01 0.9395E+01
         PSS3 0.1803E+02 0.5547E+02
        DISPLACEMENTS
         UX     0.2758E-01 0.5404E-09
         UY     0.0000E+00 0.0000E+00
         UZ     0.7146E+00 0.5388E+00
        NORMAL STRAINS
         EXX -0.4231E-03 0.2036E-03
         EYY -0.5060E-03-0.3805E-03
         EZZ -0.6683E-03 0.1190E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.4378E-09 0.1405E-17
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1-0.4231E-03 0.2036E-03
         PE 2-0.5060E-03 0.1190E-03
         PE 3-0.6683E-03-0.3805E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.2452E-03 0.5841E-03
         PSE2 0.8286E-04 0.8459E-04
         PSE3 0.1623E-03 0.4995E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-3

```
        Z= 100.00   LAYER NO   1
        X=       0.00      175.00
        Y=       0.00        0.00
      NORMAL STRESSES
       SXX -0.8343E+02-0.1560E+03
       SYY -0.7617E+02-0.4516E+02
       SZZ -0.3806E+03-0.9453E+02
      SHEAR STRESSES
       SXY   0.0000E+00 0.0000E+00
       SXZ   0.1019E+02 0.2499E-03
       SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
       PS 1-0.7617E+02-0.4516E+02
       PS 2-0.8308E+02-0.9453E+02
       PS 3-0.3809E+03-0.1560E+03
     THETA   0.5402E+03 0.2957E+03
 DEV. STRESS   0.3047E+03 0.1108E+03
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
       PSS1 0.1524E+03 0.5541E+02
       PSS2 0.3457E+01 0.2469E+02
       PSS3 0.1489E+03 0.3072E+02
      DISPLACEMENTS
       UX    0.7224E-02-0.5027E-07
       UY    0.0000E+00 0.0000E+00
       UZ    0.6044E+00 0.5503E+00
      NORMAL STRAINS
       EXX   0.2548E-03-0.3571E-03
       EYY   0.2876E-03 0.1418E-03
       EZZ -0.1083E-02-0.8050E-04
      SHEAR STRAINS
       EXY   0.0000E+00 0.0000E+00
       EXZ   0.9178E-04 0.2250E-08
       EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
       PE 1 0.2876E-03 0.1418E-03
       PE 2 0.2564E-03-0.8050E-04
       PE 3-0.1084E-02-0.3571E-03
      PRINCIPAL SHEAR STRAINS
       PSE1 0.1372E-02 0.4989E-03
       PSE2 0.3113E-04 0.2223E-03
       PSE3 0.1341E-02 0.2766E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 3s-cm-3
              Z= 201.00    LAYER NO    2
              X=           0.00        175.00
              Y=           0.00          0.00
           NORMAL STRESSES
            SXX -0.4921E+01-0.4507E+02
            SYY    0.9606E+01 0.8336E+01
            SZZ -0.1728E+03-0.1125E+03
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.1947E+02 0.4127E-03
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1 0.9606E+01 0.8336E+01
            PS 2-0.2691E+01-0.4507E+02
            PS 3-0.1750E+03-0.1125E+03
          THETA    0.1681E+03 0.1493E+03
    DEV. STRESS    0.1846E+03 0.1209E+03
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.9230E+02 0.6043E+02
            PSS2 0.6149E+01 0.2670E+02
            PSS3 0.8615E+02 0.3372E+02
           DISPLACEMENTS
            UX    -0.4420E-02-0.1125E-06
            UY      0.0000E+00 0.0000E+00
            UZ      0.5257E+00 0.5281E+00
           NORMAL STRAINS
            EXX    0.1196E-03-0.6346E-04
            EYY    0.1802E-03 0.1592E-03
            EZZ -0.5801E-03-0.3446E-03
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.1624E-03 0.3441E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.1802E-03 0.1592E-03
            PE 2 0.1289E-03-0.6346E-04
            PE 3-0.5894E-03-0.3446E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.7695E-03 0.5038E-03
            PSE2 0.5126E-04 0.2226E-03
            PSE3 0.7183E-03 0.2811E-03
```

```
ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM   1 - 3s-cm-3
          Z= 300.00   LAYER NO   2
          X=          0.00        175.00
          Y=          0.00          0.00
        NORMAL STRESSES
          SXX   0.9349E+01 0.1427E+01
          SYY   0.2277E+02 0.2481E+02
          SZZ -0.8602E+02-0.7974E+02
        SHEAR STRESSES
          SXY   0.0000E+00 0.0000E+00
          SXZ   0.1884E+02 0.3611E-03
          SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
          PS 1 0.2277E+02 0.2481E+02
          PS 2 0.1294E+02 0.1427E+01
          PS 3-0.8961E+02-0.7974E+02
        THETA   0.5391E+02 0.5351E+02
DEV. STRESS   0.1124E+03 0.1045E+03
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
          PSS1 0.5619E+02 0.5227E+02
          PSS2 0.4915E+01 0.1169E+02
          PSS3 0.5127E+02 0.4058E+02
        DISPLACEMENTS
          UX   -0.1190E-01-0.1560E-06
          UY    0.0000E+00 0.0000E+00
          UZ    0.4836E+00 0.4964E+00
        NORMAL STRAINS
          EXX   0.8392E-04 0.5056E-04
          EYY   0.1398E-03 0.1480E-03
          EZZ -0.3137E-03-0.2878E-03
        SHEAR STRAINS
          EXY   0.0000E+00 0.0000E+00
          EXZ   0.1571E-03 0.3011E-08
          EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
          PE 1 0.1398E-03 0.1480E-03
          PE 2 0.9887E-04 0.5056E-04
          PE 3-0.3286E-03-0.2878E-03
        PRINCIPAL SHEAR STRAINS
          PSE1 0.4685E-03 0.4358E-03
          PSE2 0.4097E-04 0.9746E-04
          PSE3 0.4275E-03 0.3384E-03
```

```
   ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
   ELASTIC SYSTEM    1 - 3s-cm-3
            Z= 399.00    LAYER NO    2
            X=           0.00        175.00
            Y=           0.00          0.00
          NORMAL STRESSES
           SXX    0.3238E+02 0.3374E+02
           SYY    0.4745E+02 0.5168E+02
           SZZ -0.4819E+02-0.5129E+02
          SHEAR STRESSES
           SXY    0.0000E+00 0.0000E+00
           SXZ    0.1194E+02 0.2099E-03
           SYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1 0.4745E+02 0.5168E+02
           PS 2 0.3411E+02 0.3374E+02
           PS 3-0.4992E+02-0.5129E+02
         THETA -0.3164E+02-0.3413E+02
   DEV. STRESS    0.9737E+02 0.1030E+03
              (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.4869E+02 0.5149E+02
           PSS2 0.6668E+01 0.8969E+01
           PSS3 0.4202E+02 0.4252E+02
          DISPLACEMENTS
           UX    -0.1987E-01-0.2636E-06
           UY     0.0000E+00 0.0000E+00
           UZ     0.4579E+00 0.4707E+00
          NORMAL STRAINS
           EXX    0.1086E-03 0.1122E-03
           EYY    0.1714E-03 0.1870E-03
           EZZ -0.2273E-03-0.2423E-03
          SHEAR STRAINS
           EXY    0.0000E+00 0.0000E+00
           EXZ    0.9956E-04 0.1750E-08
           EYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.1714E-03 0.1870E-03
           PE 2 0.1158E-03 0.1122E-03
           PE 3-0.2345E-03-0.2423E-03
          PRINCIPAL SHEAR STRAINS
           PSE1 0.4059E-03 0.4292E-03
           PSE2 0.5559E-04 0.7478E-04
           PSE3 0.3503E-03 0.3545E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 3s-cm-3

```
        Z= 401.00   LAYER NO   3
        X=        0.00       175.00
        Y=        0.00         0.00
      NORMAL STRESSES
       SXX   0.3164E+01 0.3071E+01
       SYY   0.1013E+02 0.1134E+02
       SZZ -0.4776E+02-0.5089E+02
      SHEAR STRESSES
       SXY   0.0000E+00 0.0000E+00
       SXZ   0.1181E+02 0.2557E-03
       SYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRESSES
       PS 1 0.1013E+02 0.1134E+02
       PS 2 0.5770E+01 0.3071E+01
       PS 3-0.5036E+02-0.5089E+02
      THETA   0.3446E+02 0.3647E+02
DEV. STRESS   0.6050E+02 0.6223E+02
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
      PRINCIPAL SHEAR STRESSES
       PSS1 0.3025E+02 0.3111E+02
       PSS2 0.2182E+01 0.4137E+01
       PSS3 0.2807E+02 0.2698E+02
      DISPLACEMENTS
       UX   -0.1996E-01-0.3275E-06
       UY    0.0000E+00 0.0000E+00
       UZ    0.4574E+00 0.4700E+00
      NORMAL STRAINS
       EXX   0.1089E-03 0.1128E-03
       EYY   0.1717E-03 0.1873E-03
       EZZ -0.3496E-03-0.3730E-03
      SHEAR STRAINS
       EXY   0.0000E+00 0.0000E+00
       EXZ   0.2127E-03 0.4605E-08
       EYZ   0.0000E+00 0.0000E+00
      PRINCIPAL STRAINS
       PE 1 0.1717E-03 0.1873E-03
       PE 2 0.1324E-03 0.1128E-03
       PE 3-0.3730E-03-0.3730E-03
      PRINCIPAL SHEAR STRAINS
       PSE1 0.5447E-03 0.5603E-03
       PSE2 0.3929E-04 0.7449E-04
       PSE3 0.5054E-03 0.4858E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 3s-cm-3
          Z= 525.00   LAYER NO   3
          X=          0.00       175.00
          Y=          0.00         0.00
        NORMAL STRESSES
          SXX   0.1005E+02 0.1221E+02
          SYY   0.1419E+02 0.1581E+02
          SZZ -0.2828E+02-0.3090E+02
        SHEAR STRESSES
          SXY   0.0000E+00 0.0000E+00
          SXZ   0.7855E+01 0.1645E-03
          SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
          PS 1 0.1419E+02 0.1581E+02
          PS 2 0.1159E+02 0.1221E+02
          PS 3-0.2983E+02-0.3090E+02
       THETA   0.4050E+01 0.2884E+01
DEV. STRESS   0.4402E+02 0.4671E+02
             (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
          PSS1 0.2201E+02 0.2335E+02
          PSS2 0.1298E+01 0.1801E+01
          PSS3 0.2071E+02 0.2155E+02
        DISPLACEMENTS
          UX   -0.1961E-01-0.3139E-06
          UY    0.0000E+00 0.0000E+00
          UZ    0.4215E+00 0.4309E+00
        NORMAL STRAINS
          EXX   0.9991E-04 0.1166E-03
          EYY   0.1372E-03 0.1491E-03
          EZZ -0.2452E-03-0.2715E-03
        SHEAR STRAINS
          EXY   0.0000E+00 0.0000E+00
          EXZ   0.1414E-03 0.2962E-08
          EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
          PE 1 0.1372E-03 0.1491E-03
          PE 2 0.1138E-03 0.1166E-03
          PE 3-0.2591E-03-0.2715E-03
        PRINCIPAL SHEAR STRAINS
          PSE1 0.3964E-03 0.4206E-03
          PSE2 0.2337E-04 0.3243E-04
          PSE3 0.3730E-03 0.3881E-03
```

```
   ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
   ELASTIC SYSTEM   1 - 3s-cm-3
              Z= 651.00   LAYER NO   4
              X=          0.00       175.00
              Y=          0.00         0.00
          NORMAL STRESSES
           SXX   0.1055E+00 0.8020E+00
           SYY   0.1456E+01 0.1812E+01
           SZZ -0.1857E+02-0.2007E+02
          SHEAR STRESSES
           SXY   0.0000E+00 0.0000E+00
           SXZ   0.3176E+01 0.6440E-04
           SYZ   0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1 0.1456E+01 0.1812E+01
           PS 2 0.6307E+00 0.8020E+00
           PS 3-0.1910E+02-0.2007E+02
         THETA   0.1701E+02 0.1746E+02
   DEV. STRESS   0.2055E+02 0.2188E+02
               (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.1028E+02 0.1094E+02
           PSS2 0.4127E+00 0.5048E+00
           PSS3 0.9864E+01 0.1044E+02
          DISPLACEMENTS
           UX   -0.2409E-01-0.4199E-06
           UY    0.0000E+00 0.0000E+00
           UZ    0.3924E+00 0.3987E+00
          NORMAL STRAINS
           EXX   0.1220E-03 0.1439E-03
           EYY   0.1585E-03 0.1712E-03
           EZZ -0.3826E-03-0.4199E-03
          SHEAR STRAINS
           EXY   0.0000E+00 0.0000E+00
           EXZ   0.1716E-03 0.3479E-08
           EYZ   0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.1585E-03 0.1712E-03
           PE 2 0.1362E-03 0.1439E-03
           PE 3-0.3968E-03-0.4199E-03
          PRINCIPAL SHEAR STRAINS
           PSE1 0.5552E-03 0.5911E-03
           PSE2 0.2229E-04 0.2727E-04
           PSE3 0.5329E-03 0.5639E-03
```

MECHANISTIC ANALYSIS DETAILS FOR THE NAMPULA CUAMBA ROAD PAVEMENT - RR91/242

PAVEMENT STRUCTURE

30 mm	S2
150 mm	G3
200 mm	C4
200 mm	G7
Semi-infi.	S4

Road Categor : **B**

Design Class of traffic: **T6**

Pavement T pe: **Granular Base**

Input Values

La er Nr	Thickness (mm)	Poisson Coef.	E-Modulus (Mpa)		
			Phase-I	Phase-II	Phase-III
2	150	0.35	400	400	300
3	200	0.25	1,500	600	300
4	200	0.35	150	150	150
5	1/2 INF.	0.35	80	80	80

Critical Parameters

Stresses (δ1 / δ3 KPa) & Strains (ε)		
Phase-I	Phase-II	Phase-III
(480.6/142)	(463.2/138.8)	(453.3/126.7)
1.33E-04	1.8E-04	(118.9/-22.7)
2.90E-04	3.72E-04	4.38E-04
3.0E-04	3.6E-04	4.2E-04

Anal ysis

La er Nr	Layer Life (E80's)		
	Phase-I	Phase-II	Phase-III
2	1.00E+09	1.00E+09	1.00E+09
3	7.00E+06	1.47E+05	5.00E+07
4	1.21E+09	9.98E+07	1.92E+07
5	8.66E+08	1.48E+08	3.26E+07
	7.00E+06	**1.47E+05**	**1.92E+07**

Structural Life (E80's)

Wet: **2.64E+07**

(sum of minimum of each phase)

Deflection (mm)

Inicial	***Final***
0.4585	***0.6253***

MECHANISTIC ANALYSIS DETAILS FOR THE NAMPULA CUAMBA ROAD PAVEMENT- THEYSE

PAVEMENT STRUCTURE

30 mm	S2
150 mm	G3
200 mm	C4
200 mm	G7
Semi-infi.	S4

Road Categor : **B**

Design Class of traffic: **T6**

Pavement T pe: **Granular Base**

Input Values

La er Nr	Thickness (mm)	Poisson Coef.	E-Modulus (Mpa) Phase-I	Phase-II	Phase-III
2	150	0.35	400	400	300
3	200	0.25	1,500	600	300
4	200	0.35	150	150	150
5	1/2 INF.	0.35	80	80	80

Critical Parameters

Stresses (δ1 / δ3 KPa) & Strains (ε) Phase-I	Phase-II	Phase-III
(480.6/142)	(463.2/138.8)	(453.3/126.7)
1.33E-04	1.8E-04	(118.9/-22.7)
2.90E-04	3.72E-04	4.38E-04
3.0E-04	3.6E-04	4.2E-04

Anal ysis

La er Nr	Layer Life (E80's) Phase-I	Phase-II	Phase-III
2	5.00E+11	6.43E+11	1.97E+11
3	1.98E+06	1.41E+05	2.23E+07
4	5.78E+08	4.78E+07	9.21E+06
5	4.14E+08	7.07E+07	1.56E+07
	1.98E+06	**1.41E+05**	**9.21E+06**

Structural Life (E80's)

Wet: **1.13E+07**

(sum of minimum of each phase)

Deflection (mm)

Inicial	*Final*
0.4585	***0.6253***

S4 Sub-grade

N13-Cuamba-Lichinga Road

PHASE 1

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-1

	ELASTIC MODULUS	POISSONS RATIO	LAYER THICKNESS
1	400.	0.350	150.000 MM
2	1500.	0.250	200.000 MM
3	150.	0.350	200.000 MM
4	80.	0.350	SEMI-INFINITE

TWO LOAD(S),EACH LOAD AS FOLLOWS

TOTAL LOAD..... 20.00 KN

LOAD STRESS.... 559.87KPA

LOAD RADIUS.... 106.63 MM

LOCATED AT

LOAD	X	Y
1	0.000	0.000
2	349.999	0.000

RESULTS REQUESTED FOR SYSTEM LOCATION(S)

DEPTH(S)

Z= 0.00 75.00 151.00 250.00 349.00 351.00 450.00 551.00

X-Y POINT(S)

X= 0.00 175.00

Y= 0.00 0.00

```
ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM  1 - 4s-cm-1
      Z=    0.00   LAYER NO   1
      X=         0.00        175.00
      Y=         0.00          0.00
    NORMAL STRESSES
     SXX -0.4587E+03 0.2764E+02
     SYY -0.4661E+03-0.6089E+02
     SZZ -0.5624E+03 0.1143E+02
    SHEAR STRESSES
     SXY   0.0000E+00 0.0000E+00
     SXZ -0.1165E-05 0.1043E-11
     SYZ   0.0000E+00 0.0000E+00
    PRINCIPAL STRESSES
     PS 1-0.4587E+03 0.2764E+02
     PS 2-0.4661E+03 0.1143E+02
     PS 3-0.5624E+03-0.6089E+02
   THETA   0.1487E+04 0.2181E+02
DEV. STRESS   0.1037E+03 0.8853E+02
       (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
    PRINCIPAL SHEAR STRESSES
     PSS1 0.5183E+02 0.4427E+02
     PSS2 0.3707E+01 0.8106E+01
     PSS3 0.4812E+02 0.3616E+02
    DISPLACEMENTS
     UX    0.1845E-01-0.5441E-09
     UY    0.0000E+00 0.0000E+00
     UZ    0.4585E+00 0.3336E+00
    NORMAL STRAINS
     EXX -0.2470E-03 0.1124E-03
     EYY -0.2720E-03-0.1865E-03
     EZZ -0.5970E-03 0.5770E-04
    SHEAR STRAINS
     EXY   0.0000E+00 0.0000E+00
     EXZ -0.7868E-11 0.7042E-17
     EYZ   0.0000E+00 0.0000E+00
    PRINCIPAL STRAINS
     PE 1-0.2470E-03 0.1124E-03
     PE 2-0.2720E-03 0.5770E-04
     PE 3-0.5970E-03-0.1865E-03
    PRINCIPAL SHEAR STRAINS
     PSE1 0.3500E-03 0.2989E-03
     PSE2 0.2504E-04 0.5474E-04
     PSE3 0.3250E-03 0.2442E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-1

Z= 75.00 LAYER NO 1

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.1423E+03-0.1866E+03

SYY -0.1421E+03-0.6675E+02

SZZ -0.4803E+03-0.6265E+02

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.8900E+01 0.1677E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1-0.1420E+03-0.6265E+02

PS 2-0.1421E+03-0.6675E+02

PS 3-0.4806E+03-0.1866E+03

THETA 0.7647E+03 0.3160E+03

DEV. STRESS 0.3385E+03 0.1240E+03

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.1693E+03 0.6199E+02

PSS2 0.1769E-01 0.2049E+01

PSS3 0.1692E+03 0.5994E+02

DISPLACEMENTS

UX 0.1093E-01-0.1774E-07

UY 0.0000E+00 0.0000E+00

UZ 0.3932E+00 0.3424E+00

NORMAL STRAINS

EXX 0.1890E-03-0.3535E-03

EYY 0.1897E-03 0.5127E-04

EZZ -0.9524E-03 0.6511E-04

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.6010E-04 0.1132E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.1898E-03 0.6511E-04

PE 2 0.1897E-03 0.5127E-04

PE 3-0.9532E-03-0.3535E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.1143E-02 0.4186E-03

PSE2 0.1194E-06 0.1384E-04

PSE3 0.1143E-02 0.4048E-03

```
ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM   1 - 4s-cm-1
          Z= 151.00   LAYER NO   2
          X=          0.00       175.00
          Y=          0.00         0.00
        NORMAL STRESSES
         SXX -0.1023E+03-0.1761E+03
         SYY -0.1133E+03-0.1144E+03
         SZZ -0.2993E+03-0.1061E+03
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.1830E+02 0.5707E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1-0.1006E+03-0.1061E+03
         PS 2-0.1133E+03-0.1144E+03
         PS 3-0.3009E+03-0.1761E+03
       THETA   0.5148E+03 0.3965E+03
DEV. STRESS   0.2003E+03 0.6999E+02
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.1002E+03 0.3500E+02
         PSS2 0.6350E+01 0.4135E+01
         PSS3 0.9382E+02 0.3086E+02
        DISPLACEMENTS
         UX     0.7212E-02 0.2052E-07
         UY     0.0000E+00 0.0000E+00
         UZ     0.3367E+00 0.3403E+00
        NORMAL STRAINS
         EXX   0.5692E-06-0.8068E-04
         EYY -0.8612E-05-0.2922E-04
         EZZ -0.1636E-03-0.2233E-04
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.3052E-04 0.9516E-09
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.1975E-05-0.2233E-04
         PE 2-0.8612E-05-0.2922E-04
         PE 3-0.1651E-03-0.8068E-04
        PRINCIPAL SHEAR STRAINS
         PSE1 0.1670E-03 0.5835E-04
         PSE2 0.1059E-04 0.6895E-05
         PSE3 0.1564E-03 0.5146E-04
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 4s-cm-1
              Z= 250.00    LAYER NO    2
              X=           0.00        175.00
              Y=           0.00          0.00
           NORMAL STRESSES
            SXX    0.2400E+02 0.2509E+01
            SYY    0.4190E+02 0.4508E+02
            SZZ -0.1166E+03-0.8062E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.2869E+02 0.7019E-03
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1 0.4190E+02 0.4508E+02
            PS 2 0.2963E+02 0.2509E+01
            PS 3-0.1222E+03-0.8062E+02
          THETA    0.5072E+02 0.3304E+02
    DEV. STRESS    0.1641E+03 0.1257E+03
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.8207E+02 0.6285E+02
            PSS2 0.6132E+01 0.2128E+02
            PSS3 0.7594E+02 0.4157E+02
           DISPLACEMENTS
            UX    -0.3152E-02-0.4559E-07
            UY     0.0000E+00 0.0000E+00
            UZ     0.3247E+00 0.3356E+00
           NORMAL STRAINS
            EXX    0.2847E-04 0.7600E-05
            EYY    0.4339E-04 0.4309E-04
            EZZ -0.8877E-04-0.6171E-04
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.4784E-04 0.1170E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.4339E-04 0.4309E-04
            PE 2 0.3316E-04 0.7600E-05
            PE 3-0.9346E-04-0.6171E-04
           PRINCIPAL SHEAR STRAINS
            PSE1 0.1368E-03 0.1048E-03
            PSE2 0.1022E-04 0.3549E-04
            PSE3 0.1266E-03 0.6931E-04
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-1

Z= 349.00 LAYER NO 2
X= 0.00 175.00
Y= 0.00 0.00

NORMAL STRESSES
SXX 0.1643E+03 0.1605E+03
SYY 0.2158E+03 0.2283E+03
SZZ -0.4105E+02-0.4269E+02

SHEAR STRESSES
SXY 0.0000E+00 0.0000E+00
SXZ 0.8300E+01 0.1584E-03
SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES
PS 1 0.2158E+03 0.2283E+03
PS 2 0.1647E+03 0.1605E+03
PS 3-0.4139E+02-0.4269E+02
THETA -0.3391E+03-0.3462E+03
DEV. STRESS 0.2572E+03 0.2710E+03
(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES
PSS1 0.1286E+03 0.1355E+03
PSS2 0.2556E+02 0.3389E+02
PSS3 0.1030E+03 0.1016E+03

DISPLACEMENTS
UX -0.1398E-01-0.1866E-06
UY 0.0000E+00 0.0000E+00
UZ 0.3166E+00 0.3283E+00

NORMAL STRAINS
EXX 0.8047E-04 0.7613E-04
EYY 0.1234E-03 0.1326E-03
EZZ -0.9076E-04-0.9332E-04

SHEAR STRAINS
EXY 0.0000E+00 0.0000E+00
EXZ 0.1384E-04 0.2642E-09
EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS
PE 1 0.1234E-03 0.1326E-03
PE 2 0.8075E-04 0.7613E-04
PE 3-0.9104E-04-0.9332E-04

PRINCIPAL SHEAR STRAINS
PSE1 0.2144E-03 0.2259E-03
PSE2 0.4263E-04 0.5650E-04
PSE3 0.1718E-03 0.1694E-03

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-1

Z= 351.00 LAYER NO 3

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.6350E+00-0.1721E+01

SYY 0.4157E+01 0.4582E+01

SZZ -0.4072E+02-0.4242E+02

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.7918E+01 0.1802E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1 0.4157E+01 0.4582E+01

PS 2 0.8724E+00-0.1721E+01

PS 3-0.4223E+02-0.4242E+02

THETA 0.3720E+02 0.3956E+02

DEV. STRESS 0.4639E+02 0.4700E+02

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.2319E+02 0.2350E+02

PSS2 0.1642E+01 0.3151E+01

PSS3 0.2155E+02 0.2035E+02

DISPLACEMENTS

UX -0.1411E-01-0.2338E-06

UY 0.0000E+00 0.0000E+00

UZ 0.3163E+00 0.3279E+00

NORMAL STRAINS

EXX 0.8113E-04 0.7686E-04

EYY 0.1243E-03 0.1336E-03

EZZ -0.2798E-03-0.2896E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.1426E-03 0.3245E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.1243E-03 0.1336E-03

PE 2 0.9470E-04 0.7686E-04

PE 3-0.2934E-03-0.2896E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.4177E-03 0.4232E-03

PSE2 0.2958E-04 0.5675E-04

PSE3 0.3881E-03 0.3665E-03

```
ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM   1 - 4s-cm-1
          Z= 450.00   LAYER NO   3
          X=          0.00        175.00
          Y=          0.00          0.00
        NORMAL STRESSES
         SXX   0.3415E+01 0.4301E+01
         SYY   0.6675E+01 0.7410E+01
         SZZ -0.2879E+02-0.3119E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.5935E+01 0.1294E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.6675E+01 0.7410E+01
         PS 2 0.4474E+01 0.4301E+01
         PS 3-0.2985E+02-0.3119E+02
       THETA   0.1870E+02 0.1948E+02
DEV. STRESS   0.3652E+02 0.3860E+02
           (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.1826E+02 0.1930E+02
         PSS2 0.1101E+01 0.1554E+01
         PSS3 0.1716E+02 0.1774E+02
        DISPLACEMENTS
         UX   -0.1425E-01-0.2365E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.2922E+00 0.3021E+00
        NORMAL STRAINS
         EXX   0.7440E-04 0.8419E-04
         EYY   0.1038E-03 0.1122E-03
         EZZ -0.2156E-03-0.2353E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.1069E-03 0.2331E-08
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.1038E-03 0.1122E-03
         PE 2 0.8394E-04 0.8419E-04
         PE 3-0.2251E-03-0.2353E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.3289E-03 0.3475E-03
         PSE2 0.1982E-04 0.2799E-04
         PSE3 0.3090E-03 0.3195E-03
```

```
ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
ELASTIC SYSTEM  1 - 4s-cm-1
      Z= 551.00  LAYER NO  4
      X=       0.00      175.00
      Y=       0.00        0.00
    NORMAL STRESSES
     SXX -0.9005E+00-0.4257E+00
     SYY  0.6525E+00 0.8228E+00
     SZZ -0.2187E+02-0.2380E+02
    SHEAR STRESSES
     SXY  0.0000E+00 0.0000E+00
     SXZ  0.3557E+01 0.7520E-04
     SYZ  0.0000E+00 0.0000E+00
    PRINCIPAL STRESSES
     PS 1 0.6525E+00 0.8228E+00
     PS 2-0.3134E+00-0.4257E+00
     PS 3-0.2246E+02-0.2380E+02
    THETA  0.2212E+02 0.2341E+02
DEV. STRESS  0.2311E+02 0.2463E+02
        (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
    PRINCIPAL SHEAR STRESSES
     PSS1 0.1155E+02 0.1231E+02
     PSS2 0.4829E+00 0.6242E+00
     PSS3 0.1107E+02 0.1169E+02
    DISPLACEMENTS
     UX   -0.1592E-01-0.2859E-06
     UY    0.0000E+00 0.0000E+00
     UZ    0.2718E+00 0.2797E+00
    NORMAL STRAINS
     EXX  0.8160E-04 0.9526E-04
     EYY  0.1078E-03 0.1163E-03
     EZZ -0.2724E-03-0.2994E-03
    SHEAR STRAINS
     EXY  0.0000E+00 0.0000E+00
     EXZ  0.1201E-03 0.2539E-08
     EYZ  0.0000E+00 0.0000E+00
    PRINCIPAL STRAINS
     PE 1 0.1078E-03 0.1163E-03
     PE 2 0.9151E-04 0.9526E-04
     PE 3-0.2823E-03-0.2994E-03
    PRINCIPAL SHEAR STRAINS
     PSE1 0.3901E-03 0.4157E-03
     PSE2 0.1631E-04 0.2108E-04
     PSE3 0.3738E-03 0.3947E-03
```

PHASE 2

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-2

	ELASTIC MODULUS	POISSONS RATIO	LAYER THICKNESS
1	400.	0.350	150.000 MM
2	600.	0.250	200.000 MM
3	150.	0.350	200.000 MM
4	80.	0.350	SEMI-INFINITE

TWO LOAD(S),EACH LOAD AS FOLLOWS

TOTAL LOAD..... 20.00 KN

LOAD STRESS.... 559.87KPA

LOAD RADIUS.... 106.63 MM

LOCATED AT

LOAD	X	Y
1	0.000	0.000
2	349.999	0.000

RESULTS REQUESTED FOR SYSTEM LOCATION(S)

DEPTH(S)

Z= 0.00 75.00 151.00 250.00 349.00 351.00 450.00 551.00

X-Y POINT(S)

X= 0.00 175.00

Y= 0.00 0.00

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 4s-cm-2
                Z=      0.00    LAYER NO    1
                X=             0.00         175.00
                Y=             0.00            0.00
             NORMAL STRESSES
              SXX -0.4967E+03 0.1855E+02
              SYY -0.5132E+03-0.9637E+02
              SZZ -0.5624E+03 0.1143E+02
             SHEAR STRESSES
              SXY    0.0000E+00 0.0000E+00
              SXZ    0.8377E-05-0.1905E-12
              SYZ    0.0000E+00 0.0000E+00
             PRINCIPAL STRESSES
              PS 1-0.4967E+03 0.1855E+02
              PS 2-0.5132E+03 0.1143E+02
              PS 3-0.5624E+03-0.9637E+02
            THETA    0.1572E+04 0.6639E+02
    DEV. STRESS    0.6563E+02 0.1149E+03
                  (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
             PRINCIPAL SHEAR STRESSES
              PSS1 0.3282E+02 0.5746E+02
              PSS2 0.8214E+01 0.3558E+01
              PSS3 0.2460E+02 0.5390E+02
             DISPLACEMENTS
              UX      0.2223E-01-0.8628E-10
              UY      0.0000E+00 0.0000E+00
              UZ      0.5103E+00 0.3854E+00
             NORMAL STRAINS
              EXX -0.3009E-03 0.1208E-03
              EYY -0.3564E-03-0.2673E-03
              EZZ -0.5225E-03 0.9672E-04
             SHEAR STRAINS
              EXY    0.0000E+00 0.0000E+00
              EXZ    0.5657E-10-0.1287E-17
              EYZ    0.0000E+00 0.0000E+00
             PRINCIPAL STRAINS
              PE 1-0.3009E-03 0.1208E-03
              PE 2-0.3564E-03 0.9672E-04
              PE 3-0.5225E-03-0.2673E-03
             PRINCIPAL SHEAR STRAINS
              PSE1 0.2216E-03 0.3880E-03
              PSE2 0.5547E-04 0.2403E-04
              PSE3 0.1661E-03 0.3640E-03
```

```
ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)
ELASTIC SYSTEM   1 - 4s-cm-2
         Z=   75.00   LAYER NO   1
         X=          0.00        175.00
         Y=          0.00          0.00
       NORMAL STRESSES
        SXX -0.1391E+03-0.1832E+03
        SYY -0.1393E+03-0.6847E+02
        SZZ -0.4629E+03-0.6436E+02
       SHEAR STRESSES
        SXY   0.0000E+00 0.0000E+00
        SXZ   0.9479E+01 0.2071E-03
        SYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRESSES
        PS 1-0.1388E+03-0.6436E+02
        PS 2-0.1393E+03-0.6847E+02
        PS 3-0.4632E+03-0.1832E+03
      THETA   0.7414E+03 0.3160E+03
DEV. STRESS   0.3244E+03 0.1188E+03
           (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
       PRINCIPAL SHEAR STRESSES
        PSS1 0.1622E+03 0.5941E+02
        PSS2 0.2405E+00 0.2056E+01
        PSS3 0.1619E+03 0.5735E+02
       DISPLACEMENTS
        UX     0.1076E-01-0.1589E-07
        UY     0.0000E+00 0.0000E+00
        UZ     0.4486E+00 0.3955E+00
       NORMAL STRAINS
        EXX   0.1793E-03-0.3419E-03
        EYY   0.1786E-03 0.4543E-04
        EZZ -0.9141E-03 0.5932E-04
       SHEAR STRAINS
        EXY   0.0000E+00 0.0000E+00
        EXZ   0.6401E-04 0.1399E-08
        EYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRAINS
        PE 1 0.1802E-03 0.5932E-04
        PE 2 0.1786E-03 0.4543E-04
        PE 3-0.9151E-03-0.3419E-03
       PRINCIPAL SHEAR STRAINS
        PSE1 0.1095E-02 0.4012E-03
        PSE2 0.1624E-05 0.1389E-04
        PSE3 0.1094E-02 0.3873E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-2

Z= 151.00 LAYER NO 2

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.2713E+02-0.9859E+02

SYY -0.1999E+02-0.2113E+02

SZZ -0.2669E+03-0.1086E+03

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.1901E+02 0.5538E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1-0.1999E+02-0.2113E+02

PS 2-0.2563E+02-0.9859E+02

PS 3-0.2684E+03-0.1086E+03

THETA 0.3140E+03 0.2283E+03

DEV. STRESS 0.2484E+03 0.8745E+02

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.1242E+03 0.4373E+02

PSS2 0.2820E+01 0.3873E+02

PSS3 0.1214E+03 0.4997E+01

DISPLACEMENTS

UX 0.3370E-02-0.3605E-07

UY 0.0000E+00 0.0000E+00

UZ 0.3931E+00 0.3914E+00

NORMAL STRAINS

EXX 0.7433E-04-0.1103E-03

EYY 0.8921E-04 0.5113E-04

EZZ -0.4253E-03-0.1311E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.7923E-04 0.2308E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.8921E-04 0.5113E-04

PE 2 0.7746E-04-0.1103E-03

PE 3-0.4284E-03-0.1311E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.5176E-03 0.1823E-03

PSE2 0.1176E-04 0.1614E-03

PSE3 0.5059E-03 0.2083E-04

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 4s-cm-2
          Z= 250.00   LAYER NO   2
          X=          0.00        175.00
          Y=          0.00          0.00
        NORMAL STRESSES
         SXX   0.1786E+02-0.9026E+00
         SYY   0.3473E+02 0.3705E+02
         SZZ -0.1125E+03-0.8567E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.2242E+02 0.5530E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.3473E+02 0.3705E+02
         PS 2 0.2161E+02-0.9026E+00
         PS 3-0.1163E+03-0.8567E+02
       THETA   0.5996E+02 0.4952E+02
DEV. STRESS   0.1510E+03 0.1227E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.7551E+02 0.6136E+02
         PSS2 0.6562E+01 0.1898E+02
         PSS3 0.6895E+02 0.4238E+02
        DISPLACEMENTS
         UX   -0.7080E-02-0.1035E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.3634E+00 0.3763E+00
        NORMAL STRAINS
         EXX   0.6221E-04 0.1876E-04
         EYY   0.9738E-04 0.9786E-04
         EZZ -0.2096E-03-0.1579E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.9346E-04 0.2305E-08
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.9738E-04 0.9786E-04
         PE 2 0.7002E-04 0.1876E-04
         PE 3-0.2174E-03-0.1579E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.3148E-03 0.2558E-03
         PSE2 0.2735E-04 0.7910E-04
         PSE3 0.2874E-03 0.1767E-03
```

```
ELSYM5  3/72 - 3,  ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
  ELASTIC SYSTEM  1 - 4s-cm-2
          Z= 349.00   LAYER NO   2
          X=        0.00      175.00
          Y=        0.00        0.00
        NORMAL STRESSES
         SXX   0.7789E+02 0.7335E+02
         SYY   0.1080E+03 0.1143E+03
         SZZ -0.5187E+02-0.5342E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.1077E+02 0.2154E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.1080E+03 0.1143E+03
         PS 2 0.7877E+02 0.7335E+02
         PS 3-0.5276E+02-0.5342E+02
       THETA -0.1340E+03-0.1342E+03
  DEV. STRESS   0.1608E+03 0.1677E+03
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.8038E+02 0.8385E+02
         PSS2 0.1462E+02 0.2046E+02
         PSS3 0.6577E+02 0.6338E+02
        DISPLACEMENTS
         UX   -0.1816E-01-0.2566E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.3462E+00 0.3606E+00
        NORMAL STRAINS
         EXX   0.1065E-03 0.9694E-04
         EYY   0.1692E-03 0.1822E-03
         EZZ -0.1640E-03-0.1673E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.4489E-04 0.8978E-09
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.1692E-03 0.1822E-03
         PE 2 0.1083E-03 0.9694E-04
         PE 3-0.1658E-03-0.1673E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.3351E-03 0.3495E-03
         PSE2 0.6093E-04 0.8529E-04
         PSE3 0.2741E-03 0.2642E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 4s-cm-2
          Z= 351.00   LAYER NO   3
          X=       0.00       175.00
          Y=       0.00         0.00
        NORMAL STRESSES
         SXX   0.7731E+00-0.9221E+00
         SYY   0.7767E+01 0.8560E+01
         SZZ -0.5141E+02-0.5305E+02
        SHEAR STRESSES
         SXY   0.0000E+00 0.0000E+00
         SXZ   0.1055E+02 0.2572E-03
         SYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRESSES
         PS 1 0.7767E+01 0.8560E+01
         PS 2 0.2826E+01-0.9221E+00
         PS 3-0.5347E+02-0.5305E+02
       THETA   0.4287E+02 0.4541E+02
DEV. STRESS   0.6123E+02 0.6161E+02
            (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
        PRINCIPAL SHEAR STRESSES
         PSS1 0.3062E+02 0.3080E+02
         PSS2 0.2471E+01 0.4741E+01
         PSS3 0.2815E+02 0.2606E+02
        DISPLACEMENTS
         UX   -0.1828E-01-0.3201E-06
         UY    0.0000E+00 0.0000E+00
         UZ    0.3457E+00 0.3601E+00
        NORMAL STRAINS
         EXX   0.1070E-03 0.9770E-04
         EYY   0.1700E-03 0.1831E-03
         EZZ -0.3628E-03-0.3716E-03
        SHEAR STRAINS
         EXY   0.0000E+00 0.0000E+00
         EXZ   0.1900E-03 0.4631E-08
         EYZ   0.0000E+00 0.0000E+00
        PRINCIPAL STRAINS
         PE 1 0.1700E-03 0.1831E-03
         PE 2 0.1255E-03 0.9770E-04
         PE 3-0.3813E-03-0.3716E-03
        PRINCIPAL SHEAR STRAINS
         PSE1 0.5514E-03 0.5547E-03
         PSE2 0.4449E-04 0.8537E-04
         PSE3 0.5069E-03 0.4693E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 4s-cm-2
            Z= 450.00   LAYER NO   3
            X=          0.00       175.00
            Y=          0.00         0.00
          NORMAL STRESSES
           SXX   0.5072E+01 0.6153E+01
           SYY   0.9686E+01 0.1071E+02
           SZZ -0.3479E+02-0.3768E+02
          SHEAR STRESSES
           SXY   0.0000E+00 0.0000E+00
           SXZ   0.7754E+01 0.1799E-03
           SYZ   0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1 0.9686E+01 0.1071E+02
           PS 2 0.6527E+01 0.6153E+01
           PS 3-0.3625E+02-0.3768E+02
         THETA   0.2003E+02 0.2082E+02
DEV. STRESS   0.4593E+02 0.4839E+02
             (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.2297E+02 0.2420E+02
           PSS2 0.1579E+01 0.2280E+01
           PSS3 0.2139E+02 0.2192E+02
          DISPLACEMENTS
           UX   -0.1766E-01-0.3060E-06
           UY    0.0000E+00 0.0000E+00
           UZ    0.3151E+00 0.3276E+00
          NORMAL STRAINS
           EXX   0.9244E-04 0.1040E-03
           EYY   0.1340E-03 0.1450E-03
           EZZ -0.2665E-03-0.2907E-03
          SHEAR STRAINS
           EXY   0.0000E+00 0.0000E+00
           EXZ   0.1396E-03 0.3240E-08
           EYZ   0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.1340E-03 0.1450E-03
           PE 2 0.1055E-03 0.1040E-03
           PE 3-0.2796E-03-0.2907E-03
          PRINCIPAL SHEAR STRAINS
           PSE1 0.4136E-03 0.4357E-03
           PSE2 0.2844E-04 0.4105E-04
           PSE3 0.3851E-03 0.3947E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

```
ELASTIC SYSTEM   1 - 4s-cm-2
           Z= 551.00   LAYER NO   4
           X=          0.00        175.00
           Y=          0.00          0.00
         NORMAL STRESSES
          SXX -0.4722E+00 0.1410E+00
          SYY   0.1673E+01 0.1925E+01
          SZZ -0.2552E+02-0.2785E+02
         SHEAR STRESSES
          SXY   0.0000E+00 0.0000E+00
          SXZ   0.4505E+01 0.9996E-04
          SYZ   0.0000E+00 0.0000E+00
         PRINCIPAL STRESSES
          PS 1 0.1673E+01 0.1925E+01
          PS 2 0.3134E+00 0.1410E+00
          PS 3-0.2631E+02-0.2785E+02
        THETA   0.2432E+02 0.2579E+02
DEV. STRESS   0.2798E+02 0.2978E+02
              (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
         PRINCIPAL SHEAR STRESSES
          PSS1 0.1399E+02 0.1489E+02
          PSS2 0.6798E+00 0.8918E+00
          PSS3 0.1331E+02 0.1400E+02
         DISPLACEMENTS
          UX   -0.1924E-01-0.3572E-06
          UY    0.0000E+00 0.0000E+00
          UZ    0.2904E+00 0.3003E+00
         NORMAL STRAINS
          EXX   0.9847E-04 0.1152E-03
          EYY   0.1347E-03 0.1454E-03
          EZZ -0.3244E-03-0.3573E-03
         SHEAR STRAINS
          EXY   0.0000E+00 0.0000E+00
          EXZ   0.1521E-03 0.3375E-08
          EYZ   0.0000E+00 0.0000E+00
         PRINCIPAL STRAINS
          PE 1 0.1347E-03 0.1454E-03
          PE 2 0.1117E-03 0.1152E-03
          PE 3-0.3377E-03-0.3573E-03
         PRINCIPAL SHEAR STRAINS
          PSE1 0.4723E-03 0.5027E-03
          PSE2 0.2295E-04 0.3011E-04
          PSE3 0.4494E-03 0.4726E-03
```

PHASE 3

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-3

	ELASTIC MODULUS	POISSONS RATIO	LAYER THICKNESS
1	300.	0.350	150.000 MM
2	300.	0.250	200.000 MM
3	150.	0.350	200.000 MM
4	80.	0.350	SEMI-INFINITE

TWO LOAD(S),EACH LOAD AS FOLLOWS

TOTAL LOAD..... 20.00 KN

LOAD STRESS.... 559.87KPA

LOAD RADIUS.... 106.63 MM

LOCATED AT

LOAD	X	Y
1	0.000	0.000
2	349.999	0.000

RESULTS REQUESTED FOR SYSTEM LOCATION(S)

DEPTH(S)

Z= 0.00 75.00 151.00 250.00 349.00 351.00 450.00 551.00

X-Y POINT(S)

X= 0.00 175.00

Y= 0.00 0.00

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 4s-cm-3
              Z=     0.00    LAYER NO    1
              X=           0.00        175.00
              Y=           0.00           0.00
           NORMAL STRESSES
            SXX -0.5059E+03 0.2967E+02
            SYY -0.5259E+03-0.1004E+03
            SZZ -0.5624E+03 0.1143E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ -0.1249E-04-0.6963E-13
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1-0.5059E+03 0.2967E+02
            PS 2-0.5259E+03 0.1143E+02
            PS 3-0.5624E+03-0.1004E+03
          THETA    0.1594E+04 0.5934E+02
    DEV. STRESS    0.5644E+02 0.1301E+03
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.2822E+02 0.6506E+02
            PSS2 0.1001E+02 0.9120E+01
            PSS3 0.1821E+02 0.5594E+02
           DISPLACEMENTS
            UX      0.2703E-01 0.1020E-09
            UY      0.0000E+00 0.0000E+00
            UZ      0.6253E+00 0.4552E+00
           NORMAL STRAINS
            EXX -0.4169E-03 0.2029E-03
            EYY -0.5070E-03-0.3830E-03
            EZZ -0.6710E-03 0.1207E-03
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ -0.1125E-09-0.6269E-18
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1-0.4169E-03 0.2029E-03
            PE 2-0.5070E-03 0.1207E-03
            PE 3-0.6710E-03-0.3830E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.2541E-03 0.5858E-03
            PSE2 0.9013E-04 0.8212E-04
            PSE3 0.1640E-03 0.5037E-03
```

```
ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 4s-cm-3
            Z=   75.00   LAYER NO    1
            X=           0.00         175.00
            Y=           0.00           0.00
          NORMAL STRESSES
           SXX -0.1280E+03-0.1711E+03
           SYY -0.1267E+03-0.5787E+02
           SZZ -0.4531E+03-0.6650E+02
          SHEAR STRESSES
           SXY    0.0000E+00 0.0000E+00
           SXZ    0.8084E+01 0.2236E-03
           SYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRESSES
           PS 1-0.1267E+03-0.5787E+02
           PS 2-0.1278E+03-0.6650E+02
           PS 3-0.4533E+03-0.1711E+03
         THETA    0.7078E+03 0.2955E+03
    DEV. STRESS    0.3266E+03 0.1132E+03
              (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
          PRINCIPAL SHEAR STRESSES
           PSS1 0.1633E+03 0.5661E+02
           PSS2 0.5319E+00 0.4316E+01
           PSS3 0.1628E+03 0.5230E+02
          DISPLACEMENTS
           UX     0.1063E-01-0.2957E-07
           UY     0.0000E+00 0.0000E+00
           UZ     0.5437E+00 0.4673E+00
          NORMAL STRAINS
           EXX    0.2500E-03-0.4254E-03
           EYY    0.2557E-03 0.8434E-04
           EZZ -0.1214E-02 0.4548E-04
          SHEAR STRAINS
           EXY    0.0000E+00 0.0000E+00
           EXZ    0.7279E-04 0.2013E-08
           EYZ    0.0000E+00 0.0000E+00
          PRINCIPAL STRAINS
           PE 1 0.2557E-03 0.8434E-04
           PE 2 0.2509E-03 0.4548E-04
           PE 3-0.1215E-02-0.4254E-03
          PRINCIPAL SHEAR STRAINS
           PSE1 0.1471E-02 0.5097E-03
           PSE2 0.4789E-05 0.3886E-04
           PSE3 0.1466E-02 0.4709E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 4s-cm-3
               Z= 151.00    LAYER NO    2
               X=           0.00        175.00
               Y=           0.00          0.00
            NORMAL STRESSES
             SXX -0.9212E+01-0.7754E+02
             SYY    0.2918E+01 0.1009E+01
             SZZ -0.2517E+03-0.1141E+03
            SHEAR STRESSES
             SXY    0.0000E+00 0.0000E+00
             SXZ    0.1677E+02 0.5102E-03
             SYZ    0.0000E+00 0.0000E+00
            PRINCIPAL STRESSES
             PS 1 0.2918E+01 0.1009E+01
             PS 2-0.8058E+01-0.7754E+02
             PS 3-0.2528E+03-0.1141E+03
           THETA    0.2580E+03 0.1906E+03
    DEV. STRESS    0.2557E+03 0.1151E+03
                 (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
            PRINCIPAL SHEAR STRESSES
             PSS1 0.1279E+03 0.5754E+02
             PSS2 0.5488E+01 0.3928E+02
             PSS3 0.1224E+03 0.1826E+02
            DISPLACEMENTS
             UX    -0.7583E-03-0.1147E-06
             UY      0.0000E+00 0.0000E+00
             UZ     0.4684E+00 0.4582E+00
            NORMAL STRAINS
             EXX    0.1767E-03-0.1643E-03
             EYY    0.2272E-03 0.1631E-03
             EZZ -0.8340E-03-0.3166E-03
            SHEAR STRAINS
             EXY    0.0000E+00 0.0000E+00
             EXZ    0.1398E-03 0.4254E-08
             EYZ    0.0000E+00 0.0000E+00
            PRINCIPAL STRAINS
             PE 1 0.2272E-03 0.1631E-03
             PE 2 0.1815E-03-0.1643E-03
             PE 3-0.8388E-03-0.3166E-03
            PRINCIPAL SHEAR STRAINS
             PSE1 0.1066E-02 0.4797E-03
             PSE2 0.4575E-04 0.3275E-03
             PSE3 0.1020E-02 0.1522E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-3

```
         Z= 250.00   LAYER NO   2
         X=        0.00      175.00
         Y=        0.00        0.00
       NORMAL STRESSES
        SXX   0.7479E+01-0.1069E+02
        SYY   0.2266E+02 0.2388E+02
        SZZ -0.1160E+03-0.9421E+02
       SHEAR STRESSES
        SXY   0.0000E+00 0.0000E+00
        SXZ   0.1915E+02 0.4702E-03
        SYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRESSES
        PS 1 0.2266E+02 0.2388E+02
        PS 2 0.1038E+02-0.1069E+02
        PS 3-0.1189E+03-0.9421E+02
      THETA   0.8582E+02 0.8102E+02
 DEV. STRESS   0.1415E+03 0.1181E+03
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
       PRINCIPAL SHEAR STRESSES
        PSS1 0.7076E+02 0.5904E+02
        PSS2 0.6140E+01 0.1729E+02
        PSS3 0.6462E+02 0.4176E+02
       DISPLACEMENTS
        UX   -0.1093E-01-0.1775E-06
        UY    0.0000E+00 0.0000E+00
        UZ    0.4101E+00 0.4249E+00
       NORMAL STRAINS
        EXX   0.1027E-03 0.2297E-04
        EYY   0.1660E-03 0.1671E-03
        EZZ -0.4118E-03-0.3252E-03
       SHEAR STRAINS
        EXY   0.0000E+00 0.0000E+00
        EXZ   0.1596E-03 0.3920E-08
        EYZ   0.0000E+00 0.0000E+00
       PRINCIPAL STRAINS
        PE 1 0.1660E-03 0.1671E-03
        PE 2 0.1148E-03 0.2297E-04
        PE 3-0.4239E-03-0.3252E-03
       PRINCIPAL SHEAR STRAINS
        PSE1 0.5899E-03 0.4922E-03
        PSE2 0.5119E-04 0.1441E-03
        PSE3 0.5387E-03 0.3481E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-3

```
         Z= 349.00   LAYER NO   2
         X=        0.00      175.00
         Y=        0.00        0.00
       NORMAL STRESSES
        SXX  0.3396E+02 0.3002E+02
        SYY  0.5269E+02 0.5602E+02
        SZZ -0.6228E+02-0.6402E+02
       SHEAR STRESSES
        SXY  0.0000E+00 0.0000E+00
        SXZ  0.1278E+02 0.2643E-03
        SYZ  0.0000E+00 0.0000E+00
       PRINCIPAL STRESSES
        PS 1 0.5269E+02 0.5602E+02
        PS 2 0.3563E+02 0.3002E+02
        PS 3-0.6395E+02-0.6402E+02
      THETA -0.2438E+02-0.2202E+02
 DEV. STRESS  0.1166E+03 0.1200E+03
          (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
       PRINCIPAL SHEAR STRESSES
        PSS1 0.5832E+02 0.6002E+02
        PSS2 0.8532E+01 0.1300E+02
        PSS3 0.4979E+02 0.4702E+02
       DISPLACEMENTS
        UX  -0.2036E-01-0.3037E-06
        UY   0.0000E+00 0.0000E+00
        UZ   0.3777E+00 0.3951E+00
       NORMAL STRAINS
        EXX  0.1212E-03 0.1068E-03
        EYY  0.1993E-03 0.2152E-03
        EZZ -0.2799E-03-0.2852E-03
       SHEAR STRAINS
        EXY  0.0000E+00 0.0000E+00
        EXZ  0.1065E-03 0.2204E-08
        EYZ  0.0000E+00 0.0000E+00
       PRINCIPAL STRAINS
        PE 1 0.1993E-03 0.2152E-03
        PE 2 0.1282E-03 0.1068E-03
        PE 3-0.2869E-03-0.2852E-03
       PRINCIPAL SHEAR STRAINS
        PSE1 0.4862E-03 0.5004E-03
        PSE2 0.7113E-04 0.1084E-03
        PSE3 0.4151E-03 0.3920E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 4s-cm-3
              Z= 351.00    LAYER NO    3
              X=           0.00         175.00
              Y=           0.00            0.00
            NORMAL STRESSES
             SXX -0.5208E+00-0.2957E+01
             SYY    0.8152E+01 0.9034E+01
             SZZ -0.6172E+02-0.6356E+02
            SHEAR STRESSES
             SXY    0.0000E+00 0.0000E+00
             SXZ    0.1264E+02 0.3224E-03
             SYZ    0.0000E+00 0.0000E+00
            PRINCIPAL STRESSES
             PS 1 0.8152E+01 0.9034E+01
             PS 2 0.1989E+01-0.2957E+01
             PS 3-0.6423E+02-0.6356E+02
           THETA    0.5409E+02 0.5749E+02
    DEV. STRESS    0.7238E+02 0.7260E+02
                 (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
            PRINCIPAL SHEAR STRESSES
             PSS1 0.3619E+02 0.3630E+02
             PSS2 0.3081E+01 0.5996E+01
             PSS3 0.3311E+02 0.3030E+02
            DISPLACEMENTS
             UX    -0.2046E-01-0.3783E-06
             UY      0.0000E+00 0.0000E+00
             UZ     0.3769E+00 0.3944E+00
            NORMAL STRAINS
             EXX    0.1216E-03 0.1076E-03
             EYY    0.1997E-03 0.2155E-03
             EZZ -0.4294E-03-0.4381E-03
            SHEAR STRAINS
             EXY    0.0000E+00 0.0000E+00
             EXZ    0.2277E-03 0.5807E-08
             EYZ    0.0000E+00 0.0000E+00
            PRINCIPAL STRAINS
             PE 1 0.1997E-03 0.2155E-03
             PE 2 0.1442E-03 0.1076E-03
             PE 3-0.4520E-03-0.4381E-03
            PRINCIPAL SHEAR STRAINS
             PSE1 0.6517E-03 0.6537E-03
             PSE2 0.5549E-04 0.1080E-03
             PSE3 0.5962E-03 0.5457E-03
```

```
    ELSYM5   3/72 - 3,   ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM
LOAD(S)
    ELASTIC SYSTEM    1 - 4s-cm-3
              Z= 450.00    LAYER NO    3
              X=           0.00        175.00
              Y=           0.00           0.00
           NORMAL STRESSES
            SXX    0.5144E+01 0.6266E+01
            SYY    0.1095E+02 0.1212E+02
            SZZ -0.4107E+02-0.4457E+02
           SHEAR STRESSES
            SXY    0.0000E+00 0.0000E+00
            SXZ    0.9396E+01 0.2264E-03
            SYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRESSES
            PS 1 0.1095E+02 0.1212E+02
            PS 2 0.6981E+01 0.6266E+01
            PS 3-0.4290E+02-0.4457E+02
          THETA    0.2498E+02 0.2619E+02
    DEV. STRESS    0.5385E+02 0.5670E+02
                (FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))
           PRINCIPAL SHEAR STRESSES
            PSS1 0.2693E+02 0.2835E+02
            PSS2 0.1983E+01 0.2927E+01
            PSS3 0.2494E+02 0.2542E+02
           DISPLACEMENTS
            UX    -0.1999E-01-0.3591E-06
            UY      0.0000E+00 0.0000E+00
            UZ     0.3410E+00 0.3563E+00
           NORMAL STRAINS
            EXX    0.1046E-03 0.1176E-03
            EYY    0.1569E-03 0.1703E-03
            EZZ -0.3115E-03-0.3402E-03
           SHEAR STRAINS
            EXY    0.0000E+00 0.0000E+00
            EXZ    0.1692E-03 0.4078E-08
            EYZ    0.0000E+00 0.0000E+00
           PRINCIPAL STRAINS
            PE 1 0.1569E-03 0.1703E-03
            PE 2 0.1212E-03 0.1176E-03
            PE 3-0.3280E-03-0.3402E-03
           PRINCIPAL SHEAR STRAINS
            PSE1 0.4849E-03 0.5105E-03
            PSE2 0.3571E-04 0.5272E-04
            PSE3 0.4492E-03 0.4578E-03
```

ELSYM5 3/72 - 3, ELASTIC LAYERED SYSTEM WITH ONE TO TEN NORMAL IDENTICAL CIRCULAR UNIFORM LOAD(S)

ELASTIC SYSTEM 1 - 4s-cm-3

Z= 551.00 LAYER NO 4

X= 0.00 175.00

Y= 0.00 0.00

NORMAL STRESSES

SXX -0.6604E+00 0.3538E-01

SYY 0.2067E+01 0.2349E+01

SZZ -0.2958E+02-0.3240E+02

SHEAR STRESSES

SXY 0.0000E+00 0.0000E+00

SXZ 0.5432E+01 0.1245E-03

SYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRESSES

PS 1 0.2067E+01 0.2349E+01

PS 2 0.3263E+00 0.3538E-01

PS 3-0.3057E+02-0.3240E+02

THETA 0.2817E+02 0.3001E+02

DEV. STRESS 0.3263E+02 0.3475E+02

(FOR THETA AND DEV. STRESS COMPRESSIVE IS POSITIVE (+))

PRINCIPAL SHEAR STRESSES

PSS1 0.1632E+02 0.1737E+02

PSS2 0.8705E+00 0.1157E+01

PSS3 0.1545E+02 0.1622E+02

DISPLACEMENTS

UX -0.2200E-01-0.4197E-06

UY 0.0000E+00 0.0000E+00

UZ 0.3122E+00 0.3245E+00

NORMAL STRAINS

EXX 0.1122E-03 0.1320E-03

EYY 0.1582E-03 0.1710E-03

EZZ -0.3761E-03-0.4156E-03

SHEAR STRAINS

EXY 0.0000E+00 0.0000E+00

EXZ 0.1834E-03 0.4205E-08

EYZ 0.0000E+00 0.0000E+00

PRINCIPAL STRAINS

PE 1 0.1582E-03 0.1710E-03

PE 2 0.1288E-03 0.1320E-03

PE 3-0.3927E-03-0.4156E-03

PRINCIPAL SHEAR STRAINS

PSE1 0.5509E-03 0.5866E-03

PSE2 0.2939E-04 0.3905E-04

PSE3 0.5216E-03 0.5475E-03

Appendix-F

Discharge Volume

Appendix-F Discharge Volume

Design Discharge Volume (Mandimba-Lichinga)

No.	Bridge Name	Catchment Area (A) (km^2)	River Length (km)	Slope (m/m)	(A) Flood Concentration Time (Tc) (h)	Return Perido (1/Year)	(B) Rainfall Intensity (R24) (mm)	(C) Point Rainfall (mm)	(D) Area Reduction Factor (ARFT)	(E) Average Intensity (I_T) (mm/h)	(F) Combined Run-off Coefficient (%)	(G) Peak Flow (m^3/s)
1		0.83			0.17	2	75.7	22.423	105.76	142.28	10.0	3.3
		0.83			0.17	5	97.9	37.827	105.76	240.03	11.0	6.1
		0.83			0.17	10	111.4	49.480	105.76	313.97	12.0	8.7
		0.83			0.17	20	123.5	61.133	105.76	387.91	13.4	12.0
		0.83			0.17	50	138.2	76.537	105.76	485.66	19.0	21.3
		0.83			0.17	100	148.7	88.190	105.76	559.60	20.0	25.8
2		0.35			0.17	2	75.7	22.423	109.71	147.60	10.0	1.4
		0.35			0.17	5	97.9	37.827	109.71	249.00	11.0	2.7
		0.35			0.17	10	111.4	49.480	109.71	325.71	12.0	3.8
		0.35			0.17	20	123.5	61.133	109.71	402.42	13.4	5.2
		0.35			0.17	50	138.2	76.537	109.71	503.82	19.0	9.3
		0.35			0.17	100	148.7	88.190	109.71	580.52	20.0	11.3
3		0.36			0.17	2	66.8	20.560	109.58	135.18	26.3	3.5
		0.36			0.17	5	83.2	34.685	109.58	228.05	28.0	6.4
		0.36			0.17	10	93.9	45.370	109.58	298.31	29.8	8.9
		0.36			0.17	20	104.1	56.054	109.58	368.56	31.5	11.6
		0.36			0.17	50	117.4	70.179	109.58	461.43	33.3	15.3
		0.36			0.17	100	127.6	80.864	109.58	531.69	35.0	18.6
4	Ngame I	37.00	13.55	0.014	2.55	2	66.8	45.047	97.24	17.17	26.3	46.3
		37.00	13.55	0.014	2.55	5	83.2	75.993	97.24	28.97	28.0	83.4
		37.00	13.55	0.014	2.55	10	93.9	99.404	97.24	37.89	29.8	115.9
		37.00	13.55	0.014	2.55	20	104.1	122.814	97.24	46.81	31.5	151.6
		37.00	13.55	0.014	2.55	50	117.4	153.761	97.24	58.61	33.3	200.3
		37.00	13.55	0.014	2.55	100	127.6	177.171	97.24	67.53	35.0	242.9
5		0.27			0.17	2	66.8	20.560	110.86	136.75	26.3	2.7
		0.27			0.17	5	83.2	34.685	110.86	230.70	28.0	4.8
		0.27			0.17	10	93.9	45.370	110.86	301.77	29.8	6.7
		0.27			0.17	20	104.1	56.054	110.86	372.84	31.5	8.8
		0.27			0.17	50	117.4	70.179	110.86	466.79	33.3	11.6
		0.27			0.17	100	127.6	80.864	110.86	537.86	35.0	14.1
6		0.63			0.17	2	66.8	20.560	107.04	132.05	26.3	6.1
		0.63			0.17	5	83.2	34.685	107.04	222.77	28.0	10.9
		0.63			0.17	10	93.9	45.370	107.04	291.39	29.8	15.2
		0.63			0.17	20	104.1	56.054	107.04	360.01	31.5	19.8
		0.63			0.17	50	117.4	70.179	107.04	450.73	33.3	26.2
		0.63			0.17	100	127.6	80.864	107.04	519.35	35.0	31.8
7		0.39			0.17	2	66.8	20.560	109.23	134.74	26.3	3.8
		0.39			0.17	5	83.2	34.685	109.23	227.31	28.0	6.9
		0.39			0.17	10	93.9	45.370	109.23	297.33	29.8	9.6
		0.39			0.17	20	104.1	56.054	109.23	367.36	31.5	12.5
		0.39			0.17	50	117.4	70.179	109.23	459.93	33.3	16.6
		0.39			0.17	100	127.6	80.864	109.23	529.95	35.0	20.1
8		1.17			0.17	2	66.8	20.560	104.12	128.44	26.3	11.0
		1.17			0.17	5	83.2	34.685	104.12	216.69	28.0	19.7
		1.17			0.17	10	93.9	45.370	104.12	283.44	29.8	27.4
		1.17			0.17	20	104.1	56.054	104.12	350.19	31.5	35.9
		1.17			0.17	50	117.4	70.179	104.12	438.43	33.3	47.4
		1.17			0.17	100	127.6	80.864	104.12	505.18	35.0	57.5
9	Nacalongo	2.74	1.5	0.021	0.40	2	66.8	28.395	103.25	73.48	26.3	14.7
		2.74	1.5	0.021	0.40	5	83.2	47.902	103.25	123.95	28.0	26.4
		2.74	1.5	0.021	0.40	10	93.9	62.659	103.25	162.14	29.8	36.7
		2.74	1.5	0.021	0.40	20	104.1	77.416	103.25	200.32	31.5	48.0
		2.74	1.5	0.021	0.40	50	117.4	96.923	103.25	250.80	33.3	63.5
		2.74	1.5	0.021	0.40	100	127.6	111.680	103.25	288.98	35.0	77.0
10	Namlungu											
11		0.04			0.17	2	66.8	20.560	118.80	146.55	26.3	0.4
		0.04			0.17	5	83.2	34.685	118.80	247.24	28.0	0.8
		0.04			0.17	10	93.9	45.370	118.80	323.40	29.8	1.1
		0.04			0.17	20	104.1	56.054	118.80	399.56	31.5	1.4
		0.04			0.17	50	117.4	70.179	118.80	500.24	33.3	1.8
		0.04			0.17	100	127.6	80.864	118.80	576.41	35.0	2.2
12		0.83			0.17	2	66.8	20.560	105.76	130.46	26.3	7.9
		0.83			0.17	5	83.2	34.685	105.76	220.09	28.0	14.2
		0.83			0.17	10	93.9	45.370	105.76	287.89	29.8	19.7
		0.83			0.17	20	104.1	56.054	105.76	355.69	31.5	25.8
		0.83			0.17	50	117.4	70.179	105.76	445.31	33.3	34.1
		0.83			0.17	100	127.6	80.864	105.76	513.11	35.0	41.4
13		0.15			0.17	2	66.8	20.560	113.39	139.88	26.3	1.5
		0.15			0.17	5	83.2	34.685	113.39	235.98	28.0	2.8
		0.15			0.17	10	93.9	45.370	113.39	308.67	29.8	3.8
		0.15			0.17	20	104.1	56.054	113.39	381.37	31.5	5.0
		0.15			0.17	50	117.4	70.179	113.39	477.47	33.3	6.6
		0.15			0.17	100	127.6	80.864	113.39	550.16	35.0	8.0
14		3.04	1.3	0.020	0.37	2	66.8	27.620	102.41	77.28	26.3	17.1
		3.04	1.3	0.020	0.37	5	83.2	46.595	102.41	130.38	28.0	30.8
		3.04	1.3	0.020	0.37	10	93.9	60.949	102.41	170.54	29.8	42.8
		3.04	1.3	0.020	0.37	20	104.1	75.303	102.41	210.71	31.5	56.0
		3.04	1.3	0.020	0.37	50	117.4	94.278	102.41	263.80	33.3	74.1
		3.04	1.3	0.020	0.37	100	127.6	108.632	102.41	303.96	35.0	89.8
15		0.61			0.17	2	66.8	20.560	107.19	132.23	26.3	5.9
		0.61			0.17	5	83.2	34.685	107.19	223.08	28.0	10.6
		0.61			0.17	10	93.9	45.370	107.19	291.80	29.8	14.7
		0.61			0.17	20	104.1	56.054	107.19	360.52	31.5	19.2
		0.61			0.17	50	117.4	70.179	107.19	451.36	33.3	25.4
		0.61			0.17	100	127.6	80.864	107.19	520.08	35.0	30.8
16	Luchimua											
17		3.73	2.0	0.015	0.57	2	66.8	31.596	103.08	57.14	26.3	15.5
		3.73	2.0	0.015	0.57	5	83.2	53.303	103.08	96.39	28.0	28.0
		3.73	2.0	0.015	0.57	10	93.9	69.723	103.08	126.09	29.8	38.9
		3.73	2.0	0.015	0.57	20	104.1	86.143	103.08	155.78	31.5	50.8
		3.73	2.0	0.015	0.57	50	117.4	107.850	103.08	195.03	33.3	67.2
		3.73	2.0	0.015	0.57	100	127.6	124.270	103.08	224.73	35.0	81.5
18		0.66			0.17	2	66.8	20.560	106.83	131.78	26.3	6.3
		0.66			0.17	5	83.2	34.685	106.83	222.32	28.0	11.4
		0.66			0.17	10	93.9	45.370	106.83	290.80	29.8	15.9
		0.66			0.17	20	104.1	56.054	106.83	359.29	31.5	20.7
		0.66			0.17	50	117.4	70.179	106.83	449.82	33.3	27.4
		0.66			0.17	100	127.6	80.864	106.83	518.31	35.0	33.3
19		9.12	1.7	0.024	0.42	2	66.8	28.919	97.35	66.55	26.3	44.3
		9.12	1.7	0.024	0.42	5	83.2	48.787	97.35	112.27	28.0	79.6
		9.12	1.7	0.024	0.42	10	93.9	63.816	97.35	146.86	29.8	110.7
		9.12	1.7	0.024	0.42	20	104.1	78.845	97.35	181.45	31.5	144.8
		9.12	1.7	0.024	0.42	50	117.4	98.712	97.35	227.17	33.3	191.4
		9.12	1.7	0.024	0.42	100	127.6	113.741	97.35	261.76	35.0	232.1
20		1.26			0.17	2	66.8	20.560	103.76	128.00	26.3	11.8
		1.26			0.17	5	83.2	34.685	103.76	215.94	28.0	21.2
		1.26			0.17	10	93.9	45.370	103.76	282.46	29.8	29.4
		1.26			0.17	20	104.1	56.054	103.76	348.98	31.5	38.5
		1.26			0.17	50	117.4	70.179	103.76	436.92	33.3	50.8
		1.26			0.17	100	127.6	80.864	103.76	503.44	35.0	61.7

Design Discharge Volume (Mandimba-Lichinga)

No.	Bridge Name	Catchment Area (A) (km^2)	River Length (km)	Slope (m/m)	(A) Flood Concentration Time (Tc) (h)	Return Perido (1/Year)	(B) Rainfall Intensity (R24) (mm)	(C) Point Rainfall (mm)	(D) Area Reduction Factor (ARFT)	(E) Average Intensity (I_T) (mm/h)	(F) Combined Run-off Coefficient (%)	(G) Peak Flow (m^3/s)
21		0.05			0.17	2	66.8	20.560	117.91	145.46	26.3	0.5
		0.05			0.17	5	83.2	34.685	117.91	245.39	28.0	1.0
		0.05			0.17	10	93.9	45.370	117.91	320.98	29.8	1.3
		0.05			0.17	20	104.1	56.054	117.91	396.58	31.5	1.7
		0.05			0.17	50	117.4	70.179	117.91	496.51	33.3	2.3
		0.05			0.17	100	127.6	80.864	117.91	572.10	35.0	2.8
22	Lilasi	46.30	11.0	0.014	2.20	2	66.8	43.702	95.40	18.98	26.3	64.1
		46.30	11.0	0.014	2.20	5	83.2	73.724	95.40	32.03	28.0	115.3
		46.30	11.0	0.014	2.20	10	93.9	96.436	95.40	41.89	29.8	160.3
		46.30	11.0	0.014	2.20	20	104.1	119.147	95.40	51.76	31.5	209.7
		46.30	11.0	0.014	2.20	50	117.4	149.170	95.40	64.80	33.3	277.1
		46.30	11.0	0.014	2.20	100	127.6	171.881	95.40	74.67	35.0	336.1
23		2.31	1.5	0.017	0.43	2	66.8	29.108	104.37	70.32	26.3	11.8
		2.31	1.5	0.017	0.43	5	83.2	49.106	104.37	118.64	28.0	21.3
		2.31	1.5	0.017	0.43	10	93.9	64.233	104.37	155.18	29.8	29.6
		2.31	1.5	0.017	0.43	20	104.1	79.360	104.37	191.73	31.5	38.8
		2.31	1.5	0.017	0.43	50	117.4	99.357	104.37	240.04	33.3	51.2
		2.31	1.5	0.017	0.43	100	127.6	114.485	104.37	276.59	35.0	62.1
24	Ninde	39.70	9.8	0.013	2.03	2	66.8	43.001	95.91	20.31	26.3	58.8
		39.70	9.8	0.013	2.03	5	83.2	72.542	95.91	34.26	28.0	105.8
		39.70	9.8	0.013	2.03	10	93.9	94.889	95.91	44.81	29.8	147.0
		39.70	9.8	0.013	2.03	20	104.1	117.236	95.91	55.36	31.5	192.3
		39.70	9.8	0.013	2.03	50	117.4	146.777	95.91	69.31	33.3	254.2
		39.70	9.8	0.013	2.03	100	127.6	169.124	95.91	79.87	35.0	308.3
25		0.55			0.17	2	66.8	20.560	107.67	132.82	26.3	5.3
		0.55			0.17	5	83.2	34.685	107.67	224.07	28.0	9.6
		0.55			0.17	10	93.9	45.370	107.67	293.09	29.8	13.3
		0.55			0.17	20	104.1	56.054	107.67	362.12	31.5	17.4
		0.55			0.17	50	117.4	70.179	107.67	453.36	33.3	23.0
		0.55			0.17	100	127.6	80.864	107.67	522.39	35.0	27.9
26		1.02			0.17	2	66.8	20.560	104.78	129.26	26.3	9.6
		1.02			0.17	5	83.2	34.685	104.78	218.06	28.0	17.3
		1.02			0.17	10	93.9	45.370	104.78	285.23	29.8	24.0
		1.02			0.17	20	104.1	56.054	104.78	352.40	31.5	31.5
		1.02			0.17	50	117.4	70.179	104.78	441.20	33.3	41.6
		1.02			0.17	100	127.6	80.864	104.78	508.37	35.0	50.4
27	Luelele											
28		0.08			0.17	2	66.8	20.560	116.01	143.11	26.3	0.8
		0.08			0.17	5	83.2	34.685	116.01	241.43	28.0	1.5
		0.08			0.17	10	93.9	45.370	116.01	315.81	29.8	2.1
		0.08			0.17	20	104.1	56.054	116.01	390.18	31.5	2.7
		0.08			0.17	50	117.4	70.179	116.01	488.50	33.3	3.6
		0.08			0.17	100	127.6	80.864	116.01	562.87	35.0	4.4
29		0.01			0.17	2	66.8	20.560	124.10	153.10	26.3	0.1
		0.01			0.17	5	83.2	34.685	124.10	258.27	28.0	0.2
		0.01			0.17	10	93.9	45.370	124.10	337.83	29.8	0.3
		0.01			0.17	20	104.1	56.054	124.10	417.40	31.5	0.4
		0.01			0.17	50	117.4	70.179	124.10	522.57	33.3	0.5
		0.01			0.17	100	127.6	80.864	124.10	602.13	35.0	0.6
30		0.05			0.17	2	66.8	20.560	117.91	145.46	26.3	0.5
		0.05			0.17	5	83.2	34.685	117.91	245.39	28.0	1.0
		0.05			0.17	10	93.9	45.370	117.91	320.98	29.8	1.3
		0.05			0.17	20	104.1	56.054	117.91	396.58	31.5	1.7
		0.05			0.17	50	117.4	70.179	117.91	496.51	33.3	2.3
		0.05			0.17	100	127.6	80.864	117.91	572.10	35.0	2.8
31		1.91	1.5	0.020	0.41	2	66.8	28.617	105.08	73.52	26.3	10.2
		1.91	1.5	0.020	0.41	5	83.2	48.277	105.08	124.03	28.0	18.4
		1.91	1.5	0.020	0.41	10	93.9	63.149	105.08	162.24	29.8	25.6
		1.91	1.5	0.020	0.41	20	104.1	78.021	105.08	200.44	31.5	33.5
		1.91	1.5	0.020	0.41	50	117.4	97.681	105.08	250.95	33.3	44.3
		1.91	1.5	0.020	0.41	100	127.6	112.553	105.08	289.16	35.0	53.7
32		0.19			0.17	2	66.8	20.560	112.38	138.64	26.3	1.9
		0.19			0.17	5	83.2	34.685	112.38	233.88	28.0	3.5
		0.19			0.17	10	93.9	45.370	112.38	305.93	29.8	4.8
		0.19			0.17	20	104.1	56.054	112.38	377.97	31.5	6.3
		0.19			0.17	50	117.4	70.179	112.38	473.22	33.3	8.3
		0.19			0.17	100	127.6	80.864	112.38	545.26	35.0	10.1
33		0.08			0.17	2	66.8	20.560	116.01	143.11	26.3	0.8
		0.08			0.17	5	83.2	34.685	116.01	241.43	28.0	1.5
		0.08			0.17	10	93.9	45.370	116.01	315.81	29.8	2.1
		0.08			0.17	20	104.1	56.054	116.01	390.18	31.5	2.7
		0.08			0.17	50	117.4	70.179	116.01	488.50	33.3	3.6
		0.08			0.17	100	127.6	80.864	116.01	562.87	35.0	4.4
34		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
35		0.23			0.17	2	66.8	20.560	111.56	137.62	26.3	2.3
		0.23			0.17	5	83.2	34.685	111.56	232.16	28.0	4.2
		0.23			0.17	10	93.9	45.370	111.56	303.68	29.8	5.8
		0.23			0.17	20	104.1	56.054	111.56	375.20	31.5	7.6
		0.23			0.17	50	117.4	70.179	111.56	469.74	33.3	10.0
		0.23			0.17	100	127.6	80.864	111.56	541.26	35.0	12.1
36	Mmaculumesi	239.50	24.6	0.014	4.06	2	66.8	49.220	88.60	10.74	26.3	187.5
		239.50	24.6	0.014	4.06	5	83.2	83.033	88.60	18.12	28.0	337.5
		239.50	24.6	0.014	4.06	10	93.9	108.612	88.60	23.70	29.8	469.0
		239.50	24.6	0.014	4.06	20	104.1	134.191	88.60	29.28	31.5	613.6
		239.50	24.6	0.014	4.06	50	117.4	168.004	88.60	36.66	33.3	810.8
		239.50	24.6	0.014	4.06	100	127.6	193.583	88.60	42.24	35.0	983.5
37		0.57			0.17	2	66.8	20.560	107.50	132.62	26.3	5.5
		0.57			0.17	5	83.2	34.685	107.50	223.73	28.0	9.9
		0.57			0.17	10	93.9	45.370	107.50	292.65	29.8	13.8
		0.57			0.17	20	104.1	56.054	107.50	361.57	31.5	18.0
		0.57			0.17	50	117.4	70.179	107.50	452.67	33.3	23.8
		0.57			0.17	100	127.6	80.864	107.50	521.59	35.0	28.9
38		1.19			0.17	2	66.8	20.560	104.04	128.34	26.3	11.1
		1.19			0.17	5	83.2	34.685	104.04	216.52	28.0	20.0
		1.19			0.17	10	93.9	45.370	104.04	283.21	29.8	27.9
		1.19			0.17	20	104.1	56.054	104.04	349.91	31.5	36.4
		1.19			0.17	50	117.4	70.179	104.04	438.09	33.3	48.1
		1.19			0.17	100	127.6	80.864	104.04	504.78	35.0	58.4
39		1.14			0.17	2	66.8	20.560	104.25	128.60	26.3	10.7
		1.14			0.17	5	83.2	34.685	104.25	216.95	28.0	19.2
		1.14			0.17	10	93.9	45.370	104.25	283.78	29.8	26.7
		1.14			0.17	20	104.1	56.054	104.25	350.61	31.5	35.0
		1.14			0.17	50	117.4	70.179	104.25	438.96	33.3	46.2
		1.14			0.17	100	127.6	80.864	104.25	505.79	35.0	56.1

Design Discharge Volume (Mandimba-Lichinga)

No.	Bridge Name	Catchment Area (A) (km^2)	River Length (km)	Slope (m/m)	(A) Flood Concentration Time (Tc) (h)	Return Perido (1/Year)	(B) Rainfall Intensity (R24) (mm)	(C) Point Rainfall (mm)	(D) Area Reduction Factor (ARFT)	(E) Average Intensity (I_T) (mm/h)	(F) Combined Run-off Coefficient (%)	(G) Peak Flow (m^3/s)
40		0.89			0.17	2	66.8	20.560	105.43	130.06	26.3	8.4
		0.89			0.17	5	83.2	34.685	105.43	219.40	28.0	15.2
		0.89			0.17	10	93.9	45.370	105.43	286.99	29.8	21.1
		0.89			0.17	20	104.1	56.054	105.43	354.58	31.5	27.6
		0.89			0.17	50	117.4	70.179	105.43	443.93	33.3	36.5
		0.89			0.17	100	127.6	80.864	105.43	511.52	35.0	44.3
41		0.13			0.17	2	66.8	20.560	114.00	140.63	26.3	1.3
		0.13			0.17	5	83.2	34.685	114.00	237.24	28.0	2.4
		0.13			0.17	10	93.9	45.370	114.00	310.32	29.8	3.3
		0.13			0.17	20	104.1	56.054	114.00	383.40	31.5	4.4
		0.13			0.17	50	117.4	70.179	114.00	480.01	33.3	5.8
		0.13			0.17	100	127.6	80.864	114.00	553.09	35.0	7.0
42		0.19			0.17	2	66.8	20.560	112.38	138.64	26.3	1.9
		0.19			0.17	5	83.2	34.685	112.38	233.88	28.0	3.5
		0.19			0.17	10	93.9	45.370	112.38	305.93	29.8	4.8
		0.19			0.17	20	104.1	56.054	112.38	377.97	31.5	6.3
		0.19			0.17	50	117.4	70.179	112.38	473.22	33.3	8.3
		0.19			0.17	100	127.6	80.864	112.38	545.26	35.0	10.1
43		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
44	Lutembue	56.60	13.6	0.018	2.34	2	66.8	44.279	94.56	17.88	26.3	73.8
		56.60	13.6	0.018	2.34	5	83.2	74.699	94.56	30.16	28.0	132.8
		56.60	13.6	0.018	2.34	10	93.9	97.711	94.56	39.45	29.8	184.5
		56.60	13.6	0.018	2.34	20	104.1	120.722	94.56	48.74	31.5	241.4
		56.60	13.6	0.018	2.34	50	117.4	151.142	94.56	61.03	33.3	319.0
		56.60	13.6	0.018	2.34	100	127.6	174.153	94.56	70.32	35.0	386.9
45		0.11			0.17	2	66.8	20.560	114.70	141.49	26.3	1.1
		0.11			0.17	5	83.2	34.685	114.70	238.69	28.0	2.0
		0.11			0.17	10	93.9	45.370	114.70	312.22	29.8	2.8
		0.11			0.17	20	104.1	56.054	114.70	385.75	31.5	3.7
		0.11			0.17	50	117.4	70.179	114.70	482.96	33.3	4.9
		0.11			0.17	100	127.6	80.864	114.70	556.49	35.0	6.0
46		0.04			0.17	2	66.8	20.560	118.80	146.55	26.3	0.4
		0.04			0.17	5	83.2	34.685	118.80	247.24	28.0	0.8
		0.04			0.17	10	93.9	45.370	118.80	323.40	29.8	1.1
		0.04			0.17	20	104.1	56.054	118.80	399.56	31.5	1.4
		0.04			0.17	50	117.4	70.179	118.80	500.24	33.3	1.8
		0.04			0.17	100	127.6	80.864	118.80	576.41	35.0	2.2
47		0.03			0.17	2	66.8	20.560	119.93	147.95	26.3	0.3
		0.03			0.17	5	83.2	34.685	119.93	249.59	28.0	0.6
		0.03			0.17	10	93.9	45.370	119.93	326.47	29.8	0.8
		0.03			0.17	20	104.1	56.054	119.93	403.36	31.5	1.1
		0.03			0.17	50	117.4	70.179	119.93	505.00	33.3	1.4
		0.03			0.17	100	127.6	80.864	119.93	581.89	35.0	1.7
48		0.01			0.17	2	66.8	20.560	124.10	153.10	26.3	0.1
		0.01			0.17	5	83.2	34.685	124.10	258.27	28.0	0.2
		0.01			0.17	10	93.9	45.370	124.10	337.83	29.8	0.3
		0.01			0.17	20	104.1	56.054	124.10	417.40	31.5	0.4
		0.01			0.17	50	117.4	70.179	124.10	522.57	33.3	0.5
		0.01			0.17	100	127.6	80.864	124.10	602.13	35.0	0.6
49	Lusanga	2.74	6.1	0.032	1.01	2	66.8	36.686	106.63	38.92	26.3	7.8
		2.74	6.1	0.032	1.01	5	83.2	61.889	106.63	65.66	28.0	14.0
		2.74	6.1	0.032	1.01	10	93.9	80.955	106.63	85.89	29.8	19.4
		2.74	6.1	0.032	1.01	20	104.1	100.020	106.63	106.12	31.5	25.4
		2.74	6.1	0.032	1.01	50	117.4	125.224	106.63	132.86	33.3	33.6
		2.74	6.1	0.032	1.01	100	127.6	144.289	106.63	153.08	35.0	40.8
50		0.68			0.17	2	66.8	20.560	106.69	131.61	26.3	6.5
		0.68			0.17	5	83.2	34.685	106.69	222.03	28.0	11.7
		0.68			0.17	10	93.9	45.370	106.69	290.43	29.8	16.3
		0.68			0.17	20	104.1	56.054	106.69	358.82	31.5	21.4
		0.68			0.17	50	117.4	70.179	106.69	449.24	33.3	28.2
		0.68			0.17	100	127.6	80.864	106.69	517.64	35.0	34.2
51		0.64			0.17	2	66.8	20.560	106.97	131.96	26.3	6.2
		0.64			0.17	5	83.2	34.685	106.97	222.61	28.0	11.1
		0.64			0.17	10	93.9	45.370	106.97	291.19	29.8	15.4
		0.64			0.17	20	104.1	56.054	106.97	359.77	31.5	20.1
		0.64			0.17	50	117.4	70.179	106.97	450.42	33.3	26.6
		0.64			0.17	100	127.6	80.864	106.97	519.00	35.0	32.3
52		0.15			0.17	2	66.8	20.560	113.39	139.88	26.3	1.5
		0.15			0.17	5	83.2	34.685	113.39	235.98	28.0	2.8
		0.15			0.17	10	93.9	45.370	113.39	308.67	29.8	3.8
		0.15			0.17	20	104.1	56.054	113.39	381.37	31.5	5.0
		0.15			0.17	50	117.4	70.179	113.39	477.47	33.3	6.6
		0.15			0.17	100	127.6	80.864	113.39	550.16	35.0	8.0
53		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
54	Luambala	131.10	20.1	0.011	3.80	2	66.8	48.631	91.90	11.75	26.3	112.3
		131.10	20.1	0.011	3.80	5	83.2	82.039	91.90	19.83	28.0	202.2
		131.10	20.1	0.011	3.80	10	93.9	107.312	91.90	25.93	29.8	281.0
		131.10	20.1	0.011	3.80	20	104.1	132.585	91.90	32.04	31.5	367.5
		131.10	20.1	0.011	3.80	50	117.4	165.994	91.90	40.11	33.3	485.7
		131.10	20.1	0.011	3.80	100	127.6	191.266	91.90	46.22	35.0	589.1
55		0.45			0.17	2	66.8	20.560	108.58	133.95	26.3	4.4
		0.45			0.17	5	83.2	34.685	108.58	225.97	28.0	7.9
		0.45			0.17	10	93.9	45.370	108.58	295.58	29.8	11.0
		0.45			0.17	20	104.1	56.054	108.58	365.19	31.5	14.4
		0.45			0.17	50	117.4	70.179	108.58	457.21	33.3	19.0
		0.45			0.17	100	127.6	80.864	108.58	526.82	35.0	23.0
56		5.37	4.0	0.008	1.27	2	66.8	38.780	104.29	31.87	26.3	12.5
		5.37	4.0	0.008	1.27	5	83.2	65.421	104.29	53.77	28.0	22.5
		5.37	4.0	0.008	1.27	10	93.9	85.574	104.29	70.33	29.8	31.2
		5.37	4.0	0.008	1.27	20	104.1	105.728	104.29	86.89	31.5	40.8
		5.37	4.0	0.008	1.27	50	117.4	132.369	104.29	108.79	33.3	54.0
		5.37	4.0	0.008	1.27	100	127.6	152.522	104.29	125.35	35.0	65.4
57		0.63			0.17	2	66.8	20.560	107.04	132.05	26.3	6.1
		0.63			0.17	5	83.2	34.685	107.04	222.77	28.0	10.9
		0.63			0.17	10	93.9	45.370	107.04	291.39	29.8	15.2
		0.63			0.17	20	104.1	56.054	107.04	360.01	31.5	19.8
		0.63			0.17	50	117.4	70.179	107.04	450.73	33.3	26.2
		0.63			0.17	100	127.6	80.864	107.04	519.35	35.0	31.8
58		0.17			0.17	2	66.8	20.560	112.86	139.22	26.3	1.7
		0.17			0.17	5	83.2	34.685	112.86	234.87	28.0	3.1
		0.17			0.17	10	93.9	45.370	112.86	307.22	29.8	4.3
		0.17			0.17	20	104.1	56.054	112.86	379.58	31.5	5.6
		0.17			0.17	50	117.4	70.179	112.86	475.22	33.3	7.5
		0.17			0.17	100	127.6	80.864	112.86	547.58	35.0	9.1
59		0.19			0.17	2	66.8	20.560	112.38	138.64	26.3	1.9
		0.19			0.17	5	83.2	34.685	112.38	233.88	28.0	3.5
		0.19			0.17	10	93.9	45.370	112.38	305.93	29.8	4.8
		0.19			0.17	20	104.1	56.054	112.38	377.97	31.5	6.3
		0.19			0.17	50	117.4	70.179	112.38	473.22	33.3	8.3
		0.19			0.17	100	127.6	80.864	112.38	545.26	35.0	10.1

Design Discharge Volume (Mandimba-Lichinga)

No.	Bridge Name	Catchment Area (A) (km²)	River Length (km)	Slope (m/m)	(A) Flood Concentration Time (Tc) (h)	Return Perido (1/Year)	(B) Rainfall Intensity (R24) (mm)	(C) Point Rainfall (mm)	(D) Area Reduction Factor (ARFT)	(E) Average Intensity (I_T) (mm/h)	(F) Combined Run-off Coefficient (%)	(G) Peak Flow (m³/s)
60		0.10			0.17	2	66.8	20.560	115.09	141.98	26.3	1.0
		0.10			0.17	5	83.2	34.685	115.09	239.52	28.0	1.9
		0.10			0.17	10	93.9	45.370	115.09	313.30	29.8	2.6
		0.10			0.17	20	104.1	56.054	115.09	387.09	31.5	3.4
		0.10			0.17	50	117.4	70.179	115.09	484.62	33.3	4.5
		0.10			0.17	100	127.6	80.864	115.09	558.41	35.0	5.4
61		0.09			0.17	2	66.8	20.560	115.53	142.52	26.3	0.9
		0.09			0.17	5	83.2	34.685	115.53	240.42	28.0	1.7
		0.09			0.17	10	93.9	45.370	115.53	314.49	29.8	2.3
		0.09			0.17	20	104.1	56.054	115.53	388.55	31.5	3.1
		0.09			0.17	50	117.4	70.179	115.53	486.46	33.3	4.0
		0.09			0.17	100	127.6	80.864	115.53	560.52	35.0	4.9
62		0.75			0.17	2	66.8	20.560	106.23	131.05	26.3	7.2
		0.75			0.17	5	83.2	34.685	106.23	221.08	28.0	12.9
		0.75			0.17	10	93.9	45.370	106.23	289.18	29.8	17.9
		0.75			0.17	20	104.1	56.054	106.23	357.29	31.5	23.4
		0.75			0.17	50	117.4	70.179	106.23	447.32	33.3	31.0
		0.75			0.17	100	127.6	80.864	106.23	515.42	35.0	37.6
63		1.22			0.17	2	66.8	20.560	103.92	128.20	26.3	11.4
		1.22			0.17	5	83.2	34.685	103.92	216.27	28.0	20.5
		1.22			0.17	10	93.9	45.370	103.92	282.89	29.8	28.5
		1.22			0.17	20	104.1	56.054	103.92	349.51	31.5	37.3
		1.22			0.17	50	117.4	70.179	103.92	437.58	33.3	49.3
		1.22			0.17	100	127.6	80.864	103.92	504.20	35.0	59.8
64		0.21			0.17	2	66.8	20.560	111.95	138.10	26.3	2.1
		0.21			0.17	5	83.2	34.685	111.95	232.98	28.0	3.8
		0.21			0.17	10	93.9	45.370	111.95	304.75	29.8	5.3
		0.21			0.17	20	104.1	56.054	111.95	376.52	31.5	6.9
		0.21			0.17	50	117.4	70.179	111.95	471.40	33.3	9.1
		0.21			0.17	100	127.6	80.864	111.95	543.17	35.0	11.1
65		0.06			0.17	2	66.8	20.560	117.18	144.56	26.3	0.6
		0.06			0.17	5	83.2	34.685	117.18	243.87	28.0	1.1
		0.06			0.17	10	93.9	45.370	117.18	318.99	29.8	1.6
		0.06			0.17	20	104.1	56.054	117.18	394.11	31.5	2.1
		0.06			0.17	50	117.4	70.179	117.18	493.42	33.3	2.7
		0.06			0.17	100	127.6	80.864	117.18	568.55	35.0	3.3
66		0.10			0.17	2	66.8	20.560	115.09	141.98	26.3	1.0
		0.10			0.17	5	83.2	34.685	115.09	239.52	28.0	1.9
		0.10			0.17	10	93.9	45.370	115.09	313.30	29.8	2.6
		0.10			0.17	20	104.1	56.054	115.09	387.09	31.5	3.4
		0.10			0.17	50	117.4	70.179	115.09	484.62	33.3	4.5
		0.10			0.17	100	127.6	80.864	115.09	558.41	35.0	5.4
67		0.13			0.17	2	66.8	20.560	114.00	140.63	26.3	1.3
		0.13			0.17	5	83.2	34.685	114.00	237.24	28.0	2.4
		0.13			0.17	10	93.9	45.370	114.00	310.32	29.8	3.3
		0.13			0.17	20	104.1	56.054	114.00	383.40	31.5	4.4
		0.13			0.17	50	117.4	70.179	114.00	480.01	33.3	5.8
		0.13			0.17	100	127.6	80.864	114.00	553.09	35.0	7.0
68		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
69		0.05			0.17	2	66.8	20.560	117.91	145.46	26.3	0.5
		0.05			0.17	5	83.2	34.685	117.91	245.39	28.0	1.0
		0.05			0.17	10	93.9	45.370	117.91	320.98	29.8	1.3
		0.05			0.17	20	104.1	56.054	117.91	396.58	31.5	1.7
		0.05			0.17	50	117.4	70.179	117.91	496.51	33.3	2.3
		0.05			0.17	100	127.6	80.864	117.91	572.10	35.0	2.8
70		0.06			0.17	2	66.8	20.560	117.18	144.56	26.3	0.6
		0.06			0.17	5	83.2	34.685	117.18	243.87	28.0	1.1
		0.06			0.17	10	93.9	45.370	117.18	318.99	29.8	1.6
		0.06			0.17	20	104.1	56.054	117.18	394.11	31.5	2.1
		0.06			0.17	50	117.4	70.179	117.18	493.42	33.3	2.7
		0.06			0.17	100	127.6	80.864	117.18	568.55	35.0	3.3
71		0.67			0.17	2	66.8	20.560	106.76	131.70	26.3	6.4
		0.67			0.17	5	83.2	34.685	106.76	222.17	28.0	11.6
		0.67			0.17	10	93.9	45.370	106.76	290.61	29.8	16.1
		0.67			0.17	20	104.1	56.054	106.76	359.05	31.5	21.0
		0.67			0.17	50	117.4	70.179	106.76	449.53	33.3	27.8
		0.67			0.17	100	127.6	80.864	106.76	517.97	35.0	33.7
72		0.09			0.17	2	66.8	20.560	115.53	142.52	26.3	0.9
		0.09			0.17	5	83.2	34.685	115.53	240.42	28.0	1.7
		0.09			0.17	10	93.9	45.370	115.53	314.49	29.8	2.3
		0.09			0.17	20	104.1	56.054	115.53	388.55	31.5	3.1
		0.09			0.17	50	117.4	70.179	115.53	486.46	33.3	4.0
		0.09			0.17	100	127.6	80.864	115.53	560.52	35.0	4.9
73		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
74		0.12			0.17	2	66.8	20.560	114.33	141.04	26.3	1.2
		0.12			0.17	5	83.2	34.685	114.33	237.94	28.0	2.2
		0.12			0.17	10	93.9	45.370	114.33	311.23	29.8	3.1
		0.12			0.17	20	104.1	56.054	114.33	384.53	31.5	4.0
		0.12			0.17	50	117.4	70.179	114.33	481.43	33.3	5.3
		0.12			0.17	100	127.6	80.864	114.33	554.72	35.0	6.5
75		0.04			0.17	2	66.8	20.560	118.80	146.55	26.3	0.4
		0.04			0.17	5	83.2	34.685	118.80	247.24	28.0	0.8
		0.04			0.17	10	93.9	45.370	118.80	323.40	29.8	1.1
		0.04			0.17	20	104.1	56.054	118.80	399.56	31.5	1.4
		0.04			0.17	50	117.4	70.179	118.80	500.24	33.3	1.8
		0.04			0.17	100	127.6	80.864	118.80	576.41	35.0	2.2
76		0.03			0.17	2	66.8	20.560	119.93	147.95	26.3	0.3
		0.03			0.17	5	83.2	34.685	119.93	249.59	28.0	0.6
		0.03			0.17	10	93.9	45.370	119.93	326.47	29.8	0.8
		0.03			0.17	20	104.1	56.054	119.93	403.36	31.5	1.1
		0.03			0.17	50	117.4	70.179	119.93	505.00	33.3	1.4
		0.03			0.17	100	127.6	80.864	119.93	581.89	35.0	1.7
77		0.14			0.17	2	66.8	20.560	113.68	140.24	26.3	1.4
		0.14			0.17	5	83.2	34.685	113.68	236.59	28.0	2.6
		0.14			0.17	10	93.9	45.370	113.68	309.47	29.8	3.6
		0.14			0.17	20	104.1	56.054	113.68	382.35	31.5	4.7
		0.14			0.17	50	117.4	70.179	113.68	478.70	33.3	6.2
		0.14			0.17	100	127.6	80.864	113.68	551.58	35.0	7.5
78		0.07			0.17	2	66.8	20.560	116.56	143.79	26.3	0.7
		0.07			0.17	5	83.2	34.685	116.56	242.57	28.0	1.3
		0.07			0.17	10	93.9	45.370	116.56	317.29	29.8	1.8
		0.07			0.17	20	104.1	56.054	116.56	392.01	31.5	2.4
		0.07			0.17	50	117.4	70.179	116.56	490.79	33.3	3.2
		0.07			0.17	100	127.6	80.864	116.56	565.52	35.0	3.8
79		0.17			0.17	2	66.8	20.560	112.86	139.22	26.3	1.7
		0.17			0.17	5	83.2	34.685	112.86	234.87	28.0	3.1
		0.17			0.17	10	93.9	45.370	112.86	307.22	29.8	4.3
		0.17			0.17	20	104.1	56.054	112.86	379.58	31.5	5.6
		0.17			0.17	50	117.4	70.179	112.86	475.22	33.3	7.5
		0.17			0.17	100	127.6	80.864	112.86	547.58	35.0	9.1

Design Discharge Volume (Mandimba-Lichinga)

No.	Bridge Name	Catchment Area (A) (km²)	River Length (km)	Slope (m/m)	(A) Flood Concentration Time (Tc) (h)	Return Perido (1/Year)	(B) Rainfall Intensity (R24) (mm)	(C) Point Rainfall (mm)	(D) Area Reduction Factor (ARFT)	(E) Average Intensity (I_T) (mm/h)	(F) Combined Run-off Coefficient (%)	(G) Peak Flow (m^3/s)
80		0.01			0.17	2	66.8	20.560	124.10	153.10	26.3	0.1
		0.01			0.17	5	83.2	34.685	124.10	258.27	28.0	0.2
		0.01			0.17	10	93.9	45.370	124.10	337.83	29.8	0.3
		0.01			0.17	20	104.1	56.054	124.10	417.40	31.5	0.4
		0.01			0.17	50	117.4	70.179	124.10	522.57	33.3	0.5
		0.01			0.17	100	127.6	80.864	124.10	602.13	35.0	0.6
81		0.01			0.17	2	66.8	20.560	124.10	153.10	26.3	0.1
		0.01			0.17	5	83.2	34.685	124.10	258.27	28.0	0.2
		0.01			0.17	10	93.9	45.370	124.10	337.83	29.8	0.3
		0.01			0.17	20	104.1	56.054	124.10	417.40	31.5	0.4
		0.01			0.17	50	117.4	70.179	124.10	522.57	33.3	0.5
		0.01			0.17	100	127.6	80.864	124.10	602.13	35.0	0.6
82		0.05			0.17	2	66.8	20.560	117.91	145.46	26.3	0.5
		0.05			0.17	5	83.2	34.685	117.91	245.39	28.0	1.0
		0.05			0.17	10	93.9	45.370	117.91	320.98	29.8	1.3
		0.05			0.17	20	104.1	56.054	117.91	396.58	31.5	1.7
		0.05			0.17	50	117.4	70.179	117.91	496.51	33.3	2.3
		0.05			0.17	100	127.6	80.864	117.91	572.10	35.0	2.8
83		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
84		0.05			0.17	2	66.8	20.560	117.91	145.46	26.3	0.5
		0.05			0.17	5	83.2	34.685	117.91	245.39	28.0	1.0
		0.05			0.17	10	93.9	45.370	117.91	320.98	29.8	1.3
		0.05			0.17	20	104.1	56.054	117.91	396.58	31.5	1.7
		0.05			0.17	50	117.4	70.179	117.91	496.51	33.3	2.3
		0.05			0.17	100	127.6	80.864	117.91	572.10	35.0	2.8
85		0.10			0.17	2	66.8	20.560	115.09	141.98	26.3	1.0
		0.10			0.17	5	83.2	34.685	115.09	239.52	28.0	1.9
		0.10			0.17	10	93.9	45.370	115.09	313.30	29.8	2.6
		0.10			0.17	20	104.1	56.054	115.09	387.09	31.5	3.4
		0.10			0.17	50	117.4	70.179	115.09	484.62	33.3	4.5
		0.10			0.17	100	127.6	80.864	115.09	558.41	35.0	5.4
86		0.01			0.17	2	66.8	20.560	124.10	153.10	26.3	0.1
		0.01			0.17	5	83.2	34.685	124.10	258.27	28.0	0.2
		0.01			0.17	10	93.9	45.370	124.10	337.83	29.8	0.3
		0.01			0.17	20	104.1	56.054	124.10	417.40	31.5	0.4
		0.01			0.17	50	117.4	70.179	124.10	522.57	33.3	0.5
		0.01			0.17	100	127.6	80.864	124.10	602.13	35.0	0.6
87		0.01			0.17	2	66.8	20.560	124.10	153.10	26.3	0.1
		0.01			0.17	5	83.2	34.685	124.10	258.27	28.0	0.2
		0.01			0.17	10	93.9	45.370	124.10	337.83	29.8	0.3
		0.01			0.17	20	104.1	56.054	124.10	417.40	31.5	0.4
		0.01			0.17	50	117.4	70.179	124.10	522.57	33.3	0.5
		0.01			0.17	100	127.6	80.864	124.10	602.13	35.0	0.6
88		0.03			0.17	2	66.8	20.560	119.93	147.95	26.3	0.3
		0.03			0.17	5	83.2	34.685	119.93	249.59	28.0	0.6
		0.03			0.17	10	93.9	45.370	119.93	326.47	29.8	0.8
		0.03			0.17	20	104.1	56.054	119.93	403.36	31.5	1.1
		0.03			0.17	50	117.4	70.179	119.93	505.00	33.3	1.4
		0.03			0.17	100	127.6	80.864	119.93	581.89	35.0	1.7
89		0.01			0.17	2	66.8	20.560	124.10	153.10	26.3	0.1
		0.01			0.17	5	83.2	34.685	124.10	258.27	28.0	0.2
		0.01			0.17	10	93.9	45.370	124.10	337.83	29.8	0.3
		0.01			0.17	20	104.1	56.054	124.10	417.40	31.5	0.4
		0.01			0.17	50	117.4	70.179	124.10	522.57	33.3	0.5
		0.01			0.17	100	127.6	80.864	124.10	602.13	35.0	0.6
90		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
91		0.02			0.17	2	66.8	20.560	121.50	149.88	26.3	0.2
		0.02			0.17	5	83.2	34.685	121.50	252.84	28.0	0.4
		0.02			0.17	10	93.9	45.370	121.50	330.73	29.8	0.5
		0.02			0.17	20	104.1	56.054	121.50	408.62	31.5	0.7
		0.02			0.17	50	117.4	70.179	121.50	511.59	33.3	0.9
		0.02			0.17	100	127.6	80.864	121.50	589.48	35.0	1.1
92		0.04			0.17	2	66.8	20.560	118.80	146.55	26.3	0.4
		0.04			0.17	5	83.2	34.685	118.80	247.24	28.0	0.8
		0.04			0.17	10	93.9	45.370	118.80	323.40	29.8	1.1
		0.04			0.17	20	104.1	56.054	118.80	399.56	31.5	1.4
		0.04			0.17	50	117.4	70.179	118.80	500.24	33.3	1.8
		0.04			0.17	100	127.6	80.864	118.80	576.41	35.0	2.2
93		0.05			0.17	2	66.8	20.560	117.91	145.46	26.3	0.5
		0.05			0.17	5	83.2	34.685	117.91	245.39	28.0	1.0
		0.05			0.17	10	93.9	45.370	117.91	320.98	29.8	1.3
		0.05			0.17	20	104.1	56.054	117.91	396.58	31.5	1.7
		0.05			0.17	50	117.4	70.179	117.91	496.51	33.3	2.3
		0.05			0.17	100	127.6	80.864	117.91	572.10	35.0	2.8
94		0.08			0.17	2	66.8	20.560	116.01	143.11	26.3	0.8
		0.08			0.17	5	83.2	34.685	116.01	241.43	28.0	1.5
		0.08			0.17	10	93.9	45.370	116.01	315.81	29.8	2.1
		0.08			0.17	20	104.1	56.054	116.01	390.18	31.5	2.7
		0.08			0.17	50	117.4	70.179	116.01	488.50	33.3	3.6
		0.08			0.17	100	127.6	80.864	116.01	562.87	35.0	4.4

Appendix-G

Drainage Schedule

Appendix-G Drainage Schedule

New Drainage Schedule for Mandimba-Lichinga Road

No.	Sta.	Bridge Name	Discharge	Existing Capacity	Drainage (Plan)										
			Volume (m3/s)	Capacity (m3/s)	Concrete Pipe (Φ:m)	Box H (m)	Box W (m)	Cell Number	rad	A	R	n	i	Plan Q (m3/s)	
1	0+701		8.9	2.82		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	9.45
2	1+194	Ngame- I													
3	1+982		6.7	0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	7.62
4	3+977		15.2	3.20		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	20.19
5	4+493			3.20		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	
6	4+702			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
7	5+442		9.6	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	11.79
8	5+830			3.20		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	
9	6+382		27.4	3.20		2.0	2.0	1		4.00	0.67	0.02	0.01	20.35	29.80
10	6+955			3.20		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	
11	7+479	Nacalongo	48.0			5.0	5.0	1		25.00	1.67	0.02	0.01	234.29	
12	8+61	Namiungu													
13	11+536		1.1	3.20	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
14	12+510		19.7	3.20		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	18.90
15	12+803			0.70		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	
16	13+377		3.8	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
17	14+899		56.0	16.54		2.0	2.0	3		4.00	0.67	0.02	0.01	61.05	61.05
18	15+764		14.7	0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	15.24
19	16+27			0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	
20	18+507	Luchimua													
21	19+168		50.8	10.39		2.0	2.0	3		4.00	0.67	0.02	0.01	61.05	61.05
22	20+843		15.9	0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	19.05
23	21+228			0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
24	21+461			0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	
25	22+623		144.8	8.06		3.0	3.0	3		9.00	1.00	0.02	0.01	180.00	223.04
26	23+397		38.5	8.06		2.0	2.0	2		4.00	0.67	0.02	0.01	40.70	43.04
27	24+539		1.30	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
28	26+400	Lilasi													
29	26+793		29.6	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	30.49
30	27+57			0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	
31	27+374			0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	
32	27+655			0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	
33	27+960			8.06	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
34	28+502	Ninde													
35	30+609		13.3	0.70		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	26.52
36	32+368		24.0	0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	26.52
37	33+759			2.06		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	
38	34+201			2.06		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	
39	35+738	Luelele													
40	38+903		2.1	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
41	40+537		0.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
42	43+392		1.3	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
43	44+244		33.5	1.64		2.0	2.0	2		4.00	0.67	0.02	0.01	40.70	40.70
44	46+809		4.8	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	7.62
45	47+400			0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
46	47+727		2.1	0.49	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
47	48+249		0.5	2.09	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
48	49+809		5.8	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	7.62
49	50+477			0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
50	52+367	Mmaculumesi													
51	60+787		13.8	0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	15.24
52	61+100			0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
53	61+826			0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
54	62+409		36.4	3.74		2.0	2.0	2		4.00	0.67	0.02	0.01	40.70	48.32
55	63+19		26.7	0.70	1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	30.49
56	63+293			0.70	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	
57	63+752			0.70	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	
58	65+34		21.1	0.70	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	22.87
59	65+683			0.70	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	
60	67+89		3.3	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
61	69+41		4.8	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	6.15
62	69+460			0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
63	70+671		0.5	2.59	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
64	74+26	Lutembue													
65	76+41		2.8	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
65	-		1.1	0.00	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
66	77+469		0.8	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
67	77+841		0.3	2.31	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
68	78+535	Lusanga	25.4			4.0	4.0	2		16.00	1.33	0.02	0.01	258.43	258.43
69	80+869		16.3	1.27	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	37.41
70	81+119			1.27	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
71	81+418			1.27	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
72	81+46			3.81	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	
73	81+648			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
74	81+813			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
75	82+4			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
76	82+120			6.19	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	
77	82+196			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
78	82+477			1.27	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
79	83+649		15.4	0.70	1.0			2	2.21	0.67	0.30	0.013	0.01	4.69	16.12
80	83+954			2.06	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	
81	84+896		3.8	2.31	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	4.93
82	85+262			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
83	85+508			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
84	85+928	Luambala													
85	87+818		0.5	2.31	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
86	89+357		11.0	0.70	1.2			3	2.21	0.97	0.37	0.013	0.01	11.43	11.43
87	90+794		40.8	2.31	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	62.34
88	92+126			19.77		3.0	3.0	1		9.00	1.00	0.02	0.01	60.00	
89	93+69		15.2	2.06		1.5	1.5	2		2.25	0.50	0.02	0.01	18.90	18.90
90	-		4.3		1.0			2	2.21	0.67	0.30	0.013	0.01	4.69	4.69
91	-		4.8		1.2			2	2.21	0.97	0.37	0.013	0.01	7.62	7.62
92	96+687		2.6	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
93	-		2.3		1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
94	103+82		17.9	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	22.71
95	101+567			1.27		1.5	1.5	2		2.25	0.50	0.02	0.01	18.90	
96	101+90		28.5	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	41.99
97	102+147			13.11		2.0	2.0	2		4.00	0.67	0.02	0.01	40.70	
98	102+357		5.3	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	7.03
99	102+718			0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
100	103+156			0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
101	104+59		1.6	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
102	-		2.6		1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
103	106+259		3.3	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	4.69
104	106+597			0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	

New Drainage Schedule for Mandimba-Lichinga Road

No.	Sta.	Bridge Name	Discharge Volume (m3/s)	Existing Capacity Capacity (m3/s)	Drainage (Plan) Concrete Pipe (Φ:m)	Box H (m)	Box W (m)	Cell Number	rad	A	R	n	i	Plan Q (m3/s)	
105	106+976		0.5	2.31	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
106	107+506		1.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	5.10
107	109+671			2.87	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
108	110+54		1.6	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
109	114+148		16.1	0.70	1.0			2	2.21	0.67	0.30	0.013	0.01	4.69	18.46
110	114+874			2.06	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
111	115+547			0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
112	115+902			2.06	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
113	116+361			2.06	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	
114	118+132		2.3	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
115	119+787		0.5	2.31	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
116	120+352		3.1	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	4.93
117	120+899			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
118	121+255			2.04	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	
119	122+459		1.1	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
120	122+955		0.8	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
121	123+940		3.6	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
122	124+610		1.8	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	3.88
123	124+892			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
124	125+159			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
125	125+675		4.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	12.03
126	125+956			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
127	126+250			2.78		1.5	1.5	1		2.25	0.50	0.02	0.01	9.45	
128	127+203		0.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
129	132+803		0.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
130	133+748		1.3	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
131	134+626		0.5	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
132	136+605		1.3	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
133	137+202		2.6	0.70	1.2			1	2.21	0.97	0.37	0.013	0.01	3.81	3.81
134	139+12		0.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
135	139+195		0.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
136	140+53		0.8	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
137	141+480		0.3	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
138	143+612		0.5	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
139	145+585		0.5	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	2.59
140	145+724			0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	
141	146+634		1.1	0.70	0.8			1	2.21	0.43	0.24	0.013	0.01	1.29	1.29
142	147+339		1.3	1.77	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34
143	148+70		2.1	0.70	1.0			1	2.21	0.67	0.30	0.013	0.01	2.34	2.34

Appendix-H
Cost Estimate

Breakdown of Cost and Quantity for Bridge (Maidimba - Lichinga)

Bill A: Road works

6000 (2) Bridge construction

Currency: USD

No.	River name	Description	Area (sq.m)	Amount	Cost per sq.m	Remarks
5	Ngame I	L=2@15.00m=30.00m, W=10.15m, Spread foundation	304.50	667,843.14	2,193.25	
6	Lilasse	L=17.00m, W=10.15m, Pile foundation	172.55	640,318.15	3,710.91	
7	Ninde	L=2@17.00m=34.00m, W=10.15m, Spread foundation	345.10	598,282.08	1,733.65	
8	Luculumesi	L=2@17.00m=34.00m, W=10.15m, Spread foundation	345.10	777,762.15	2,253.73	
9	Lutembue	L=2@17.00m=34.00m, W=10.15m, Pile foundation	345.10	875,533.48	2,537.04	
10	Luambala	L=2@15.00m=30.00m, W=10.15m, Spread foundation	304.50	700,557.02	2,300.68	
		Total	**1,816.85**	**4,260,296.01**	**2,344.88**	

Breakdown of Cost and Quantity for Bridge (Maidimba - Lichinga)

Bill A: Road works L = 30.00 (m) Area = 304.50 (sq.m)
Bridge No.5: Ngame I Bridge W = 10.15 (m) **Currency: USD**

Item	Description					Unit	Rate	Quantity	Amount	Remarks
6000	(2) Bridge	1) Foundation	(i)	Excavation	Soil	cu.m	2.39	114.70	273.90	
			(ii)	Excavation	Rock	cu.m	17.58	573.48	10,081.78	
			(iii)	Backfill		cu.m	5.62	688.18	3,864.82	
			(iv)	Pile	Steel tube (D=400mm)	m	840.00	0.00	0.00	
		2) Substructure	(i)	Concrete	σck=240kgf/cm2	cu.m	249.78	396.13	98,945.35	
			(ii)	Formwork		sq.m	33.24	548.86	18,244.11	
			(iii)	Reinforcement bar	SD295	t	2,950.25	53.48	157,779.26	
		3) Superstructur	(i)	Precast RC girder	σck=300kgf/cm2, L=15m	No.	6,858.19	12.00	82,298.27	
			(ii)	Concrete	σck=270kgf/cm2 (deck, cross beam, precast panel)	cu.m	225.60	127.29	28,716.62	
			(iii)	Formwork		sq.m	30.72	138.48	4,254.11	
			(iv)	Reinforcement bar	SD295	t	2,820.00	42.74	120,526.80	
			(v)	Girder erection		No.	974.54	12.00	11,694.53	
		4) Ancillaries	(i)	Expansion joint		m	1,059.73	30.45	32,268.84	
			(ii)	Bearing		No.	336.56	24.00	8,077.54	
			(iii)	Drainage pipe	PVC (D=75mm)	m	115.15	8.00	921.22	
			(iv)	Parapet	New Jersey type	m	838.10	60.00	50,286.24	
			(v)	Slope & river protection	Gabion (t=30cm)	sq.m	69.49	570.00	39,609.76	
							Total of Bridge No.5		**667,843.14**	

(USD 2,193.25 per sq.m)

Bill A: Road works L = 17.00 (m) Area = 172.55 (sq.m)
Bridge No.6: Lilasse Bridge W = 10.15 (m) **Currency: USD**

Item	Description					Unit	Rate	Quantity	Amount	Remarks
6000	(2) Bridge	1) Foundation	(i)	Excavation	Soil	cu.m	2.39	36.54	87.26	
			(ii)	Excavation	Rock	cu.m	17.58	182.70	3,211.87	
			(iii)	Backfill		cu.m	5.62	219.24	1,231.25	
			(iv)	Pile	Steel tube (D=400mm)	m	840.00	325.50	273,420.00	
		2) Substructure	(i)	Concrete	σck=240kgf/cm2	cu.m	249.78	246.52	61,575.77	
			(ii)	Formwork		sq.m	33.24	340.74	11,326.20	
			(iii)	Reinforcement bar	SD295	t	2,950.25	33.28	98,184.25	
		3) Superstructur	(i)	Precast RC girder	σck=300kgf/cm2, L=17m	No.	7,745.02	6.00	46,470.14	
			(ii)	Concrete	σck=270kgf/cm2 (deck, cross beam, precast panel)	cu.m	225.60	69.18	15,607.01	
			(iii)	Formwork		sq.m	30.72	72.04	2,213.07	
			(iv)	Reinforcement bar	SD295	t	2,820.00	23.63	66,636.60	
			(v)	Girder erection		No.	974.54	6.00	5,847.26	
		4) Ancillaries	(i)	Expansion joint		m	1,059.73	20.30	21,512.56	
			(ii)	Bearing		No.	336.56	12.00	4,038.77	
			(iii)	Drainage pipe	PVC (D=75mm)	m	115.15	4.00	460.61	
			(iv)	Parapet	New Jersey type	m	838.10	34.00	28,495.54	
			(v)	Slope & river protection	Gabion (t=30cm)	sq.m	69.49	0.00	0.00	
							Total of Bridge No.6		**640,318.15**	

(USD 3,710.91 per sq.m)

Bill A: Road works L = 34.00 (m) Area = 345.10 (sq.m)
Bridge No.7: Ninde Bridge W = 10.15 (m) **Currency: USD**

Item	Description					Unit	Rate	Quantity	Amount	Remarks
6000	(2) Bridge	1) Foundation	(i)	Excavation	Soil	cu.m	2.39	80.19	191.49	
			(ii)	Excavation	Rock	cu.m	17.58	400.93	7,048.35	
			(iii)	Backfill		cu.m	5.62	481.12	2,701.97	
			(iv)	Pile	Steel tube (D=400mm)	m	840.00	0.00	0.00	
		2) Substructure	(i)	Concrete	σck=240kgf/cm2	cu.m	249.78	311.95	77,918.87	
			(ii)	Formwork		sq.m	33.24	432.60	14,379.62	
			(iii)	Reinforcement bar	SD295	t	2,950.25	42.11	124,234.94	
		3) Superstructur	(i)	Precast RC girder	σck=300kgf/cm2, L=17m	No.	7,745.02	12.00	92,940.29	
			(ii)	Concrete	σck=270kgf/cm2 (deck, cross beam, precast panel)	cu.m	225.60	138.36	31,214.02	
			(iii)	Formwork		sq.m	30.72	144.08	4,426.14	
			(iv)	Reinforcement bar	SD295	t	2,820.00	47.26	133,273.20	
			(v)	Girder erection		No.	974.54	12.00	11,694.53	
		4) Ancillaries	(i)	Expansion joint		m	1,059.73	30.45	32,268.84	
			(ii)	Bearing		No.	336.56	24.00	8,077.54	
			(iii)	Drainage pipe	PVC (D=75mm)	m	115.15	8.00	921.22	
			(iv)	Parapet	New Jersey type	m	838.10	68.00	56,991.07	
			(v)	Slope & river protection	Gabion (t=30cm)	sq.m	69.49	0.00	0.00	
							Total of Bridge No.7		**598,282.08**	

(USD 1,733.65 per sq.m)

Breakdown of Cost and Quantity for Bridge (Maidimba - Lichinga)

Bill A: Road works L = 34.00 (m) Area = 345.10 (sq.m)

Bridge No.8: Luculumesi Bridge W = 10.15 (m) **Currency: USD**

Item	Description				Unit	Rate	Quantity	Amount	Remarks
6000	(2) Bridge	1) Foundation	(i) Excavation	Soil	cu.m	2.39	74.10	176.95	
			(ii) Excavation	Rock	cu.m	17.58	370.48	6,513.04	
			(iii) Backfill		cu.m	5.62	444.58	2,496.76	
			(iv) Pile	Steel tube (D=400mm)	m	840.00	0.00	0.00	
		2) Substructure	(i) Concrete	σck=240kgf/cm2	cu.m	249.78	510.02	127,392.80	
			(ii) Formwork		sq.m	33.24	738.77	24,556.71	
			(iii) Reinforcement bar	SD295	t	2,950.25	68.85	203,124.57	
		3) Superstructur	(i) Precast RC girder	σck=300kgf/cm2, L=17m	No.	7,745.02	12.00	92,940.29	
			(ii) Concrete	σck=270kgf/cm2 (deck, cross beam, precast panel)	cu.m	225.60	138.36	31,214.02	
			(iii) Formwork		sq.m	30.72	144.08	4,426.14	
			(iv) Reinforcement bar	SD295	t	2,820.00	47.26	133,273.20	
			(v) Girder erection		No.	974.54	12.00	11,694.53	
		4) Ancillaries	(i) Expansion joint		m	1,059.73	30.45	32,268.84	
			(ii) Bearing		No.	336.56	24.00	8,077.54	
			(iii) Drainage pipe	PVC (D=75mm)	m	115.15	8.00	921.22	
			(iv) Parapet	New Jersey type	m	838.10	68.00	56,991.07	
			(v) Slope & river protection	Gabion (t=30cm)	sq.m	69.49	600.00	41,694.48	
						Total of Bridge No.8		**777,762.15**	

(USD 2,253.73 per sq.m)

Bill A: Road works L = 34.00 (m) Area = 345.10 (sq.m)

Bridge No.9: Lutembue Bridge W = 10.15 (m) **Currency: USD**

Item	Description				Unit	Rate	Quantity	Amount	Remarks
6000	(2) Bridge	1) Foundation	(i) Excavation	Soil	cu.m	2.39	90.84	216.93	
			(ii) Excavation	Rock	cu.m	17.58	454.21	7,985.01	
			(iii) Backfill		cu.m	5.62	545.05	3,061.00	
			(iv) Pile	Steel tube (D=400mm)	m	840.00	221.48	186,043.20	
		2) Substructure	(i) Concrete	σck=240kgf/cm2	cu.m	249.78	441.91	110,380.28	
			(ii) Formwork		sq.m	33.24	602.54	20,028.43	
			(iii) Reinforcement bar	SD295	t	2,950.25	59.66	176,011.80	
		3) Superstructur	(i) Precast RC girder	σck=300kgf/cm2, L=17m	No.	7,745.02	12.00	92,940.29	
			(ii) Concrete	σck=270kgf/cm2 (deck, cross beam, precast panel)	cu.m	225.60	138.36	31,214.02	
			(iii) Formwork		sq.m	30.72	144.08	4,426.14	
			(iv) Reinforcement bar	SD295	t	2,820.00	47.26	133,273.20	
			(v) Girder erection		No.	974.54	12.00	11,694.53	
		4) Ancillaries	(i) Expansion joint		m	1,059.73	30.45	32,268.84	
			(ii) Bearing		No.	336.56	24.00	8,077.54	
			(iii) Drainage pipe	PVC (D=75mm)	m	115.15	8.00	921.22	
			(iv) Parapet	New Jersey type	m	838.10	68.00	56,991.07	
			(v) Slope & river protection	Gabion (t=30cm)	sq.m	69.49	0.00	0.00	
						Total of Bridge No.9		**875,533.48**	

(USD 2,537.04 per sq.m)

Bill A: Road works L = 30.00 (m) Area = 304.50 (sq.m)

Bridge No.10: Luambala Bridge W = 10.15 (m) **Currency: USD**

Item	Description				Unit	Rate	Quantity	Amount	Remarks
6000	(2) Bridge	1) Foundation	(i) Excavation	Soil	cu.m	2.39	58.87	140.58	
			(ii) Excavation	Rock	cu.m	17.58	294.36	5,174.85	
			(iii) Backfill		cu.m	5.62	353.23	1,983.74	
			(iv) Pile	Steel tube (D=400mm)	m	840.00	0.00	0.00	
		2) Substructure	(i) Concrete	σck=240kgf/cm2	cu.m	249.78	447.49	111,774.05	
			(ii) Formwork		sq.m	33.24	614.80	20,435.95	
			(iii) Reinforcement bar	SD295	t	2,950.25	60.41	178,224.48	
		3) Superstructur	(i) Precast RC girder	σck=300kgf/cm2, L=15m	No.	6,858.19	12.00	82,298.27	
			(ii) Concrete	σck=270kgf/cm2 (deck, cross beam, precast panel)	cu.m	225.60	127.29	28,716.62	
			(iii) Formwork		sq.m	30.72	138.48	4,254.11	
			(iv) Reinforcement bar	SD295	t	2,820.00	42.74	120,526.80	
			(v) Girder erection		No.	974.54	12.00	11,694.53	
		4) Ancillaries	(i) Expansion joint		m	1,059.73	30.45	32,268.84	
			(ii) Bearing		No.	336.56	24.00	8,077.54	
			(iii) Drainage pipe	PVC (D=75mm)	m	115.15	8.00	921.22	
			(iv) Parapet	New Jersey type	m	838.10	60.00	50,286.24	
			(v) Slope & river protection	Gabion (t=30cm)	sq.m	69.49	630.00	43,779.20	
						Total of Bridge No.10		**700,557.02**	

(USD 2,300.68 per sq.m)

Summary of Project Cost of Mandimba - Lichinga

(L = 148.4 km) Currency: USD

Description	Final DBST	ALT 1 AC	ALT 2 DBST	ALT 3 Gravel
1000 General	28,083,346	*36,915,300*	*28,987,965*	*16,422,307*
2000 Drainage	11,519,383	*11,519,383*	*11,519,383*	*11,519,383*
3000 EW & granular layers	66,843,578	*61,771,161*	*70,324,482*	*30,065,573*
4000 AC & seals	14,259,205	*69,132,980*	*14,128,742*	*0*
5000 Ancillary	3,578,272	*3,578,272*	*3,578,272*	*3,578,272*
6000 Structures	5,797,170	*5,797,170*	*5,797,170*	*5,797,170*
7000 Test & QC	17,250	*17,250*	*17,250*	*17,250*
8000 Others	1,997,534	*1,997,534*	*1,997,534*	*1,997,534*
Total (Bill A: Road)	**132,095,738**	***190,729,051***	***136,350,798***	***69,397,489***
Bill B: Day works	1,136,023	*1,640,270*	*1,172,617*	*596,818*
Bill C: Social issues	1,241,700	*1,792,853*	*1,281,698*	*652,336*
Bill D: Environmental	330,239	*476,823*	*340,877*	*173,494*
Total (Bill A to D)	**134,803,700**	***194,638,997***	***139,145,989***	***70,820,138***
Contingencies (10%)	13,480,370	*19,463,900*	*13,914,599*	*7,082,014*
IVA (6.8%)	10,083,317	*14,558,997*	*10,408,120*	*5,297,346*
Total construction cost	**158,367,387**	***228,661,893***	***163,468,708***	***83,199,498***
Engineering cost (5%)	7,414,204	*10,705,145*	*7,653,029*	*3,895,108*
IVA (6.8%)	504,166	*727,950*	*520,406*	*264,867*
Total project cost	**166,285,757**	***240,094,988***	***171,642,144***	***87,359,473***
Compensation cost	199,391	*199,391*	*199,391*	*199,391*
Project cost per km	**1,121,868**	***1,619,234***	***1,157,962***	***590,019***

Final: DBST

Project Cost of Mandimba - Lichinga Section (L = 148.40 km) **Currency: USD**

Item	Description			Unit	Rate	Quantity	Amount	Remarks
Bill A: Road works								
1000	General			Ls.	28,083,345.82	1.00	28,083,345.82	27.00% of 2000 to 8000
2000	Drainage	(1)	Prefabricated pipe culvert (RC)	m	1,236.63	2,276.00	2,814,568.74	
		(2.1)	Concrete lined ditch (type 1)	m	158.62	32,812.00	5,204,623.03	
		(2.2)	Concrete lined ditch (type 2)	m	78.04	1,370.00	106,915.89	
		(2.3)	Concrete lined ditch (type 3)	m	396.55	3,465.00	1,374,041.42	
		(3)	Concrete kerb	m	33.35	2,740.00	91,379.00	
		(4)	Stone pitching	sq.m	65.55	2,325.00	152,403.75	
		(5)	Gabion	cu.m	142.00	12,503.00	1,775,451.01	
				Total (2000)			**11,519,382.84**	
3000	Earthworks & pavement layers of gravel or crushed stone	(1)	Cut & fill	cu.m	6.11	744,280.00	4,544,945.82	
		(2)	Haulage of embankment material from borrow pit (1.0km)	cu.m	0.92	14,916,670.00	13,723,336.40	Distance btw. site & pit = 10km
		(3)	Disposal of surplus material (1.0km)	cu.m	5.75	186,070.00	1,069,902.50	
		(4.1)	Upper subgrade	cu.m	5.92	321,710.00	1,905,327.48	
		(4.2)	Lower subgrade	cu.m	4.74			
		(5.1)	Cement stabilized gravel sub base course (C2)	cu.m	72.62			
		(5.2)	Cement stabilized gravel sub base course (C3)	cu.m	60.52			
		(5.3)	Cement stabilized gravel sub base course (C4)	cu.m	48.42	293,333.00	14,201,717.20	
		(5.4)	Gravel wearing course	cu.m	36.80			Equivalent with gravel sub base course (CBR>30%)
		(6)	Crushed stone base course	cu.m	128.80	243,776.00	31,398,348.80	Transport distance of aggregate = 110km
				Total (3000)			**66,843,578.19**	
4000	Asphalt pavements & seals	(1)	Prime coat	sq.m	1.53	1,348,550.00	2,062,607.23	
		(2)	Single seal	sq.m	5.98	225,651.00	1,349,392.98	
		(3)	Double seal	sq.m	9.66	1,122,899.00	10,847,204.34	
		(4)	Asphalt concrete (t=10cm)	sq.m	51.75		0.00	
		(5)	Interlocking block pavement	sq.m	25.30	2,740.00	69,322.00	
				Total (4000)			**14,259,204.55**	
5000	Ancillary roadworks	(1)	Km post	No.	110.76	300.00	33,226.95	
		(2)	Guardrail	m	64.62	1,235.00	79,803.85	
		(3)	Road sign	sq.m	473.01	166.78	78,888.02	
		(4)	Road marking (W=10cm)	km	1,523.88	447.36	681,721.39	
		(5)	Grassing (embankment slope)	sq.m	2.94	918,693.00	2,704,632.19	
				Total (5000)			**3,578,272.40**	
6000	Structures	(1)	Box culvert	cu.m	646.29	2,378.00	1,536,874.05	
		(2)	Bridge	Ls.	4,260,296.01	1.00	4,260,296.01	
				Total (6000)			**5,797,170.06**	
7000	Testing & quality control			Ls.	17,250.00	1.00	**17,250.00**	
8000	Other works	(1)	Railway level crossing	No.	115,000.00		0.00	
		(2)	Demolishing existing concrete	cu.m	42.99	2,421.60	104,097.32	
		(3)	Removal of corrugated pipe	m	6.79	880.10	5,971.48	
		(4)	Finishing of road & road reserve (single carriageway)	km	1,725.00	148.40	255,990.00	
		(5)	Treatment of old road & temp. diversion	km	1,380.00	148.10	204,378.00	
		(6)	Transportation of construction material	Ls.	1,427,097.10	1.00	1,427,097.10	225km from Cuamba by trailer truck (50t)
				Total (8000)			**1,997,533.90**	
				Total (Bill A: Road works)			**132,095,737.76**	
Bill B: Day works				Ls.	1,136,023.34	1.00	1,136,023.34	0.86% of Bill A
Bill C: Social issues				Ls.	1,241,699.93	1.00	1,241,699.93	0.94% of Bill A
Bill D: Environmental mitigation				Ls.	330,239.34	1.00	330,239.34	0.25% of Bill A
				Total (Bill A+B+C+D)			**134,803,700.39**	
Contingencies				Ls.	13,480,370.04	1.00	13,480,370.04	10% of A to D
IVA				Ls.	10,083,316.79	1.00	10,083,316.79	6.8% of (A to D) & Contingencies
				Total construction cost			**158,367,387.21**	
Engineering cost				Ls.	7,414,203.52	1.00	7,414,203.52	5% of (A to D) & Contingencies
IVA				Ls.	504,165.84	1.00	504,165.84	6.8% of Engineering cost
				Total project cost			**166,285,756.57**	
				Compensation for land acquisition & resettlement			199,391.00	

(USD 1,121,868 per km)

ALT-1: Asphalt Concrete

Project Cost of Mandimba - Lichinga Section (L = 148.40 km) **Currency: USD**

Item	Description			Unit	Rate	Quantity	Amount	Remarks
Bill A: Road works								
1000	General			Ls.	36,915,300.22	1.00	36,915,300.22	24.00% of 2000 to 8000
2000	Drainage	(1)	Prefabricated pipe culvert (RC)	m	1,236.63	2,276.00	2,814,568.74	
		(2.1)	Concrete lined ditch (type 1)	m	158.62	32,812.00	5,204,623.03	
		(2.2)	Concrete lined ditch (type 2)	m	78.04	1,370.00	106,915.89	
		(2.3)	Concrete lined ditch (type 3)	m	396.55	3,465.00	1,374,041.42	
		(3)	Concrete kerb	m	33.35	2,740.00	91,379.00	
		(4)	Stone pitching	sq.m	65.55	2,325.00	152,403.75	
		(5)	Gabion	cu.m	142.00	12,503.00	1,775,451.01	
			Total (2000)				**11,519,382.84**	
3000	Earthworks & pavement layers of gravel or crushed stone	(1)	Cut & fill	cu.m	6.11	727,056.00	4,439,767.46	
		(2)	Haulage of embankment material from borrow pit (1.0km)	cu.m	0.92	16,124,820.00	14,834,834.40	Distance btw. site & pit = 10km
		(3)	Disposal of surplus material (1.0km)	cu.m	5.75	181,764.00	1,045,143.00	
		(4.1)	Upper subgrade	cu.m	5.92	172,554.00	1,021,951.07	
		(4.2)	Lower subgrade	cu.m	4.74			
		(5.1)	Cement stabilized gravel sub base course (C2)	cu.m	72.62		0.00	
		(5.2)	Cement stabilized gravel sub base course (C3)	cu.m	60.52	241,576.00	14,619,877.55	
		(5.3)	Cement stabilized gravel sub base course (C4)	cu.m	48.42		0.00	
		(5.4)	Gravel wearing course	cu.m	36.80		0.00	Equivalent with gravel sub base course (CBR>30%)
		(6)	Crushed stone base course	cu.m	128.80	200,385.00	25,809,588.00	Transport distance of aggregate = 110km
			Total (3000)				**61,771,161.48**	
4000	Asphalt pavements & seals	(1)	Prime coat	sq.m	1.53		0.00	
		(2)	Single seal	sq.m	5.98		0.00	
		(3)	Double seal	sq.m	9.66		0.00	
		(4)	Asphalt concrete (t=10cm)	sq.m	51.75	1,335,903.00	69,132,980.25	
		(5)	Interlocking block pavement	sq.m	25.30		0.00	
			Total (4000)				**69,132,980.25**	
5000	Ancillary roadworks	(1)	Km post	No.	110.76	300.00	33,226.95	
		(2)	Guardrail	m	64.62	1,235.00	79,803.85	
		(3)	Road sign	sq.m	473.01	166.78	78,888.02	
		(4)	Road marking (W=10cm)	km	1,523.88	447.36	681,721.39	
		(5)	Grassing (embankment slope)	sq.m	2.94	918,693.00	2,704,632.19	
			Total (5000)				**3,578,272.40**	
6000	Structures	(1)	Box culvert	cu.m	646.29	2,378.00	1,536,874.05	
		(2)	Bridge	Ls.	4,260,296.01	1.00	4,260,296.01	
			Total (6000)				**5,797,170.06**	
7000	Testing & quality control			Ls.	17,250.00	1.00	**17,250.00**	
8000	Other works	(1)	Railway level crossing	No.	115,000.00		0.00	
		(2)	Demolishing existing concrete	cu.m	42.99	2,421.60	104,097.32	
		(3)	Removal of corrugated pipe	m	6.79	880.10	5,971.48	
		(4)	Finishing of road & road reserve (single carriageway)	km	1,725.00	148.40	255,990.00	
		(5)	Treatment of old road & temp. diversion	km	1,380.00	148.10	204,378.00	
		(6)	Transportation of construction material	Ls.	1,427,097.10	1.00	1,427,097.10	225km from Cuamba by trailer truck (50t)
			Total (8000)				**1,997,533.90**	
			Total (Bill A: Road works)				**190,729,051.16**	
Bill B: Day works				Ls.	1,640,269.84	1.00	1,640,269.84	0.86% of Bill A
Bill C: Social issues				Ls.	1,792,853.08	1.00	1,792,853.08	0.94% of Bill A
Bill D: Environmental mitigation				Ls.	476,822.63	1.00	476,822.63	0.25% of Bill A
			Total (Bill A+B+C+D)				**194,638,996.71**	
Contingencies				Ls.	19,463,899.67	1.00	19,463,899.67	10% of A to D
IVA				Ls.	14,558,996.95	1.00	14,558,996.95	6.8% of (A to D) & Contingencies
			Total construction cost				**228,661,893.33**	
Engineering cost				Ls.	10,705,144.82	1.00	10,705,144.82	5% of (A to D) & Contingencies
IVA				Ls.	727,949.85	1.00	727,949.85	6.8% of Engineering cost
			Total project cost				**240,094,988.00**	
			Compensation for land acquisition & resettlement				199,391.00	

(USD 1,619,234 per km)

ALT-2: DBST

Project Cost of Mandimba - Lichinga Section (L = 148.40 km) **Currency: USD**

Item	Description			Unit	Rate	Quantity	Amount	Remarks
Bill A: Road works								
1000	General			Ls.	28,987,964.94	1.00	28,987,964.94	27.00% of 2000 to 8000
2000	Drainage	(1)	Prefabricated pipe culvert (RC)	m	1,236.63	2,276.00	2,814,568.74	
		(2.1)	Concrete lined ditch (type 1)	m	158.62	32,812.00	5,204,623.03	
		(2.2)	Concrete lined ditch (type 2)	m	78.04	1,370.00	106,915.89	
		(2.3)	Concrete lined ditch (type 3)	m	396.55	3,465.00	1,374,041.42	
		(3)	Concrete kerb	m	33.35	2,740.00	91,379.00	
		(4)	Stone pitching	sq.m	65.55	2,325.00	152,403.75	
		(5)	Gabion	cu.m	142.00	12,503.00	1,775,451.01	
				Total (2000)			**11,519,382.84**	
3000	Earthworks & pavement layers of gravel or crushed stone	(1)	Cut & fill	cu.m	6.11	727,620.00	4,443,211.53	
		(2)	Haulage of embankment material from borrow pit (1.0km)	cu.m	0.92	16,114,490.00	14,825,330.80	Distance btw. site & pit = 10km
		(3)	Disposal of surplus material (1.0km)	cu.m	5.75	181,905.00	1,045,953.75	
		(4.1)	Upper subgrade	cu.m	5.92	207,065.00	1,226,342.46	
		(4.2)	Lower subgrade	cu.m	4.74			
		(5.1)	Cement stabilized gravel sub base course (C2)	cu.m	72.62	172,554.00	12,531,302.87	
		(5.2)	Cement stabilized gravel sub base course (C3)	cu.m	60.52	172,554.00	10,442,752.39	
		(5.3)	Cement stabilized gravel sub base course (C4)	cu.m	48.42		0.00	
		(5.4)	Gravel wearing course	cu.m	36.80		0.00	Equivalent with gravel sub base course (CBR>30%)
		(6)	Crushed stone base course	cu.m	128.80	200,385.00	25,809,588.00	Transport distance of aggregate = 110km
				Total (3000)			**70,324,481.80**	
4000	Asphalt pavements & seals	(1)	Prime coat	sq.m	1.53	1,335,904.00	2,043,265.17	
		(2)	Single seal	sq.m	5.98	222,651.00	1,331,452.98	
		(3)	Double seal	sq.m	9.66	1,113,253.00	10,754,023.98	
		(4)	Asphalt concrete (t=10cm)	sq.m	51.75		0.00	
		(5)	Interlocking block pavement	sq.m	25.30		0.00	
				Total (4000)			**14,128,742.13**	
5000	Ancillary roadworks	(1)	Km post	No.	110.76	300.00	33,226.95	
		(2)	Guardrail	m	64.62	1,235.00	79,803.85	
		(3)	Road sign	sq.m	473.01	166.78	78,888.02	
		(4)	Road marking (W=10cm)	km	1,523.88	447.36	681,721.39	
		(5)	Grassing (embankment slope)	sq.m	2.94	918,693.00	2,704,632.19	
				Total (5000)			**3,578,272.40**	
6000	Structures	(1)	Box culvert	cu.m	646.29	2,378.00	1,536,874.05	
		(2)	Bridge	Ls.	4,260,296.01	1.00	4,260,296.01	
				Total (6000)			**5,797,170.06**	
7000	Testing & quality control			Ls.	17,250.00	1.00	**17,250.00**	
8000	Other works	(1)	Railway level crossing	No.	115,000.00		0.00	
		(2)	Demolishing existing concrete	cu.m	42.99	2,421.60	104,097.32	
		(3)	Removal of corrugated pipe	m	6.79	880.10	5,971.48	
		(4)	Finishing of road & road reserve (single carriageway)	km	1,725.00	148.40	255,990.00	
		(5)	Treatment of old road & temp. diversion	km	1,380.00	148.10	204,378.00	
		(6)	Transportation of construction material	Ls.	1,427,097.10	1.00	1,427,097.10	225km from Cuamba by trailer truck (50t)
				Total (8000)			**1,997,533.90**	
Total (Bill A: Road works)							**136,350,798.07**	
Bill B: Day works				Ls.	1,172,616.86	1.00	1,172,616.86	0.86% of Bill A
Bill C: Social issues				Ls.	1,281,697.50	1.00	1,281,697.50	0.94% of Bill A
Bill D: Environmental mitigation				Ls.	340,877.00	1.00	340,877.00	0.25% of Bill A
Total (Bill A+B+C+D)							**139,145,989.43**	
Contingencies				Ls.	13,914,598.94	1.00	13,914,598.94	10% of A to D
IVA				Ls.	10,408,120.01	1.00	10,408,120.01	6.8% of (A to D) & Contingencies
Total construction cost							**163,468,708.38**	
Engineering cost				Ls.	7,653,029.42	1.00	7,653,029.42	5% of (A to D) & Contingencies
IVA				Ls.	520,406.00	1.00	520,406.00	6.8% of Engineering cost
Total project cost							**171,642,143.80**	
Compensation for land acquisition & resettlement							199,391.00	
						(USD	1,157,962	per km)

ALT-3: Gravel

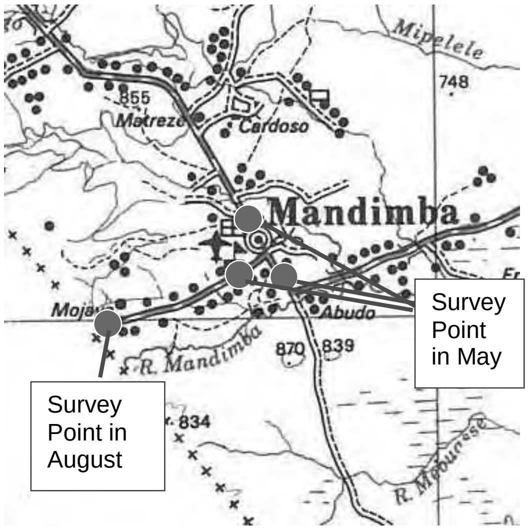
Project Cost of Mandimba - Lichinga Section (L = 148.40 km) **Currency: USD**

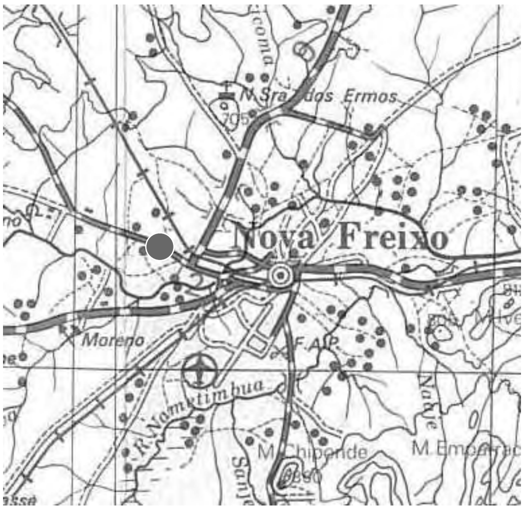
Item	Description			Unit	Rate	Quantity	Amount	Remarks
Bill A: Road works								
1000	General			Ls.	16,422,306.61	1.00	16,422,306.61	31.00% of 2000 to 8000
2000	Drainage	(1)	Prefabricated pipe culvert (RC)	m	1,236.63	2,276.00	2,814,568.74	
		(2.1)	Concrete lined ditch (type 1)	m	158.62	32,812.00	5,204,623.03	
		(2.2)	Concrete lined ditch (type 2)	m	78.04	1,370.00	106,915.89	
		(2.3)	Concrete lined ditch (type 3)	m	396.55	3,465.00	1,374,041.42	
		(3)	Concrete kerb	m	33.35	2,740.00	91,379.00	
		(4)	Stone pitching	sq.m	65.55	2,325.00	152,403.75	
		(5)	Gabion	cu.m	142.00	12,503.00	1,775,451.01	
				Total (2000)			**11,519,382.84**	
3000	Earthworks & pavement layers of gravel or crushed stone	(1)	Cut & fill	cu.m	6.11	752,662.00	4,596,130.50	
		(2)	Haulage of embankment material from borrow pit (1.0km)	cu.m	0.92	14,582,660.00	13,416,047.20	Distance btw. site & pit = 10km
		(3)	Disposal of surplus material (1.0km)	cu.m	5.75	188,166.00	1,081,954.50	
		(4.1)	Upper subgrade	cu.m	5.92	276,087.00	1,635,125.26	
		(4.2)	Lower subgrade	cu.m	4.74	414,130.00	1,962,147.94	
		(5.1)	Cement stabilized gravel sub base course (C2)	cu.m	72.62		0.00	
		(5.2)	Cement stabilized gravel sub base course (C3)	cu.m	60.52		0.00	
		(5.3)	Cement stabilized gravel sub base course (C4)	cu.m	48.42		0.00	
		(5.4)	Gravel wearing course	cu.m	36.80	200,385.00	7,374,168.00	Equivalent with gravel sub base course (CBR>30%)
		(6)	Crushed stone base course	cu.m	128.80		0.00	Transport distance of aggregate = 110km
				Total (3000)			**30,065,573.40**	
4000	Asphalt pavements & seals	(1)	Prime coat	sq.m	1.53		0.00	
		(2)	Single seal	sq.m	5.98		0.00	
		(3)	Double seal	sq.m	9.66		0.00	
		(4)	Asphalt concrete (t=10cm)	sq.m	51.75		0.00	
		(5)	Interlocking block pavement	sq.m	25.30		0.00	
				Total (4000)			**0.00**	
5000	Ancillary roadworks	(1)	Km post	No.	110.76	300.00	33,226.95	
		(2)	Guardrail	m	64.62	1,235.00	79,803.85	
		(3)	Road sign	sq.m	473.01	166.78	78,888.02	
		(4)	Road marking (W=10cm)	km	1,523.88	447.36	681,721.39	
		(5)	Grassing (embankment slope)	sq.m	2.94	918,693.00	2,704,632.19	
				Total (5000)			**3,578,272.40**	
6000	Structures	(1)	Box culvert	cu.m	646.29	2,378.00	1,536,874.05	
		(2)	Bridge	Ls.	4,260,296.01	1.00	4,260,296.01	
				Total (6000)			**5,797,170.06**	
7000	Testing & quality control			Ls.	17,250.00	1.00	**17,250.00**	
8000	Other works	(1)	Railway level crossing	No.	115,000.00		0.00	
		(2)	Demolishing existing concrete	cu.m	42.99	2,421.60	104,097.32	
		(3)	Removal of corrugated pipe	m	6.79	880.10	5,971.48	
		(4)	Finishing of road & road reserve (single carriageway)	km	1,725.00	148.40	255,990.00	
		(5)	Treatment of old road & temp. diversion	km	1,380.00	148.10	204,378.00	
		(6)	Transportation of construction material	Ls.	1,427,097.10	1.00	1,427,097.10	225km from Cuamba by trailer truck (50t)
				Total (8000)			**1,997,533.90**	
				Total (Bill A: Road works)			**69,397,489.21**	
Bill B: Day works				Ls.	596,818.41	1.00	596,818.41	0.86% of Bill A
Bill C: Social issues				Ls.	652,336.40	1.00	652,336.40	0.94% of Bill A
Bill D: Environmental mitigation				Ls.	173,493.72	1.00	173,493.72	0.25% of Bill A
				Total (Bill A+B+C+D)			**70,820,137.74**	
Contingencies				Ls.	7,082,013.77	1.00	7,082,013.77	10% of A to D
IVA				Ls.	5,297,346.30	1.00	5,297,346.30	6.8% of (A to D) & Contingencies
				Total construction cost			**83,199,497.82**	
Engineering cost				Ls.	3,895,107.58	1.00	3,895,107.58	5% of (A to D) & Contingencies
IVA				Ls.	264,867.32	1.00	264,867.32	6.8% of Engineering cost
				Total project cost			**87,359,472.71**	
				Compensation for land acquisition & resettlement			199,391.00	
						(USD	590,019	per km)

Appendix-I

Traffic Survey

1. Survey Points

Lichinga	Mandimba
	

Cuamba


● Survey Point

2. Survey Forms

2.1 Traffic Volume Survey

Traffic Count Survey

Date: ______ / ______ / 2009

Location: ______________________

Direction: ______________________ Surveyor: ______________

Vehicle Type / Time	Passenger Car		Bus		Truck				Others			
	1	2	3	4	5	6	7	8	9	10	11	12
	Medium Passenger Car	4-Wheel Vehicle	Minibus and Light Bus (<20 seats)	Medium / Large Bus (>20 seats)	Light Goods Vehicle	Medium Goods Vehicle (2 Axles)	Heavy Goods Vehicle (3 Axles)	Very Heavy Goods Vehicle (>3 Alxes)	Agricultural Tractors / Trailers	Motorcycle	Bicycle	Animal Cart
6:00 - 7:00												
7:00 - 8:00												
8:00 - 9:00												
9:00 - 10:00												
10:00 - 11:00												
11:00 - 12:00												
12:00 - 13:00												
13:00 - 14:00												
14:00 - 15:00												
15:00 - 16:00												
16:00 - 17:00												
17:00 - 18:00												
Sum												
18:00 - 19:00												
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
0:00 - 1:00												
1:00 - 2:00												
2:00 - 3:00												
3:00 - 4:00												
4:00 - 5:00												
5:00 - 6:00												
Sum												

2.2 Roadside Origin-Destination (OD) Survey

Roadside OD interview Survey

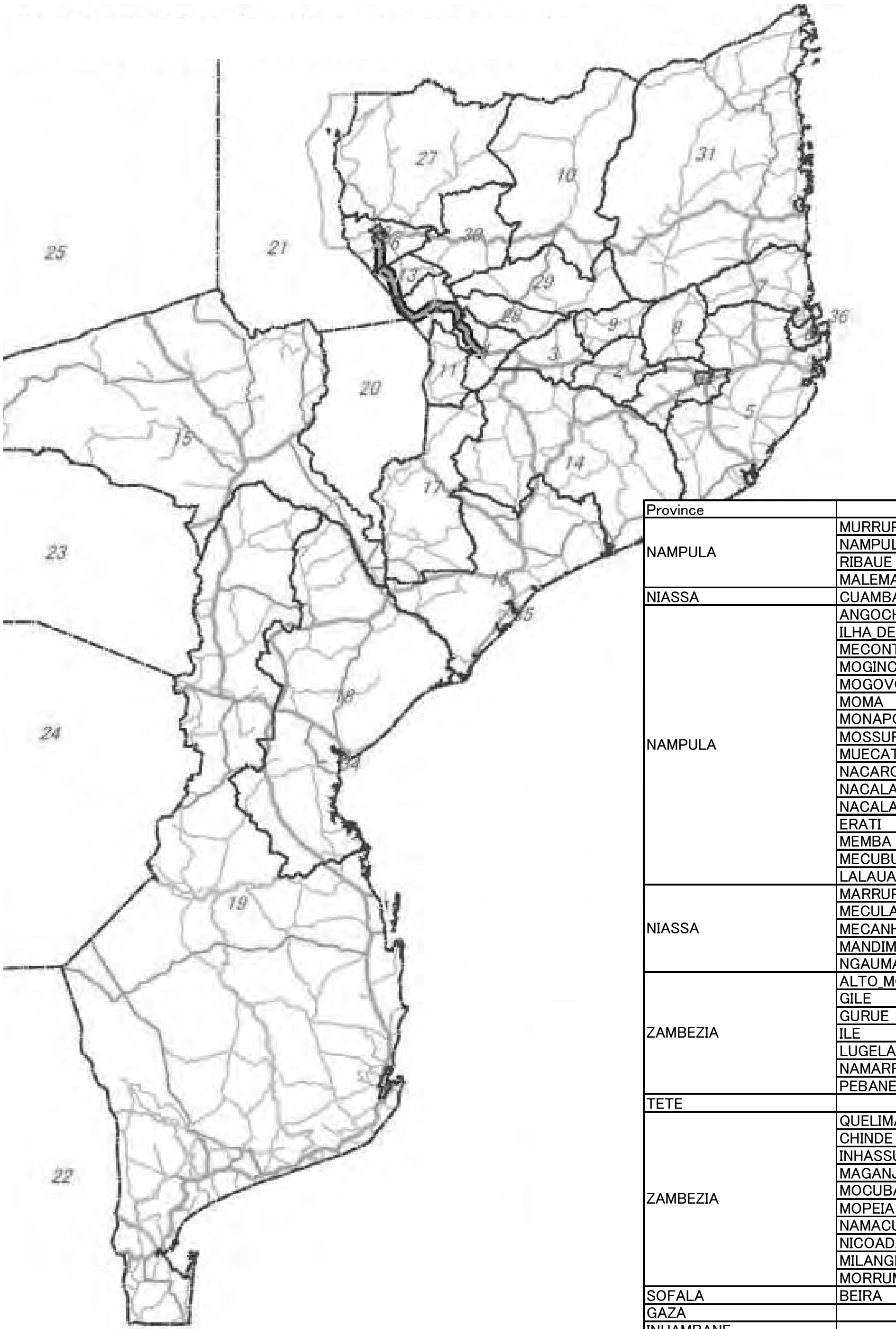
Date: ____/____/ 2009   Time: ____:____   No. ______

Location: ____________________

Direction: From ____________ To ____________   Surveyor: ____________________

1	**Vehicle Information** Number of plate ____________ Number of Passengers ______ Model ________
2	**Type of Vehicle** 1 Medium Passenger Car 2 4-Wheel Vehicle 3 Minibus and Light Bus 4 Medium / Large Bus 5 Light Goods Vehicle 6 Medium Goods Vehicle 7 Heavy Goods Vehicle 8 Very Heavy Goods Vehicle 9 Agricultural Tractors / Trailers 10 Motorcycle 11 Bicycle 12 Animal Cart [ ]
3	**Origin of Trip** Country ________ Province ________ District ________ Village ________ If Port Beira / Quelimane / Nacala If City Nampula / Lichinga [ ] *Zone Code
4	**Destination of Trip** Country ________ Province ________ District ________ Village ________ If Port Beira / Quelimane / Nacala If City Nampula / Lichinga [ ] *Zone Code
5	**Expected Travel Time** (From Origin to Destination) [hours : minutes]
6	**Purpose of Trip** 1 Commute 2 School 3 Shopping 4 Hospital 5 Tourism 6 Business 7 Social 8 Others ____________ [ ]
7	**Trip Frequency** 1 Everyday 2 A few days per Week 3 Once per Week 4 A few days per Month 5 Once per Month 6 A few days per Year 7 First time 8 Others ____________ [ ]
8	**Contents and Volume of Freight** (only for freight car) unit : kg Name and Tel of Company Contents ____________ Volume ________ Name ________ Contents ____________ Volume ________ Telephone ________ Contents ____________ Volume ________
9	**Time spent for border crossing** [hours : minutes]

Reference: OD Zone Code



Province	District	Zone No
NAMPULA	MURRUPULA	1
	NAMPULA	
	RIBAUE	2
	MALEMA	3
NIASSA	CUAMBA	4
NAMPULA	ANGOCHE	5
	ILHA_DE_MOZAMBIQUE	
	MECONTA	
	MOGINCUAL	
	MOGOVOLAS	
	MOMA	
	MONAPO	
	MOSSURIL	
	MUECATE	
	NACAROA	
	NACALA	6
	NACALA_A_VELHA	
	ERATI	7
	MEMBA	
	MECUBURI	8
	LALAUA	9
NIASSA	MARRUPA	10
	MECULA	
	MECANHELAS	11
	MANDIMBA	12
	NGAUMA	13
ZAMBEZIA	ALTO_MOLOCUE	14
	GILE	
	GURUE	
	ILE	
	LUGELA	
	NAMARROI	
	PEBANE	
TETE		15
ZAMBEZIA	QUELIMANE	16
	CHINDE	
	INHASSUNGE	
	MAGANJA_DA_COSTA	
	MOCUBA	
	MOPEIA	
	NAMACURRA	
	NICOADALA	
	MILANGE	17
	MORRUMBALA	
SOFALA	BEIRA	18
GAZA		19
INHAMBANE		
MANICA		
MAPUTO		
South of Malawi		20
North of Malawi		21
South Africa and Swaziland		22
North of Zimbabwe		23
South of Zimbabwe		24
Zambia		25
NIASSA	LICHINGA	26
	LAGO	27
	MAVAGO	
	MUEMBE	
	SANGA	
	METARICA	28
	MAUA	29
	NIPEPE	
	MAJUNE	30
CABO DELGADO		31
NAMPULA	CIDADE_DE_NAMPULA	32
NIASSA	CIDADE_DE_LICHINGA	33
Beira Port		34
Quelimane Port		35
Nacala Port		36

3. Survey Results

3.1 OD Survey on Study Road Sections

(Surveyed between 9th (Sun) and 12th (Wed) August, 2009)

(1) Number of vehicles (vehicles/4days)

[All vehicle types: Total]

Total	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												3														21												24
2																																						
3																																						
4	1			75							4	11			13					4						104	2	1										215
5																										2												2
6																										4												4
7																																						
8																																						
9																																						
10				1											6																							7
11				5							1				9											1												16
12	1		1	15		1					1	2			2			1		13						53												90
13																										5												5
14																										1												1
15				11						3	4	4							1							3			5									31
16																										1												1
17																										1												1
18				1																						3												4
19																										18					1							19
20	3			8		14					1	24	1													13					1							65
21																																						
22																										4												4
23																										1												1
24																																						
25																																						
26	23	1	1	108	2	2					3	40	6	1	3	3		3	8	5						130		1	2		2						12	356
27													1																									1
28																										1												1
29																										1												1
30																						1																1
31																										1												1
32																																						
33																																						
34																																						
35																																						
36																																						
40																										2												2
Total	28	1	2	224	2	17				3	14	84	8	1	33	3		4	9	22		1				370	2	2	7		4						12	853

Zone: Code

Nampula	1
Ribaue	2
Malema	3
Cuamba	4
Angoche	5
Nacala	6
Erati	7
Mecuburi	8
Lalaua	9
Marrupa	10
Mecanhelas	11
Mandimba	12
Ngauma	13
Zambezia N	14
Tete	15
Zambezia S	16
Milange	17
Beira	18
Maputo	19
Malawi S	20
Malawi N	21
SA	22
Zimbabwe N	23
Zimbabwe S	24
Zambia	25
Lichinga	26
Lago	27
Metarica	28
Maua	29
Majune	30
Cabo Delgado	31
Nampula City	32
Lichinga City	33
Beira Port	34
Quelimane Port	35
Nacala Port	36
Others (N/A)	40

[Passenger car]

1	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4				6																																		6
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																				2						1												3
13																																						
14																																						
15												1														1												2
16																																						
17																																						
18																																						
19																										2												2
20												3														3					1							7
21																																						
22																																						
23																																						
24																																						
25																																						
26	1		1	1								1			1																						1	6
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	1		1	7								5			1					2						7					1						1	26

[4-Wheel vehicle]

2	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												1														13												14
2																																						
3																																						
4				27							2	6			1					3						38		1										78
5																										1												1
6																										1												1
7																																						
8																																						
9																																						
10																																						
11				1							1															1												3
12				2		1						2								5						14												24
13																										3												3
14																																						
15				2								1														1												4
16																																						
17																										1												1
18																										1												1
19																										5					1							6
20				6								3	1													4												14
21																																						
22																																						
23																										1												1
24																																						
25																																						
26	10			25		1					3	20	5			3		1	3	3						36			2								5	117
27													1																									1
28																																						
29																										1												1
30																						1																1
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																										1												1
Total	10			63		2					6	33	7		1	3		1	3	11		1				122		1	2		1						5	272

[Minibus and Light Bus]

3	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4				2																						35												37
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12				2																						7												9
13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																																						
20												1														1												2
21																																						
22																										1												1
23																																						
24																																						
25																																						
26				45								8														4												57
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total				49								9														48												106

[Medium/ Large Bus]

4	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																										2												2
2																																						
3																																						
4																										1												1
5																										1												1
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12				1																																		1
13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																										2												2
20																										2												2
21																																						
22																																						
23																																						
24																																						
25																																						
26		1		2																1																		4
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total		1		3																1						8												13

[Light Goods Vehicle]

5	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																										1												1
2																																						
3																																						
4	1			20								2														16												39
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12			1	5							1									4						14												25
13																																						
14																																						
15												1																										1
16																																						
17																																						
18																																						
19																										4												4
20												11														1												12
21																																						
22																										2												2
23																																						
24																																						
25																																						
26	3			14	1							8	1						1	1						32											1	62
27																																						
28																										1												1
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																										1												1
Total	4		1	39	1						1	22	1						1	5						72											1	148

[Medium Goods Vehicle]

6	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												1														3												4
2																																						
3																																						
4				19							2	3														12	2											38
5																																						
6																																						
7																																						
8																																						
9																																						
10				1																																		1
11				4																																		4
12	1			5																						17												23
13																										2												2
14																										1												1
15																																						
16																										1												1
17																																						
18																																						
19																																						
20												3																										3
21																																						
22																										1												1
23																																						
24																																						
25																																						
26	4			19	1							3		1												55		1			2						5	91
27																																						
28																																						
29																																						
30																																						
31																										1												1
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	5			48	1						2	10		1												93	2	1			2						5	170

[Heavy Goods Vehicle]

7	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4				1																						1												2
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																																						
13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																																						
20												1																										1
21																																						
22																																						
23																																						
24																																						
25																																						
26	2					1																				2												5
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	2			1		1						1														3												8

[Very Heavy Goods Vehicle]

8	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												1														2												3
2																																						
3																																						
4															12					1						1												14
5																																						
6																										3												3
7																																						
8																																						
9																																						
10															6																							6
11															9																							9
12															2			1		2																		5
13																																						
14																																						
15				9						3	4	1							1							1			5									24
16																																						
17																																						
18				1																						2												3
19																										5												5
20	3			2		14					1	2														2												24
21																																						
22																																						
23																																						
24																																						
25																																						
26	3			2											2			2	4							1												14
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	6			14		14				3	5	4			31			3	5	3						17			5									110

(2) Number of Passenger (Passenger/ 4days)

[All vehicle types: Total]

Total	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												8														100												108
2																																						
3																																						
4	3			278							15	62			25					7						881	14	2										1287
5																										34												34
6																										9												9
7																																						
8																																						
9																																						
10				18											12																							30
11				17							5				16											8												46
12	10		2	124		2					3	4			4			2		48						367												566
13																										28												28
14																										2												2
15				21						6	10	10							2							3			8									60
16																										6												6
17																										2												2
18				1																						9												10
19																										182					2							184
20	4			17		24					1	131	4													62					2							245
21																																						
22																										12												12
23																										3												3
24																																						
25																																						
26	74	1	1	1030	9	4					12	283	26	5	10	17		9	21	18						731		5	7		10						48	2321
27													1																									1
28																										19												19
29																										3												3
30																						2																2
31																										3												3
32																																						
33																																						
34																																						
35																																						
36																																						
40																										12												12
Total	91	1	3	1506	9	30				6	46	498	31	5	67	17		11	23	73		2				2476	14	7	15		14						48	4993

Zone: Code

Zone	Code
Nampula	1
Ribaue	2
Malema	3
Cuamba	4
Angoche	5
Nacala	6
Erati	7
Mecuburi	8
Lalaua	9
Marrupa	10
Mecanhelas	11
Mandimba	12
Ngauma	13
Zambezia N	14
Tete	15
Zambezia S	16
Milange	17
Beira	18
Maputo	19
Malawi S	20
Malawi N	21
SA	22
Zimbabwe N	23
Zimbabwe S	24
Zambia	25
Lichinga	26
Lago	27
Metarica	28
Maua	29
Majune	30
Cabo Delgado	31
Nampula City	32
Lichinga City	33
Beira Port	34
Quelimane Port	35
Nacala Port	36
Others (N/A)	40

[Passenger car]

1	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4				29																																		29
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																				3						2												5
13																																						
14																																						
15												2														1												3
16																																						
17																																						
18																																						
19																										8												8
20												5														12					2							19
21																																						
22																																						
23																																						
24																																						
25																																						
26	5		1	4								3			6																						2	21
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	5		1	33								10			6					3						23					2						2	85

[4-Wheel vehicle]

2	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												2														49												51
2																																						
3																																						
4				96							9	31			2					5						138		2										283
5																										2												2
6																										2												2
7																																						
8																																						
9																																						
10																																						
11				5							5															8												18
12				9		2						4								14						51												80
13																										16												16
14																																						
15				6								2														1												9
16																																						
17																										2												2
18																										5												5
19																										17					2							19
20				13								6	4													13												36
21																																						
22																																						
23																										3												3
24																																						
25																																						
26	36			108		2					12	69	19			17		5	11	13						160			7								16	475
27													1																									1
28																																						
29																										3												3
30																						2																2
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																										10												10
Total	36			237		4					26	114	24		2	17		5	11	32		2				480		2	7		2						16	1017

[Minibus and Light Bus]

3	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4				30																						524												554
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12				30																						82												112
13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																																						
20												15														6												21
21																																						
22																										3												3
23																																						
24																																						
25																																						
26				683								120														13												816
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total				743								135														628												1506

[Medium/Large Bus]

4	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																										34												34
2																																						
3																																						
4																										29												29
5																										32												32
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12				29																																		29
13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																										130												130
20																										24												24
21																																						
22																																						
23																																						
24																																						
25																																						
26		1		26																2																		29
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total		1		55																2						249												307

(3) Transported Goods Volume (kg/ 4days)

[All vehicle types: Total]

Total	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												1500														154000												155500
2																																						
3																																						
4				17460							10000	5000			197020					60000						97405	85000											471885
5																																						
6																										64750												64750
7																																						
8																																						
9																																						
10															106411																							106411
11				12000											187568																							199568
12				500											36000					160						49240												85900
13																										8350												8350
14																										2500												2500
15																																						
16																										7000												7000
17																																						
18				29000																						60000												89000
19																										148140												148140
20												43445														63800												107245
21																																						
22																										2200												2200
23																																						
24																																						
25																																						
26	####			62110	250	18000						20075	400		32780			20000	63350							86890		2660									1800	348215
27																																						
28																										140												140
29																																						
30																																						
31																										2500												2500
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	####			121070	250	18000					10000	70020	400		559779			20000	63350	60160						746915	85000	2660									1800	1799304

Zone: Code

Zone	Code
Nampula	1
Ribaue	2
Malema	3
Cuamba	4
Angoche	5
Nacala	6
Erati	7
Mecuburi	8
Lalaua	9
Marrupa	10
Mecanhelas	11
Mandimba	12
Ngauma	13
Zambezia N	14
Tete	15
Zambezia S	16
Milange	17
Beira	18
Maputo	19
Malawi S	20
Malawi N	21
SA	22
Zimbabwe N	23
Zimbabwe S	24
Zambia	25
Lichinga	26
Lago	27
Metarica	28
Maua	29
Majune	30
Cabo Delgado	31
Nampula City	32
Lichinga City	33
Beira Port	34
Quelimane Port	35
Nacala Port	36
Others (N/A)	40

[Light Goods Vehicle]

5	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																										4000												4000
2																																						
3																																						
4				11500																						4605												16105
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12				500																160						4680												5340
13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																										1140												1140
20												26445																										26445
21																																						
22																																						
23																																						
24																																						
25																																						
26	350			9410	250							4675	400						350							11400											700	27535
27																																						
28																										140												140
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	350			21410	250							31120	400						350	160						25965											700	80705

[Medium Goods Vehicle]

6	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																										95000												95000
2																																						
3																																						
4				5960							10000	5000														35800	85000											141760
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11				12000																																		12000
12																										44560												44560
13																										8350												8350
14																										2500												2500
15																																						
16																										7000												7000
17																																						
18																																						
19																																						
20												17000																										17000
21																																						
22																										2200												2200
23																																						
24																																						
25																																						
26	250			22700								15400														69490		2660									1100	111600
27																																						
28																																						
29																																						
30																																						
31																										2500												2500
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	250			40660							10000	37400														267400	85000	2660									1100	444470

[Heavy Goods Vehicle]

7	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4																										17000												17000
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																																						
13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																																						
20																																						
21																																						
22																																						
23																																						
24																																						
25																																						
26	3000					18000																				6000												27000
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	3000					18000																				23000												44000

[Very Heavy Goods Vehicle]

8	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1												1500														55000												56500
2																																						
3																																						
4															197020					60000						40000												297020
5																																						
6																										64750												64750
7																																						
8																																						
9																																						
10															106411																							106411
11															187568																							187568
12															36000																							36000
13																																						
14																																						
15																																						
16																																						
17																																						
18				29000																						60000												89000
19																										147000												147000
20																										63800												63800
21																																						
22																																						
23																																						
24																																						
25																																						
26	####			30000											32780			20000	63000																			182080
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	####			59000								1500			559779			20000	63000	60000						430550												1230129

3.2 OD Survey on International Cross-Borders

3.2.1 Zobwe/ Mwanza Border (Surveyed on 27th (Mon) July, 2009)

(1) Number of vehicles (Vehicles/ 4days)

[All vehicle types: Total]

Total	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12															1																							1
13																																						
14																																						
15											2	1					2			9						3												17
16																																						
17															1																							1
18																				1																		1
19																				1																		1
20															28			2	2	15		14		16										26				103
21																																						
22																				36	1																	37
23																																						
24																				23																		23
25																																						
26															1									1														2
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																				29																		29
35																																						
36																																						
40																				1																		1
Total											2	1			31		2	2	2	115	1	14		17		3								26				216

Zone: Code

Zone	Code
Nampula	1
Ribaue	2
Malema	3
Cuamba	4
Angoche	5
Nacala	6
Erati	7
Mecuburi	8
Lalaua	9
Marrupa	10
Mecanhelas	11
Mandimba	12
Ngauma	13
Zambezia N	14
Tete	15
Zambezia S	16
Milange	17
Beira	18
Maputo	19
Malawi S	20
Malawi N	21
SA	22
Zimbabwe N	23
Zimbabwe S	24
Zambia	25
Lichinga	26
Lago	27
Metarica	28
Maua	29
Majune	30
Cabo Delgado	31
Nampula City	32
Lichinga City	33
Beira Port	34
Quelimane Port	35
Nacala Port	36
Others (N/A)	40

[Passenger car / 4-Wheel vehicle]

1+2	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																																						
13																																						
14																																						
15																	1			8						1												10
16																																						
17																																						
18																				1																		1
19																				1																		1
20															24			1	2	12		3		5														47
21																																						
22																				11	1																	12
23																																						
24																				5																		5
25																																						
26															1									1														2
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total															25		1	1	2	38	1	3		6		1												78

[Minibus and Light Bus / Medium/Large Bus]

3+4	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4																																						
5																																						
6																																						
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13																																						
14																																						
15																																						
16																																						
17																																						
18																																						
19																																						
20																								1														1
21																																						
22																				6																		6
23																																						
24																				1																		1
25																																						
26																																						
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total																				7				1														8

[Goods Vehicle]

5+6+7+8	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12															1																							1
13																																						
14																																						
15											2	1					1			1						2												7
16																																						
17															1																							1
18																																						
19																																						
20															4			1		3		11		10										26				55
21																																						
22																				22																		22
23																																						
24																				17																		17
25																																						
26																																						
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																				29																		29
35																																						
36																																						
40																				1																		1
Total											2	1			6		1	1		73		11		10		2								26				133

(2) Transported Goods Volume (kg/ 4days)

[All vehicle types: Total]

Total	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12															20000																							20000
13																																						
14																																						
15																	1000																					1000
16																																						
17															12000																							12000
18																																						
19																																						
20															22000			180		4050		149100		208000														383330
21																																						
22																				402140																		402140
23																																						
24																				432140																		432140
25																																						
26																																						
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																				678390																		678390
35																																						
36																																						
40																				28000																		28000
Total															54000		1000	180		1544720		149100		208000														1957000

3.2.2 Milange/ Muloza Border (Surveyed on 24th (Fri) July, 2009)

(1) Number of vehicles (Vehicles/ 4days)

[All vehicle types: Total]

Total	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Toal
1																																						
2																																						
3																																						
4																																						
5	1																																					1
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																																						
13																																						
14																																						
15														1																								1
16																				1																	1	2
17															1					23																		24
18																																						
19																																					1	1
20	1													1		1	31															1				7		42
21																																						
22																1																						1
23																																						
24																																						
25																																						
26																																						
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Toal	2													2	1	2	31			24												1				7	2	72

[Passenger car / 4-Wheel vehicle]

1+2	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Toal
1																																						
2																																						
3																																						
4																																						
5	1																																					1
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																																						
13																																						
14																																						
15																																						
16																				1																	1	2
17																				12																		12
18																																						
19																																						
20	1													1			9															1						12
21																																						
22																																						
23																																						
24																																						
25																																						
26																																						
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Toal	2													1			9			13												1					1	27

[Goods Vehicle]

5+6+7+8	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Toal
1																																						
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						
11																																						
12																																						
13																																						
14																																						
15														1																								1
16																																						
17															1					11																		12
18																																						
19																																					1	1
20																1	22																			7		30
21																																						
22																1																						1
23																																						
24																																						
25																																						
26																																						
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Toal														1	1	2	22			11																7	1	45

(2) Transported Goods Volume (kg/ 4days)

[All vehicle types: Total]

Total	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
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16																																						
17															13052					164000																		177052
18																																						
19																																						
20																10000	1000																			150000		161000
21																																						
22																1200																						1200
23																																						
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33																																						
34																																						
35																																						
36																																						
40																																						
Total															13052	11200	1000			164000																150000		339252

3.2.3 Mchinji Border (Surveyed on 12th (Mon) July, 2009)

(1) Number of vehicles (Vehicles/ 4days)

[All vehicle types: Total]

Total	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Total
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20																						1			26												27
21																						1			14												15
22																									5												5
23																									1												1
24																																					
25																				31	3				13												47
26																																					
27																																					
28																																					
29																																					
30																																					
31																																					
32																																					
33																																					
34																																					
35																																					
36																																					
40																									2												2
Total																				31	3	2			61												97

Zone: Code

Zone	Code
Nampula	1
Ribaue	2
Malema	3
Cuamba	4
Angoche	5
Nacala	6
Erati	7
Mecuburi	8
Lalaua	9
Marrupa	10
Mecanhelas	11
Mandimba	12
Ngauma	13
Zambezia N	14
Tete	15
Zambezia S	16
Milange	17
Beira	18
Maputo	19
Malawi S	20
Malawi N	21
SA	22
Zimbabwe N	23
Zimbabwe S	24
Zambia	25
Lichinga	26
Lago	27
Metarica	28
Maua	29
Majune	30
Cabo Delgado	31
Nampula City	32
Lichinga City	33
Beira Port	34
Quelimane Port	35
Nacala Port	36
Others (N/A)	40

[Passenger car / 4-Wheel vehicle]

1+2	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Total
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21																									8												8
22																									5												5
23																									1												1
24																																					
25																				20	2				11												33
26																																					
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35																																					
36																																					
40																									1												1
Total																				20	2				44												66

[Minibus and Light Bus / Medium/Large Bus]

3+4	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Total
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26																																					
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35																																					
36																																					
40																																					
Total																					1				4												5

[Goods Vehicle]

5+6+7+8	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Total
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21																						1			6												7
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25																				11																	11
26																																					
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33																																					
34																																					
35																																					
36																																					
40																									1												1
Total																				11		2			13												26

(2) Transported Goods Volume (kg/ 4days)

[All vehicle types: Total]

Total	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Total
1																																					
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20																									66000												66000
21																									3000												3000
22																																					
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24																																					
25																				118000																	118000
26																																					
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30																																					
31																																					
32																																					
33																																					
34																																					
35																																					
36																																					
40																																					
Total																				118000					69000												187000

3.2.4 Mandimba/ Chiponde Border

(Surveyed between 9th (Sun) and 12th (Wed) August, 2009)

(1) Number of vehicles (Vehicles/ 4days)

[All vehicle types: Total]

Total	Destination																																				
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
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10															7																							7
11															4																							4
12												2			2					14																		18
13																																						
14																																						
15				7						4	3	2								1						3			4									24
16																																						
17																																						
18				1																						3												4
19																										4					1							5
20	3			6		12					1	24	1													11					1							59
21																																						
22																										3												3
23																										1												1
24																																						
25																																						
26															4			1	2	12																		19
27																																						
28																																						
29																																						
30																						1																1
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	3			14		12				4	4	28	1		25			2	2	31		1				25			4		2							158

Zone: Code

Zone	Code
Nampula	1
Ribaue	2
Malema	3
Cuamba	4
Angoche	5
Nacala	6
Erati	7
Mecuburi	8
Lalaua	9
Marrupa	10
Mecanhelas	11
Mandimba	12
Ngauma	13
Zambezia N	14
Tete	15
Zambezia S	16
Milange	17
Beira	18
Maputo	19
Malawi S	20
Malawi N	21
SA	22
Zimbabwe N	23
Zimbabwe S	24
Zambia	25
Lichinga	26
Lago	27
Metarica	28
Maua	29
Majune	30
Cabo Delgado	31
Nampula City	32
Lichinga City	33
Beira Port	34
Quelimane Port	35
Nacala Port	36
Others (N/A)	40

[Passenger car / 4-Wheel vehicle]

1+2	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
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15				1																1						2												4
16																																						
17																																						
18																										1												1
19																										1					1							2
20				5								6	1													7					1							20
21																																						
22																																						
23																										1												1
24																																						
25																																						
26															2				1	7																		10
27																																						
28																																						
29																																						
30																						1																1
31																																						
32																																						
33																																						
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35																																						
36																																						
40																																						
Total				6								8	1		3				1	18		1				12					2							52

[Minibus and Light Bus / Medium/Large Bus]

3+4	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
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19																																						
20												1														2												3
21																																						
22																										1												1
23																																						
24																																						
25																																						
26																				2																		2
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34																																						
35																																						
36																																						
40																																						
Total												1								3						3												7

[Goods Vehicle]

5+6+7+	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
1																																						
2																																						
3																																						
4															7			1		1																		9
5																																						
6																																						
7																																						
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9																																						
10															7																							7
11															4																							4
12															2					6																		8
13																																						
14																																						
15				6						4	3	2														1			4									20
16																																						
17																																						
18				1																						2												3
19																										3												3
20	3			1		12					1	17														2												36
21																																						
22																										2												2
23																																						
24																																						
25																																						
26															2			1	1	3																		7
27																																						
28																																						
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31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total	3			8		12				4	4	19			22			2	1	10						10			4									99

(2) Transported Goods Volume (kg/ 4days)

[All vehicle types: Total]

Total	Destination																																					
Origin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	40	Total
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2																																						
3																																						
4															111300			15000		30000																		156300
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9																																						
10															98280																							98280
11															70200																							70200
12															36000					160																		36160
13																																						
14																																						
15																																						
16																																						
17																																						
18				29000																						60000												89000
19																										90000												90000
20												42795														3800												46595
21																																						
22																																						
23																																						
24																																						
25																																						
26															32780			20000																				52780
27																																						
28																																						
29																																						
30																																						
31																																						
32																																						
33																																						
34																																						
35																																						
36																																						
40																																						
Total				29000								42795			348560			35000		30160						153800												639315

Appendix-J

Traffic Demand Forecast

1. Future Traffic Volume

(1) Normal Traffic

	Lichinga～Mandimba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	46	28	1	7	15	20	26	142
2010	51	36	1	8	17	22	29	163
2011	57	46	1	9	19	23	31	186
2012	63	58	1	11	22	25	34	214
2013	70	74	1	13	25	27	37	247
2014	113	136	1	20	37	31	53	393
2015	127	182	1	25	42	34	64	475
2016	139	203	2	29	47	36	73	530
2017	154	249	2	35	54	39	85	617
2018	170	303	2	42	61	41	91	710
2019	189	366	2	50	70	44	99	819
2020	209	440	2	60	79	47	104	941
2021	231	525	3	73	90	50	112	1,084
2022	256	624	3	87	102	53	119	1,244
2023	283	738	3	105	116	56	138	1,439
2024	313	867	3	127	133	60	151	1,653
2025	346	1,013	4	153	151	64	161	1,893
2026	382	1,178	4	185	172	68	173	2,163
2027	422	1,363	5	224	197	73	185	2,469
2028	466	1,569	5	271	225	78	196	2,811
2029	514	1,798	6	329	258	83	209	3,196
2030	567	2,050	6	399	295	89	222	3,629
2031	626	2,327	7	484	338	96	245	4,122
2032	690	2,629	7	587	389	104	267	4,673
2033	760	2,958	8	712	446	112	288	5,284
2034	838	3,313	9	864	514	121	310	5,969
2035	922	3,696	10	1,050	592	131	335	6,736

	Mandimba～Cuamba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	35	26	0	3	11	3	23	101
2010	39	34	0	4	12	3	32	124
2011	43	43	1	4	14	3	41	150
2012	48	56	1	5	16	4	50	178
2013	53	71	1	6	18	4	57	209
2014	77	117	1	9	26	6	118	355
2015	87	157	1	11	30	7	133	426
2016	95	175	1	13	34	8	145	471
2017	105	215	1	15	38	8	159	542
2018	116	262	1	18	43	10	167	617
2019	129	317	2	22	49	11	175	703
2020	143	381	2	26	55	12	181	799
2021	158	456	2	31	62	14	189	911
2022	174	542	2	36	70	15	195	1,036
2023	193	641	2	43	80	17	213	1,190
2024	213	754	3	52	90	19	225	1,357
2025	236	882	3	62	102	21	235	1,541
2026	261	1,026	3	74	116	24	245	1,749
2027	288	1,188	4	89	131	27	256	1,982
2028	318	1,369	4	107	149	30	265	2,241
2029	351	1,569	4	129	168	34	275	2,530
2030	387	1,790	5	155	191	38	286	2,853
2031	427	2,033	5	187	217	42	306	3,218
2032	470	2,298	6	226	246	47	326	3,620
2033	519	2,587	6	273	280	53	343	4,061
2034	571	2,899	7	329	318	59	362	4,547
2035	629	3,236	8	398	362	66	383	5,083

(2) Generated Traffic (Senario-1: Only section between Cuamba ~ Mandimba will be improved)

	Lichinga～Mandimba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	11	13	0	5	9	2	5	45
2015	12	18	0	6	10	2	6	54
2016	14	20	0	7	11	2	7	60
2017	15	24	0	8	12	3	7	70
2018	17	29	0	10	14	3	8	81
2019	18	35	0	12	16	3	9	94
2020	20	43	0	14	18	4	10	109
2021	22	51	0	17	21	4	11	126
2022	25	60	0	20	24	5	13	146
2023	27	71	0	24	27	5	14	169
2024	30	83	0	29	31	6	16	195
2025	33	97	0	35	35	7	17	225
2026	37	113	0	43	40	8	19	260
2027	40	131	0	52	45	9	22	299
2028	45	150	0	63	52	10	24	344
2029	49	172	1	76	59	11	27	395
2030	54	196	1	92	68	12	30	453
2031	60	222	1	112	78	13	33	519
2032	66	251	1	136	90	15	37	594
2033	72	282	1	164	103	17	41	680
2034	80	316	1	199	119	19	46	779
2035	88	352	1	242	137	21	51	891

	Mandimba～Cuamba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	7	11	0	2	6	1	4	32
2015	8	15	0	3	7	2	5	39
2016	9	17	0	3	8	2	5	43
2017	10	20	0	4	9	2	6	51
2018	11	25	0	4	10	2	7	59
2019	12	30	0	5	11	2	7	68
2020	13	36	0	6	13	3	8	79
2021	15	43	0	7	14	3	9	92
2022	17	51	0	8	16	4	10	106
2023	18	61	0	10	18	4	11	123
2024	20	71	0	12	21	4	13	142
2025	22	84	0	14	24	5	14	163
2026	25	97	0	17	27	6	16	188
2027	27	113	0	21	30	6	18	215
2028	30	130	0	25	34	7	20	246
2029	33	149	0	30	39	8	22	281
2030	37	170	0	36	44	9	24	320
2031	41	193	0	43	50	10	27	364
2032	45	219	1	52	57	11	30	414
2033	49	246	1	63	65	12	33	469
2034	54	276	1	76	73	14	37	531
2035	60	308	1	92	84	15	41	601

(3) Generated Traffic (Senario-2: Both sections are improved)

	Lichinga～Mandimba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	24	29	0	5	9	2	5	75
2015	27	39	0	6	10	2	6	91
2016	30	44	0	7	11	2	7	101
2017	33	54	0	8	12	3	7	118
2018	37	65	0	10	14	3	8	138
2019	41	79	0	12	16	3	9	161
2020	45	95	0	14	18	4	10	187
2021	50	114	1	17	21	4	11	217
2022	55	135	1	20	24	5	13	252
2023	61	160	1	24	27	5	14	292
2024	68	188	1	29	31	6	16	338
2025	75	219	1	35	35	7	17	390
2026	83	255	1	43	40	8	19	448
2027	91	295	1	52	45	9	22	515
2028	101	340	1	63	52	10	24	590
2029	111	389	1	76	59	11	27	675
2030	123	444	1	92	68	12	30	770
2031	136	504	1	112	78	13	33	877
2032	149	570	2	136	90	15	37	998
2033	165	641	2	164	103	17	41	1,133
2034	182	718	2	199	119	19	46	1,284
2035	200	801	2	242	137	21	51	1,454

	Mandimba～Cuamba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	19	28	0	2	6	1	4	61
2015	21	38	0	3	7	2	5	75
2016	23	42	0	3	8	2	5	83
2017	25	51	0	4	9	2	6	97
2018	28	63	0	4	10	2	7	114
2019	31	76	0	5	11	2	7	133
2020	34	91	0	6	13	3	8	155
2021	38	109	0	7	14	3	9	181
2022	42	130	1	8	16	4	10	211
2023	46	154	1	10	18	4	11	244
2024	51	181	1	12	21	4	13	282
2025	56	211	1	14	24	5	14	325
2026	62	246	1	17	27	6	16	374
2027	69	285	1	21	30	6	18	429
2028	76	328	1	25	34	7	20	490
2029	84	376	1	30	39	8	22	559
2030	93	429	1	36	44	9	24	636
2031	102	487	1	43	50	10	27	720
2032	113	551	1	52	57	11	30	815
2033	124	620	2	63	65	12	33	919
2034	137	694	2	76	73	14	37	1,033
2035	151	775	2	92	84	15	41	1,160

(4) Diverted Traffic (for international corridor transportation)

	Lichinga～Mandimba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0

	Mandimba～Cuamba							
	Passenger Car	Mini-bus	Large Bus	Light Goods Vehicle	Medium Goods Vehicle	Heavy Goods Vehicle	Very Heavy Goods Vehicles	Total
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	42	42
2015	0	0	0	0	0	0	43	43
2016	0	0	0	0	0	0	44	44
2017	0	0	0	0	0	0	45	45
2018	0	0	0	0	0	0	46	46
2019	0	0	0	0	0	0	46	46
2020	0	0	0	0	0	0	47	47
2021	0	0	0	0	0	0	47	47
2022	0	0	0	0	0	0	47	47
2023	0	0	0	0	0	0	48	48
2024	0	0	0	0	0	0	48	48
2025	0	0	0	0	0	0	48	48
2026	0	0	0	0	0	0	48	48
2027	0	0	0	0	0	0	48	48
2028	0	0	0	0	0	0	48	48
2029	0	0	0	0	0	0	48	48
2030	0	0	0	0	0	0	48	48
2031	0	0	0	0	0	0	48	48
2032	0	0	0	0	0	0	48	48
2033	0	0	0	0	0	0	48	48
2034	0	0	0	0	0	0	48	48
2035	0	0	0	0	0	0	48	48

Appendix-K

Coordinate of Centerline

Appendix-K Coordinate of Centerline

●Bypass−Mandimba JCT

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
1	−1−035.883	8,409,555.733	139,339.019	0		0	375.411	325−52−45.354
2	−0−660.472	8,409,866.520	139,128.436	6,000		6,000	322.338	325−52−45.354
3	−0−338.135	8,410,138.097	138,954.878	0		0	11.004	328−57−26.521
4	−0−327.131	8,410,147.525	138,949.203	−5,000		−5,000	273.435	328−57−26.507
5	−0−053.695	8,410,377.829	138,801.865	0		0	53.695	325−49−26.499
6	0+000.000	8,410,422.252	138,771.703					325−49−26.499

●MandimbaJCT−Lichinga

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
1	0+000.000	8,410,422.252	138,771.703	0		0	465.832	325−49−26.500
2	0+465.832	8,410,807.642	138,510.028	3,100		3,100	310.427	325−49−26.500
3	0+776.258	8,411,072.758	138,348.789	0		0	81.348	331−33−41.369
4	0+857.606	8,411,144.289	138,310.050	−10,500		−10,500	311.415	331−33−41.368
5	1+169.021	8,411,415.886	138,157.711	0		0	1,979.383	329−51−43.849
6	3+148.404	8,413,127.696	137,163.899	−25,000		−25,000	303.189	329−51−43.848
7	3+451.593	8,413,388.971	137,010.087	0		0	727.883	329−10−02.358
8	4+179.475	8,414,013.980	136,637.024	0	300	−600	150.000	329−10−02.358
9	4+329.475	8,414,139.379	136,554.903	−600		−600	435.896	322−00−19.258
10	4+765.371	8,414,360.206	136,190.172	−600	300	0	150.000	280−22−49.415
11	4+915.371	8,414,374.848	136,040.993	0		0	990.013	273−13−06.315
12	5+905.384	8,414,430.430	135,052.541	1,100		1,100	821.564	273−13−06.315
13	6+726.948	8,414,764.726	134,322.873	0		0	2,587.084	316−00−40.584
14	9+314.033	8,416,626.072	132,526.100	−12,000		−12,000	325.177	316−00−40.584
15	9+639.210	8,416,856.941	132,297.117	0		0	232.691	314−27−31.204
16	9+871.901	8,417,019.917	132,131.032	4,500		4,500	313.028	314−27−31.204
17	10+184.929	8,417,246.751	131,915.409	0		0	25.777	318−26−39.353
18	10+210.706	8,417,266.041	131,898.309	−8,000		−8,000	339.710	318−26−39.352
19	10+550.416	8,417,515.389	131,667.635	0		0	324.390	316−00−40.584
20	10+874.806	8,417,748.780	131,442.340	0	300	−600	150.000	316−00−40.583
21	11+024.806	8,417,852.197	131,333.834	−600		−600	263.802	308−50−57.483
22	11+288.608	8,417,967.951	131,099.145	−600	300	0	150.000	283−39−28.958
23	11+438.608	8,417,991.098	130,951.047	0		0	96.261	276−29−45.858
24	11+534.869	8,418,001.988	130,855.405	0	350	700	175.000	276−29−45.857
25	11+709.869	8,418,028.993	130,682.624	700		700	134.438	283−39−28.958
26	11+844.307	8,418,073.049	130,555.828	700	350	0	175.000	294−39−42.901
27	12+019.307	8,418,158.995	130,403.527	0		0	35.734	301−49−26.001
28	12+055.041	8,418,177.838	130,373.165	0	250	−700	89.286	301−49−26.002
29	12+144.327	8,418,223.288	130,296.331	−700		−700	102.570	298−10−11.359
30	12+246.896	8,418,264.924	130,202.692	−700	250	0	89.286	289−46−27.727
31	12+336.182	8,418,291.527	130,117.479	0		0	23.543	286−07−13.081
32	12+359.725	8,418,298.064	130,094.862	0	300	700	128.571	286−07−13.085
33	12+488.297	8,418,337.512	129,972.542	700		700	334.550	291−22−55.771
34	12+822.847	8,418,527.930	129,701.340	700	300	0	128.571	318−45−55.613
35	12+951.418	8,418,629.584	129,622.698	0		0	138.789	324−01−38.298

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
36	13+090.207	8,418,741.905	129,541.174	−1,000		−1,000	309.454	324−01−38.298
37	13+399.661	8,418,960.466	129,323.846	0		0	423.217	306−17−48.779
38	13+822.877	8,419,210.997	128,982.750	4,000		4,000	233.270	306−17−48.779
39	14+056.148	8,419,354.489	128,798.875	0		0	14.678	309−38−17.647
40	14+070.826	8,419,363.852	128,787.572	−9,000		−9,000	313.962	309−38−17.642
41	14+384.788	8,419,559.883	128,542.349	0		0	933.106	307−38−22.158
42	15+317.894	8,420,129.723	127,803.452	−35,000		−35,000	317.320	307−38−22.158
43	15+635.214	8,420,322.366	127,551.301	0		0	987.503	307−07−12.100
44	16+622.717	8,420,918.310	126,763.893	8,000		8,000	307.297	307−07−12.100
45	16+930.014	8,421,108.420	126,522.484	0		0	86.550	309−19−15.164
46	17+016.564	8,421,163.264	126,455.528	−11,000		−11,000	322.804	309−19−15.162
47	17+339.368	8,421,364.119	126,202.839	0		0	766.314	307−38−22.158
48	18+105.682	8,421,832.100	125,596.018	0	160	−270	94.815	307−38−22.157
49	18+200.497	8,421,885.440	125,517.787	−270		−270	152.266	297−34−45.566
50	18+352.763	8,421,915.199	125,370.507	−270	160	0	94.815	265−16−02.687
51	18+447.578	8,421,896.419	125,277.703	0		0	39.976	255−12−26.093
52	18+487.553	8,421,886.212	125,239.053	0	160	230	111.304	255−12−26.095
53	18+598.858	8,421,866.603	125,129.783	230		230	227.784	269−04−15.161
54	18+826.642	8,421,967.342	124,935.792	230	160	0	111.304	325−48−52.531
55	18+937.946	8,422,068.004	124,888.980	0		0	1,754.342	339−40−41.596
56	20+692.288	8,423,713.151	124,279.711	1,600		1,600	313.159	339−40−41.596
57	21+005.447	8,424,015.556	124,200.293	0		0	95.839	350−53−32.697
58	21+101.286	8,424,110.187	124,185.123	−1,100		−1,100	341.014	350−53−32.699
59	21+442.300	8,424,433.234	124,080.228	0		0	26.290	333−07−48.012
60	21+468.590	8,424,456.686	124,068.346	0	180	400	81.000	333−07−48.010
61	21+549.590	8,424,530.101	124,034.211	400		400	96.101	338−55−52.323
62	21+645.691	8,424,623.048	124,010.716	400	180	0	81.000	352−41−47.996
63	21+726.691	8,424,703.865	124,005.864	0		0	20.897	358−29−52.304
64	21+747.589	8,424,724.755	124,005.316	−1,200		−1,200	228.678	358−29−52.306
65	21+976.266	8,424,951.404	123,977.642	0		0	44.638	347−34−45.530
66	22+020.904	8,424,994.997	123,968.041	1,200		1,200	386.489	347−34−45.527
67	22+407.394	8,425,379.220	123,946.601	0		0	37.606	6−01−58.139
68	22+445.000	8,425,416.618	123,950.553	0	160	−300	85.333	6−01−58.143
69	22+530.333	8,425,501.732	123,955.486	−300		−300	48.322	357−53−02.703
70	22+578.655	8,425,549.668	123,949.829	−300	160	0	85.333	348−39−19.211
71	22+663.988	8,425,631.296	123,925.219	0		0	364.582	340−30−23.772
72	23+028.570	8,425,974.980	123,803.558	−1,000		−1,000	159.276	340−30−23.772
73	23+187.846	8,426,120.269	123,738.701	2,800		2,800	180.592	331−22−50.736
74	23+368.438	8,426,281.475	123,657.370	0		0	7.126	335−04−34.230

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
75	23+375.564	8,426,287.937	123,654.367	0	230	−700	75.571	335−04−34.210
76	23+451.136	8,426,355.878	123,621.297	−700		−700	143.380	331−59−00.120
77	23+594.515	8,426,474.698	123,541.499	−700	230	0	75.571	320−14−51.289
78	23+670.087	8,426,531.015	123,491.121	0		0	46.921	317−09−17.200
79	23+717.008	8,426,565.418	123,459.213	4,000		4,000	322.666	317−09−17.199
80	24+039.674	8,426,810.583	123,249.568	0		0	185.861	321−46−35.873
81	24+225.535	8,426,956.596	123,134.571	0	190	500	72.200	321−46−35.874
82	24+297.735	8,427,014.362	123,091.286	500		500	55.366	325−54−48.196
83	24+353.102	8,427,061.839	123,062.856	500	190	0	72.200	332−15−28.448
84	24+425.302	8,427,127.267	123,032.368	0		0	485.309	336−23−40.769
85	24+910.610	8,427,571.968	122,838.034	−2,500		−2,500	318.767	336−23−40.769
86	25+229.377	8,427,855.144	122,692.138	0		0	800.414	329−05−20.638
87	26+029.790	8,428,541.873	122,280.961	0	200	−400	100.000	329−05−20.638
88	26+129.790	8,428,625.397	122,226.100	−400		−400	116.936	321−55−37.538
89	26+246.726	8,428,705.681	122,141.653	−400	200	0	100.000	305−10−38.293
90	26+346.726	8,428,756.253	122,055.463	0		0	97.657	298−00−55.192
91	26+444.383	8,428,802.123	121,969.250	2,500		2,500	319.880	298−00−55.193
92	26+764.262	8,428,970.005	121,697.222	0		0	26.120	305−20−47.156
93	26+790.383	8,428,985.116	121,675.917	−6,000		−6,000	300.643	305−20−47.159
94	27+091.025	8,429,152.829	121,426.438	0		0	62.345	302−28−31.828
95	27+153.371	8,429,186.304	121,373.842	0	250	500	125.000	302−28−31.829
96	27+278.371	8,429,257.706	121,271.347	500		500	288.159	309−38−14.929
97	27+566.530	8,429,493.717	121,113.040	500	250	0	125.000	342−39−29.083
98	27+691.530	8,429,615.638	121,085.861	0		0	136.725	349−49−12.185
99	27+828.255	8,429,750.211	121,061.696	−1,800		−1,800	341.219	349−49−12.185
100	28+169.474	8,430,078.351	120,970.012	0		0	377.781	338−57−31.386
101	28+547.255	8,430,430.942	120,834.374	3,500		3,500	310.345	338−57−31.387
102	28+857.600	8,430,725.151	120,735.927	0		0	1,021.599	344−02−20.869
103	29+879.199	8,431,707.368	120,455.006	−4,000		−4,000	633.671	344−02−20.869
104	30+512.870	8,432,300.293	120,233.330	0		0	504.027	334−57−44.838
105	31+016.897	8,432,756.956	120,020.020	2,500		2,500	1,065.572	334−57−44.838
106	32+082.470	8,433,788.090	119,785.241	0		0	46.139	359−23−00.872
107	32+128.609	8,433,834.227	119,784.745	0	230	−700	75.571	359−23−00.877
108	32+204.180	8,433,909.757	119,782.573	−700		−700	101.145	356−17−26.784
109	32+305.325	8,434,009.868	119,768.773	−700	230	0	75.571	348−00−42.928
110	32+380.897	8,434,083.169	119,750.429	0		0	301.992	344−55−08.836
111	32+682.889	8,434,374.761	119,671.856	2,400		2,400	308.768	344−55−08.837
112	32+991.657	8,434,677.234	119,610.893	0		0	36.332	352−17−25.518
113	33+027.989	8,434,713.237	119,606.019	−1,600		−1,600	319.673	352−17−25.517

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
114	33+347.662	8,435,023.647	119,531.878	0		0	36.450	340-50-34.723
115	33+384.112	8,435,058.079	119,519.917	1,000		1,000	332.422	340-50-34.719
116	33+716.534	8,435,384.305	119,464.541	0		0	256.953	359-53-21.596
117	33+973.487	8,435,641.258	119,464.045	1,600		1,600	337.115	359-53-21.596
118	34+310.602	8,435,975.952	119,498.782	0		0	233.287	11-57-40.998
119	34+543.889	8,436,204.174	119,547.131	-2,200		-2,200	304.643	11-57-40.999
120	34+848.532	8,436,505.615	119,589.466	0		0	147.826	4-01-38.668
121	34+996.357	8,436,653.076	119,599.848	4,000		4,000	327.629	4-01-38.669
122	35+323.987	8,436,978.589	119,636.210	0		0	47.367	8-43-13.274
123	35+371.354	8,437,025.408	119,643.392	0	160	-230	111.304	8-43-13.276
124	35+482.658	8,437,136.139	119,651.332	-230		-230	102.979	354-51-24.212
125	35+585.637	8,437,233.278	119,619.826	-230	160	0	111.304	329-12-12.655
126	35+696.941	8,437,318.269	119,548.406	0		0	19.615	315-20-23.590
127	35+716.556	8,437,332.221	119,534.618	-2,500		-2,500	202.892	315-20-23.591
128	35+919.448	8,437,470.594	119,386.309	0		0	132.239	310-41-23.823
129	36+051.687	8,437,556.809	119,286.039	0	160	270	94.815	310-41-23.822
130	36+146.502	8,437,622.633	119,217.977	270		270	91.311	320-45-00.416
131	36+237.813	8,437,701.680	119,173.143	270	160	0	94.815	340-07-37.122
132	36+332.628	8,437,793.877	119,151.577	0		0	269.576	350-11-13.713
133	36+602.204	8,438,059.509	119,105.633	0	190	-500	72.200	350-11-13.714
134	36+674.404	8,438,130.319	119,091.623	-500		-500	50.240	346-03-01.393
135	36+724.644	8,438,178.387	119,077.084	-500	190	0	72.200	340-17-36.072
136	36+796.844	8,438,245.093	119,049.502	4,900		4,900	224.394	336-09-23.751
137	37+021.238	8,438,452.341	118,963.524	0		0	253.644	338-46-49.594
138	37+274.882	8,438,688.788	118,871.719	-8,000		-8,000	313.361	338-46-49.594
139	37+588.244	8,438,978.608	118,752.609	0		0	149.825	336-32-10.171
140	37+738.068	8,439,116.044	118,692.953	1,300		1,300	405.459	336-32-10.171
141	38+143.528	8,439,506.948	118,591.649	0		0	186.441	354-24-22.480
142	38+329.968	8,439,692.501	118,573.476	0	160	350	73.143	354-24-22.479
143	38+403.111	8,439,765.464	118,568.887	350		350	40.088	0-23-35.048
144	38+443.199	8,439,805.448	118,571.455	350	160	0	73.143	6-57-19.984
145	38+516.342	8,439,877.225	118,585.338	0		0	278.501	12-56-32.550
146	38+794.843	8,440,148.651	118,647.714	0	160	-300	85.333	12-56-32.551
147	38+880.176	8,440,232.553	118,662.851	-300		-300	124.649	4-47-37.112
148	39+004.825	8,440,355.356	118,647.534	-300	160	0	85.333	340-59-14.701
149	39+090.159	8,440,432.970	118,612.253	0		0	220.352	332-50-19.261
150	39+310.511	8,440,629.023	118,511.662	2,700		2,700	726.485	332-50-19.261
151	40+036.996	8,441,311.972	118,270.447	0		0	187.127	348-15-18.642
152	40+224.124	8,441,495.182	118,232.356	-1,000		-1,000	314.865	348-15-18.642

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
153	40+538.989	8,441,788.379	118,121.186	0		0	1,695.308	330-12-53.078
154	42+234.296	8,443,259.725	117,279.041	0	160	400	64.000	330-12-53.077
155	42+298.296	8,443,316.082	117,248.750	400		400	59.315	334-47-54.263
156	42+357.611	8,443,371.424	117,227.557	400	160	0	64.000	343-17-40.749
157	42+421.611	8,443,433.599	117,212.459	0		0	52.570	347-52-41.933
158	42+474.182	8,443,484.997	117,201.420	-2,700		-2,700	245.513	347-52-41.932
159	42+719.695	8,443,722.363	117,139.030	0	170	400	72.250	342-40-06.117
160	42+791.945	8,443,791.924	117,119.599	400		400	173.907	347-50-34.408
161	42+965.852	8,443,964.462	117,120.497	400	170	0	72.250	12-45-11.735
162	43+038.102	8,444,033.817	117,140.650	0		0	100.205	17-55-40.029
163	43+138.307	8,444,129.157	117,171.495	0	210	-600	73.500	17-55-40.028
164	43+211.807	8,444,199.524	117,192.684	-600		-600	30.947	14-25-06.306
165	43+242.755	8,444,229.682	117,199.614	-600	210	0	73.500	11-27-47.399
166	43+316.255	8,444,302.240	117,211.266	0		0	49.942	7-57-13.677
167	43+366.197	8,444,351.702	117,218.177	2,700		2,700	309.686	7-57-13.679
168	43+675.883	8,444,655.282	117,278.506	0	210	-600	73.500	14-31-31.957
169	43+749.383	8,444,726.782	117,295.481	-600		-600	245.373	11-00-58.238
170	43+994.756	8,444,970.431	117,292.506	-600	210	0	73.500	347-35-05.211
171	44+068.256	8,445,041.495	117,273.790	0		0	42.195	344-04-31.494
172	44+110.451	8,445,082.070	117,262.213	8,000		8,000	300.170	344-04-31.493
173	44+410.621	8,445,372.199	117,185.289	0		0	139.415	346-13-30.813
174	44+550.036	8,445,507.604	117,152.093	0	230	-700	75.571	346-13-30.815
175	44+625.607	8,445,580.657	117,132.784	-700		-700	58.643	343-07-56.724
176	44+684.250	8,445,635.998	117,113.439	-700	230	0	75.571	338-19-56.871
177	44+759.821	8,445,705.172	117,083.032	0		0	17.855	335-14-22.774
178	44+777.677	8,445,721.386	117,075.553	0	240	800	72.000	335-14-22.779
179	44+849.677	8,445,787.206	117,046.385	800		800	44.796	337-49-04.695
180	44+894.473	8,445,829.138	117,030.642	800	240	0	72.000	341-01-34.608
181	44+966.473	8,445,897.892	117,009.287	0		0	149.424	343-36-16.523
182	45+115.897	8,446,041.240	116,967.110	-1,200		-1,200	326.746	343-36-16.524
183	45+442.643	8,446,338.361	116,833.604	0		0	15.656	328-00-13.074
184	45+458.299	8,446,351.639	116,825.308	1,700		1,700	302.544	328-00-13.076
185	45+760.843	8,446,621.095	116,688.617	0		0	48.765	338-12-01.390
186	45+809.608	8,446,666.373	116,670.507	-4,000		-4,000	542.608	338-12-01.391
187	46+352.216	8,447,154.988	116,435.502	0		0	282.810	330-25-41.163
188	46+635.026	8,447,400.959	116,295.931	-5,000		-5,000	300.052	330-25-41.163
189	46+935.078	8,447,657.327	116,140.112	0		0	457.690	326-59-23.126
190	47+392.768	8,448,041.133	115,890.767	-3,000		-3,000	325.718	326-59-23.126
191	47+718.486	8,448,304.111	115,698.855	0		0	239.001	320-46-08.423

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
192	47+957.486	8,448,489.242	115,547.700	0	210	600	73.500	320-46-08.424
193	48+030.986	8,448,547.103	115,502.394	600		600	215.720	324-16-42.143
194	48+246.706	8,448,740.887	115,410.288	600	210	0	73.500	344-52-41.132
195	48+320.206	8,448,812.554	115,394.029	0		0	257.859	348-23-14.854
196	48+578.065	8,449,065.135	115,342.124	5,000		5,000	301.844	348-23-14.854
197	48+879.909	8,449,362.454	115,290.324	0		0	43.262	351-50-46.801
198	48+923.171	8,449,405.279	115,284.188	950		950	700.097	351-50-46.803
199	49+623.268	8,450,072.213	115,437.650	0		0	288.468	34-04-12.542
200	49+911.736	8,450,311.166	115,599.252	0	160	-230	111.304	34-04-12.542
201	50+023.041	8,450,407.835	115,653.836	-230		-230	40.744	20-12-23.477
202	50+063.785	8,450,447.115	115,664.458	-230	160	0	111.304	10-03-24.121
203	50+175.089	8,450,558.119	115,666.031	0		0	753.043	356-11-35.055
204	50+928.132	8,451,309.500	115,616.033	0	190	-500	72.200	356-11-35.056
205	51+000.332	8,451,381.388	115,609.509	-500		-500	31.326	352-03-22.735
206	51+031.658	8,451,412.257	115,604.211	-500	190	0	72.200	348-27-59.829
207	51+103.858	8,451,482.207	115,586.393	0		0	39.853	344-19-47.507
208	51+143.711	8,451,520.579	115,575.628	1,400		1,400	312.278	344-19-47.509
209	51+455.989	8,451,828.131	115,525.375	0		0	28.780	357-06-36.048
210	51+484.768	8,451,856.874	115,523.924	0	160	-350	73.143	357-06-36.047
211	51+557.911	8,451,929.716	115,517.698	-350		-350	66.915	351-07-23.478
212	51+624.826	8,451,994.443	115,501.134	-350	160	0	73.143	340-10-08.595
213	51+697.969	8,452,061.322	115,471.606	0		0	34.740	334-10-56.029
214	51+732.709	8,452,092.594	115,456.476	1,100		1,100	237.200	334-10-56.027
215	51+969.908	8,452,315.561	115,376.905	-2,400		-2,400	303.090	346-32-14.145
216	52+272.999	8,452,605.090	115,287.941	0		0	52.178	339-18-05.454
217	52+325.177	8,452,653.900	115,269.499	-1,300		-1,300	309.263	339-18-05.456
218	52+634.439	8,452,927.539	115,126.968	0		0	27.895	325-40-16.231
219	52+662.334	8,452,950.575	115,111.237	0	160	350	73.143	325-40-16.231
220	52+735.477	8,453,012.347	115,072.136	350		350	41.733	331-39-28.800
221	52+777.211	8,453,050.171	115,054.558	350	160	0	73.143	338-29-23.456
222	52+850.353	8,453,119.888	115,032.551	0		0	1,140.848	344-28-36.023
223	53+991.201	8,454,219.119	114,727.226	0	230	-700	75.571	344-28-36.023
224	54+066.773	8,454,291.549	114,705.696	-700		-700	162.500	341-23-01.933
225	54+229.273	8,454,438.173	114,636.492	-700	230	0	75.571	328-04-59.054
226	54+304.844	8,454,500.832	114,594.262	0		0	492.907	324-59-24.965
227	54+797.751	8,454,904.549	114,311.474	0	170	400	72.250	324-59-24.968
228	54+870.001	8,454,964.925	114,271.837	400		400	92.854	330-09-53.256
229	54+962.854	8,455,050.088	114,235.362	400	170	0	72.250	343-27-54.303
230	55+035.104	8,455,120.436	114,219.011	0		0	579.789	348-38-22.594

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
231	55+614.894	8,455,688.866	114,104.804	0	190	500	72.200	348-38-22.592
232	55+687.094	8,455,759.957	114,092.293	500		500	76.078	352-46-34.913
233	55+763.172	8,455,835.867	114,088.494	500	190	0	72.200	1-29-39.518
234	55+835.372	8,455,907.852	114,093.846	0		0	268.639	5-37-51.838
235	56+104.011	8,456,175.194	114,120.206	0	300	-600	150.000	5-37-51.839
236	56+254.011	8,456,324.850	114,128.688	-600		-600	159.792	358-28-08.737
237	56+413.803	8,456,482.139	114,103.325	-600	300	0	150.000	343-12-36.128
238	56+563.803	8,456,621.542	114,048.230	0		0	272.674	336-02-53.029
239	56+836.478	8,456,870.736	113,937.532	-1,200		-1,200	255.254	336-02-53.028
240	57+091.732	8,457,091.274	113,809.969	0		0	2.909	323-51-38.019
241	57+094.641	8,457,093.624	113,808.254	1,200		1,200	233.685	323-51-38.013
242	57+328.327	8,457,294.530	113,689.624	0		0	91.644	335-01-05.536
243	57+419.971	8,457,377.601	113,650.920	0	180	-450	72.000	335-01-05.534
244	57+491.971	8,457,442.012	113,618.792	-450		-450	56.280	330-26-04.350
245	57+548.251	8,457,489.102	113,588.038	-450	180	0	72.000	323-16-07.390
246	57+620.251	8,457,544.413	113,541.975	0		0	199.107	318-41-06.204
247	57+819.359	8,457,693.961	113,410.525	0	160	350	73.143	318-41-06.204
248	57+892.502	8,457,750.519	113,364.201	350		350	57.129	324-40-18.773
249	57+949.630	8,457,799.611	113,335.108	350	160	0	73.143	334-01-26.295
250	58+022.773	8,457,867.402	113,307.739	0		0	123.008	340-00-38.860
251	58+145.781	8,457,983.000	113,265.690	0	160	270	94.815	340-00-38.860
252	58+240.595	8,458,073.721	113,238.582	270		270	27.622	350-04-15.455
253	58+268.218	8,458,101.126	113,235.218	270	160	0	94.815	355-55-57.453
254	58+363.033	8,458,195.710	113,239.579	0	160	-230	111.304	5-59-34.046
255	58+474.337	8,458,306.693	113,242.241	-230		-230	33.840	352-07-44.982
256	58+508.178	8,458,339.754	113,235.162	-230	160	0	111.304	343-41-56.714
257	58+619.482	8,458,439.916	113,187.289	0		0	279.651	329-50-07.649
258	58+899.133	8,458,681.698	113,046.769	0	160	400	64.000	329-50-07.648
259	58+963.133	8,458,737.854	113,016.105	400		400	76.071	334-25-08.833
260	59+039.204	8,458,809.169	112,989.961	400	160	0	64.000	345-18-55.792
261	59+103.204	8,458,871.838	112,977.065	0		0	221.906	349-53-56.977
262	59+325.110	8,459,090.304	112,938.146	0	300	600	150.000	349-53-56.977
263	59+475.110	8,459,238.844	112,918.027	600		600	154.031	357-03-40.078
264	59+629.141	8,459,391.996	112,929.853	600	300	0	150.000	11-46-12.152
265	59+779.141	8,459,535.686	112,972.539	0		0	935.646	18-55-55.253
266	60+714.787	8,460,420.717	113,276.105	0	180	-450	72.000	18-55-55.255
267	60+786.787	8,460,489.401	113,297.635	-450		-450	164.095	14-20-54.068
268	60+950.882	8,460,652.211	113,308.739	-450	180	0	72.000	353-27-18.474
269	61+022.882	8,460,723.182	113,296.734	0		0	411.369	348-52-17.289

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
270	61+434.251	8,461,126.816	113,217.336	0	350	-700	175.000	348-52-17.289
271	61+609.251	8,461,296.852	113,176.465	-700		-700	413.724	341-42-34.188
272	62+022.975	8,461,629.933	112,941.307	-700	350	0	175.000	307-50-44.669
273	62+197.975	8,461,725.360	112,794.759	0		0	117.275	300-41-01.567
274	62+315.250	8,461,785.205	112,693.903	0	190	500	72.200	300-41-01.567
275	62+387.450	8,461,823.523	112,632.730	500		500	91.487	304-49-13.886
276	62+478.936	8,461,882.324	112,562.809	500	190	0	72.200	315-18-14.845
277	62+551.136	8,461,936.019	112,514.567	0		0	288.230	319-26-27.165
278	62+839.367	8,462,154.997	112,327.151	6,000		6,000	339.238	319-26-27.165
279	63+178.605	8,462,418.825	112,113.969	0		0	607.088	322-40-49.308
280	63+785.693	8,462,901.622	111,745.915	0	160	-270	94.815	322-40-49.308
281	63+880.508	8,462,973.436	111,684.206	-270		-270	156.292	312-37-12.716
282	64+036.800	8,463,041.087	111,545.728	-270	160	0	94.815	279-27-14.428
283	64+131.614	8,463,045.623	111,451.152	0		0	231.685	269-23-37.839
284	64+363.299	8,463,043.172	111,219.481	1,700		1,700	308.378	269-23-37.839
285	64+671.677	8,463,067.819	110,912.513	0		0	443.666	279-47-14.052
286	65+115.343	8,463,143.238	110,475.304	0	160	230	111.304	279-47-14.052
287	65+226.647	8,463,170.858	110,367.780	230		230	151.435	293-39-03.117
288	65+378.083	8,463,271.353	110,258.159	230	160	0	111.304	331-22-30.774
289	65+489.387	8,463,376.078	110,221.320	0		0	184.586	345-14-19.839
290	65+673.973	8,463,554.572	110,174.290	0	170	400	72.250	345-14-19.839
291	65+746.223	8,463,624.934	110,157.998	400		400	77.337	350-24-48.131
292	65+823.560	8,463,701.958	110,152.548	400	170	0	72.250	1-29-28.091
293	65+895.810	8,463,773.914	110,158.768	0		0	598.195	6-39-56.384
294	66+494.005	8,464,368.066	110,228.204	2,500		2,500	311.092	6-39-56.383
295	66+805.098	8,464,674.014	110,283.421	0		0	354.083	13-47-43.343
296	67+159.181	8,465,017.883	110,367.854	0	230	-700	75.571	13-47-43.345
297	67+234.752	8,465,091.578	110,384.549	-700		-700	158.940	10-42-09.254
298	67+393.692	8,465,249.751	110,396.158	-700	230	0	75.571	357-41-35.334
299	67+469.264	8,465,325.093	110,390.403	0		0	1,075.970	354-36-01.244
300	68+545.234	8,466,396.289	110,289.151	0	230	-700	75.571	354-36-01.244
301	68+620.805	8,466,471.375	110,280.688	-700		-700	151.560	351-30-27.155
302	68+772.365	8,466,617.691	110,242.316	-700	230	0	75.571	339-06-07.888
303	68+847.937	8,466,687.267	110,212.841	0		0	1,208.441	336-00-33.799
304	70+056.377	8,467,791.313	109,721.505	0	230	700	75.571	336-00-33.798
305	70+131.949	8,467,860.888	109,692.029	700		700	107.635	339-06-07.890
306	70+239.583	8,467,963.993	109,661.503	700	230	0	75.571	347-54-43.906
307	70+315.155	8,468,038.400	109,648.348	0		0	525.075	351-00-17.997
308	70+840.230	8,468,557.018	109,566.253	0	190	500	72.200	351-00-17.998

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
309	70+912.430	8,468,628.565	109,556.686	500		500	133.214	355-08-30.316
310	71+045.644	8,468,761.229	109,563.115	500	190	0	72.200	10-24-25.066
311	71+117.844	8,468,831.516	109,579.555	0		0	725.640	14-32-37.386
312	71+843.484	8,469,533.903	109,761.777	0	160	-350	73.143	14-32-37.389
313	71+916.627	8,469,605.264	109,777.660	-350		-350	126.334	8-33-24.818
314	72+042.960	8,469,730.852	109,773.750	-350	160	0	73.143	347-52-32.811
315	72+116.103	8,469,801.087	109,753.457	0		0	1,428.380	341-53-20.245
316	73+544.483	8,471,158.699	109,309.431	0	180	-280	115.714	341-53-20.245
317	73+660.198	8,471,265.742	109,266.061	-280		-280	167.117	330-02-59.202
318	73+827.315	8,471,377.929	109,145.550	-280	180	0	115.714	295-51-10.696
319	73+943.029	8,471,413.540	109,035.682	0		0	51.918	284-00-49.655
320	73+994.947	8,471,426.112	108,985.309	-1,400		-1,400	307.449	284-00-49.653
321	74+302.396	8,471,467.343	108,681.261	0		0	1,143.107	271-25-52.629
322	75+445.503	8,471,495.895	107,538.510	0	230	-700	75.571	271-25-52.630
323	75+521.074	8,471,496.423	107,462.951	-700		-700	240.554	268-20-18.538
324	75+761.629	8,471,448.674	107,228.389	-700	230	0	75.571	248-38-55.817
325	75+837.200	8,471,418.649	107,159.049	0		0	115.080	245-33-21.724
326	75+952.280	8,471,371.029	107,054.284	0	160	230	111.304	245-33-21.725
327	76+063.584	8,471,333.378	106,949.849	230		230	275.123	259-25-10.789
328	76+338.708	8,471,437.437	106,712.660	230	160	0	111.304	327-57-22.373
329	76+450.012	8,471,539.779	106,669.641	0		0	94.619	341-49-11.438
330	76+544.631	8,471,629.675	106,640.119	1,600		1,600	308.178	341-49-11.438
331	76+852.809	8,471,929.893	106,572.670	0		0	42.488	352-51-20.360
332	76+895.298	8,471,972.051	106,567.386	0	160	-230	111.304	352-51-20.364
333	77+006.602	8,472,080.735	106,544.753	-230		-230	155.475	338-59-31.299
334	77+162.077	8,472,196.939	106,445.949	-230	160	0	111.304	300-15-40.986
335	77+273.381	8,472,236.754	106,342.319	0	160	350	73.143	286-23-51.921
336	77+346.524	8,472,259.822	106,272.946	350		350	55.984	292-23-04.490
337	77+402.508	8,472,285.182	106,223.103	350	160	0	73.143	301-32-57.498
338	77+475.651	8,472,327.678	106,163.615	0		0	6.231	307-32-10.067
339	77+481.882	8,472,331.474	106,158.674	0	160	300	85.333	307-32-10.069
340	77+567.215	8,472,386.563	106,093.605	300		300	49.313	315-41-05.505
341	77+616.528	8,472,424.513	106,062.203	300	160	0	85.333	325-06-10.605
342	77+701.861	8,472,498.743	106,020.268	0		0	241.299	333-15-06.044
343	77+943.160	8,472,714.221	105,911.666	2,000		2,000	276.460	333-15-06.044
344	78+219.621	8,472,968.898	105,804.670	0	160	-230	111.304	341-10-18.047
345	78+330.925	8,473,070.747	105,760.497	-230		-230	30.462	327-18-28.987
346	78+361.387	8,473,095.220	105,742.396	-230	160	0	111.304	319-43-10.350
347	78+472.691	8,473,167.282	105,657.948	0		0	8.625	305-51-21.290

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
348	78+481.316	8,473,172.334	105,650.958	−4,500		−4,500	328.606	305−51−21.285
349	78+809.922	8,473,354.923	105,377.837	0		0	288.875	301−40−19.115
350	79+098.797	8,473,506.598	105,131.985	0	160	−230	111.304	301−40−19.116
351	79+210.101	8,473,557.090	105,033.117	−230		−230	179.912	287−48−30.050
352	79+390.013	8,473,543.023	104,858.322	−230	160	0	111.304	242−59−24.245
353	79+501.317	8,473,477.372	104,768.800	0		0	85.155	229−07−35.181
354	79+586.473	8,473,421.647	104,704.409	0	190	500	72.200	229−07−35.181
355	79+658.673	8,473,375.738	104,648.706	500		500	80.383	233−15−47.498
356	79+739.056	8,473,333.031	104,580.709	500	190	0	72.200	242−28−27.816
357	79+811.256	8,473,302.791	104,515.165	0		0	45.165	246−36−40.139
358	79+856.420	8,473,284.862	104,473.712	0	160	300	85.333	246−36−40.135
359	79+941.754	8,473,254.763	104,393.945	300		300	198.452	254−45−35.574
360	80+140.205	8,473,267.374	104,199.500	300	160	0	85.333	292−39−40.917
361	80+225.539	8,473,307.523	104,124.289	0		0	64.909	300−48−36.353
362	80+290.447	8,473,340.769	104,068.541	0	160	−350	73.143	300−48−36.356
363	80+363.590	8,473,376.005	104,004.486	−350		−350	47.747	294−49−23.788
364	80+411.337	8,473,393.037	103,959.919	−350	160	0	73.143	287−00−25.204
365	80+484.480	8,473,409.502	103,888.690	0		0	85.621	281−01−12.636
366	80+570.101	8,473,425.869	103,804.648	0	160	230	111.304	281−01−12.638
367	80+681.405	8,473,455.796	103,697.743	230		230	36.109	294−53−01.699
368	80+717.515	8,473,473.494	103,666.310	230	160	0	111.304	303−52−44.662
369	80+828.819	8,473,549.381	103,585.283	0		0	8.278	317−44−33.723
370	80+837.097	8,473,555.508	103,579.717	−2,000		−2,000	170.085	317−44−33.726
371	81+007.182	8,473,676.381	103,460.129	0		0	2.530	312−52−12.391
372	81+009.712	8,473,678.102	103,458.275	0	160	−230	111.304	312−52−12.432
373	81+121.016	8,473,746.833	103,371.094	−230		−230	135.011	299−00−23.366
374	81+256.028	8,473,774.934	103,241.014	−230	160	0	111.304	265−22−24.799
375	81+367.332	8,473,748.319	103,133.236	0	160	230	111.304	251−30−35.732
376	81+478.636	8,473,721.704	103,025.459	230		230	249.585	265−22−24.797
377	81+728.221	8,473,827.539	102,812.824	230	160	0	111.304	327−32−53.110
378	81+839.525	8,473,929.571	102,769.077	0		0	57.998	341−24−42.177
379	81+897.523	8,473,984.543	102,750.590	0	160	−230	111.304	341−24−42.176
380	82+008.828	8,474,086.576	102,706.843	−230		−230	61.262	327−32−53.109
381	82+070.090	8,474,133.310	102,667.513	−230	160	0	111.304	312−17−12.720
382	82+181.394	8,474,193.842	102,574.453	0		0	886.942	298−25−23.655
383	83+068.336	8,474,616.009	101,794.427	0	200	400	100.000	298−25−23.656
384	83+168.336	8,474,667.193	101,708.600	400		400	40.103	305−35−06.752
385	83+208.439	8,474,692.124	101,677.210	400	200	0	100.000	311−19−46.237
386	83+308.439	8,474,764.135	101,607.923	0		0	1,153.090	318−29−29.337

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
387	84+461.529	8,475,627.634	100,843.734	−2,000		−2,000	331.893	318−29−29.337
388	84+793.422	8,475,856.827	100,604.211	0		0	1,304.759	308−59−00.367
389	86+098.181	8,476,677.646	99,589.986	−1,000		−1,000	1,192.110	308−59−00.367
390	87+290.291	8,476,772.221	98,471.212	0		0	1,610.180	240−40−50.102
391	88+900.471	8,475,983.751	97,067.291	0	160	230	111.304	240−40−50.103
392	89+011.775	8,475,937.361	96,966.433	230		230	210.178	254−32−39.166
393	89+221.953	8,475,975.120	96,767.036	230	160	0	111.304	306−54−07.118
394	89+333.257	8,476,055.175	96,690.123	0		0	1,682.186	320−45−56.181
395	91+015.444	8,477,358.138	95,626.150	1,400		1,400	301.001	320−45−56.181
396	91+316.444	8,477,609.878	95,462.199	0		0	217.717	333−05−03.189
397	91+534.161	8,477,804.010	95,363.643	7,000		7,000	332.659	333−05−03.189
398	91+866.821	8,478,104.099	95,220.158	0		0	44.272	335−48−25.460
399	91+911.093	8,478,144.483	95,202.014	−3,100		−3,100	306.556	335−48−25.462
400	92+217.649	8,478,417.452	95,062.774	0		0	29.283	330−08−28.112
401	92+246.932	8,478,442.848	95,048.195	6,000		6,000	308.197	330−08−28.117
402	92+555.130	8,478,713.956	94,901.685	0		0	280.848	333−05−03.162
403	92+835.978	8,478,964.381	94,774.551	0	200	600	66.667	333−05−03.161
404	92+902.644	8,479,024.366	94,745.482	600		600	236.861	336−16−02.318
405	93+139.505	8,479,254.181	94,694.855	600	200	0	66.667	358−53−08.963
406	93+206.172	8,479,320.829	94,696.028	0		0	718.904	2−04−08.118
407	93+925.076	8,480,039.264	94,721.981	0	170	−400	72.250	2−04−08.117
408	93+997.326	8,480,111.487	94,722.415	−400		−400	113.100	356−53−39.827
409	94+110.426	8,480,222.061	94,700.509	−400	170	0	72.250	340−41−38.493
410	94+182.676	8,480,288.663	94,672.573	0		0	803.868	335−31−10.203
411	94+986.544	8,481,020.265	94,339.463	0	160	230	111.304	335−31−10.203
412	95+097.848	8,481,124.677	94,301.746	230		230	161.584	349−22−59.267
413	95+259.432	8,481,280.783	94,327.895	230	160	0	111.304	29−38−07.991
414	95+370.736	8,481,367.204	94,397.579	0		0	555.699	43−29−57.055
415	95+926.436	8,481,770.299	94,780.091	0	170	−400	72.250	43−29−57.053
416	95+998.686	8,481,824.162	94,828.207	−400		−400	165.877	38−19−28.765
417	96+164.562	8,481,971.620	94,901.549	−400	170	0	72.250	14−33−52.406
418	96+236.812	8,482,042.489	94,915.472	0		0	111.739	9−23−24.116
419	96+348.552	8,482,152.731	94,933.703	0	190	500	72.200	9−23−24.118
420	96+420.752	8,482,223.643	94,947.190	500		500	108.054	13−31−36.433
421	96+528.806	8,482,325.164	94,983.575	500	190	0	72.200	25−54−32.044
422	96+601.006	8,482,388.499	95,018.203	0		0	19.289	30−02−44.354
423	96+620.295	8,482,405.197	95,027.861	0	210	−600	73.500	30−02−44.360
424	96+693.795	8,482,469.548	95,063.349	−600		−600	80.238	26−32−10.642
425	96+774.033	8,482,543.512	95,094.297	−600	210	0	73.500	18−52−26.965

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
426	96+847.533	8,482,613.961	95,115.211	0		0	714.497	15-21-53.245
427	97+562.029	8,483,302.920	95,304.527	0	190	-500	72.200	15-21-53.246
428	97+634.229	8,483,372.964	95,321.972	-500		-500	16.382	11-13-40.923
429	97+650.611	8,483,389.081	95,324.898	-500	190	0	72.200	9-21-02.923
430	97+722.811	8,483,460.787	95,333.186	0		0	2.843	5-12-50.587
431	97+725.654	8,483,463.618	95,333.444	0	160	300	85.333	5-12-50.605
432	97+810.987	8,483,548.060	95,345.206	300		300	31.542	13-21-46.039
433	97+842.529	8,483,578.308	95,354.094	300	160	0	85.333	19-23-12.594
434	97+927.863	8,483,655.690	95,389.882	0		0	421.517	27-32-08.032
435	98+349.380	8,484,029.459	95,584.749	0	250	-500	125.000	27-32-08.032
436	98+474.380	8,484,142.532	95,637.833	-500		-500	165.654	20-22-24.932
437	98+640.034	8,484,304.464	95,668.965	-500	250	0	125.000	1-23-27.644
438	98+765.034	8,484,429.160	95,661.591	0		0	1,085.772	354-13-44.543
439	99+850.806	8,485,509.429	95,552.415	0	160	-270	94.815	354-13-44.541
440	99+945.621	8,485,602.916	95,537.401	-270		-270	32.561	344-10-07.953
441	99+978.182	8,485,633.631	95,526.653	-270	160	0	94.815	337-15-33.144
442	100+072.997	8,485,716.083	95,480.103	0	170	400	72.250	327-11-56.553
443	100+145.247	8,485,777.941	95,442.822	400		400	19.592	332-22-24.853
444	100+164.839	8,485,795.515	95,434.166	400	170	0	72.250	335-10-47.670
445	100+237.089	8,485,862.773	95,407.848	0		0	187.033	340-21-15.960
446	100+424.121	8,486,038.918	95,344.968	0	160	230	111.304	340-21-15.962
447	100+535.426	8,486,146.137	95,316.185	230		230	25.911	354-13-05.026
448	100+561.337	8,486,172.009	95,315.031	230	160	0	111.304	0-40-22.223
449	100+672.641	8,486,281.365	95,334.151	0		0	159.036	14-32-11.287
450	100+831.677	8,486,435.310	95,374.068	0	170	400	72.250	14-32-11.289
451	100+903.927	8,486,504.644	95,394.292	400		400	36.614	19-42-39.574
452	100+940.541	8,486,538.500	95,408.200	400	170	0	72.250	24-57-20.015
453	101+012.791	8,486,602.028	95,442.558	0	160	-300	85.333	30-07-48.301
454	101+098.124	8,486,677.710	95,481.812	-300		-300	112.142	21-58-52.864
455	101+210.267	8,486,787.050	95,503.605	-300	160	0	85.333	0-33-49.456
456	101+295.600	8,486,871.999	95,496.369	0		0	14.141	352-24-54.017
457	101+309.741	8,486,886.017	95,494.502	0	160	230	111.304	352-24-54.017
458	101+421.045	8,486,996.883	95,488.758	230		230	30.859	6-16-43.078
459	101+451.905	8,487,027.239	95,494.177	230	160	0	111.304	13-57-57.712
460	101+563.209	8,487,129.269	95,537.930	0	160	-230	111.304	27-49-46.776
461	101+674.513	8,487,231.298	95,581.682	-230		-230	25.875	13-57-57.713
462	101+700.388	8,487,256.706	95,586.503	-230	160	0	111.304	7-31-12.965
463	101+811.693	8,487,367.671	95,583.162	0		0	19.942	353-39-23.894
464	101+831.635	8,487,387.491	95,580.959	6,000		6,000	304.286	353-39-23.900

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
465	102+135.921	8,487,690.637	95,555.021	0		0	372.204	356-33-44.498
466	102+508.125	8,488,062.171	95,532.703	0	160	-230	111.304	356-33-44.498
467	102+619.429	8,488,172.091	95,517.144	-230		-230	102.595	342-41-55.432
468	102+722.025	8,488,260.135	95,466.147	-230	160	0	111.304	317-08-27.687
469	102+833.329	8,488,328.543	95,378.543	0		0	10.401	303-16-38.626
470	102+843.731	8,488,334.031	95,369.847	0	230	700	75.571	303-16-38.624
471	102+919.302	8,488,376.621	95,307.432	700		700	87.787	306-22-12.714
472	103+007.089	8,488,432.969	95,240.190	700	230	0	75.571	313-33-20.443
473	103+082.661	8,488,486.972	95,187.339	0		0	840.144	316-38-54.533
474	103+922.805	8,489,097.888	94,610.603	0	160	230	111.304	316-38-54.534
475	104+034.109	8,489,184.488	94,541.143	230		230	45.297	330-30-43.598
476	104+079.407	8,489,225.852	94,522.859	230	160	0	111.304	341-47-46.542
477	104+190.711	8,489,335.512	94,505.571	0	160	230	111.304	355-39-35.608
478	104+302.015	8,489,446.526	94,506.112	230		230	170.075	9-31-24.672
479	104+472.090	8,489,589.445	94,590.995	230	160	0	111.304	51-53-28.108
480	104+583.394	8,489,643.036	94,688.219	0		0	92.007	65-45-17.173
481	104+675.402	8,489,680.818	94,772.111	0	160	-350	73.143	65-45-17.171
482	104+748.544	8,489,713.142	94,837.684	-350		-350	45.879	59-46-04.605
483	104+794.423	8,489,738.770	94,875.697	-350	160	0	73.143	52-15-27.057
484	104+867.566	8,489,787.435	94,930.253	0		0	201.498	46-16-14.489
485	105+069.064	8,489,926.721	95,075.858	0	190	500	72.200	46-16-14.489
486	105+141.264	8,489,975.348	95,129.205	500		500	25.115	50-24-26.808
487	105+166.379	8,489,990.862	95,148.952	500	190	0	72.200	53-17-07.660
488	105+238.579	8,490,031.181	95,208.825	0	160	-350	73.143	57-25-19.980
489	105+311.722	8,490,072.667	95,269.022	-350		-350	74.146	51-26-07.412
490	105+385.868	8,490,124.662	95,321.687	-350	160	0	73.143	39-17-51.070
491	105+459.011	8,490,184.323	95,363.939	0		0	32.598	33-18-38.500
492	105+491.608	8,490,211.565	95,381.841	0	160	-230	111.304	33-18-38.501
493	105+602.913	8,490,308.949	95,435.139	-230		-230	192.863	19-26-49.437
494	105+795.776	8,490,495.615	95,420.201	-230	160	0	111.304	331-24-08.895
495	105+907.080	8,490,583.284	95,352.095	0		0	133.638	317-32-19.829
496	106+040.718	8,490,681.873	95,261.877	1,300		1,300	310.215	317-32-19.830
497	106+350.933	8,490,933.433	95,081.612	0		0	278.468	331-12-40.195
498	106+629.401	8,491,177.482	94,947.507	-2,500		-2,500	152.922	331-12-40.195
499	106+782.323	8,491,309.167	94,869.811	0	160	230	111.304	327-42-23.258
500	106+893.627	8,491,407.482	94,818.250	230		230	81.330	341-34-12.322
501	106+974.957	8,491,487.542	94,806.571	230	160	0	111.304	1-49-49.296
502	107+086.261	8,491,596.489	94,827.896	0	160	-230	111.304	15-41-38.359
503	107+197.566	8,491,705.437	94,849.222	-230		-230	58.251	1-49-49.294

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
504	107+255.817	8,491,763.272	94,843.729	−230	160	0	111.304	347−19−09.639
505	107+367.121	8,491,866.257	94,802.276	0		0	510.353	333−27−20.574
506	107+877.474	8,492,322.814	94,574.205	−1,200		−1,200	310.541	333−27−20.574
507	108+188.015	8,492,579.673	94,401.225	0		0	62.403	318−37−42.542
508	108+250.418	8,492,626.503	94,359.981	0	160	230	111.304	318−37−42.540
509	108+361.723	8,492,715.451	94,293.554	230		230	142.980	332−29−31.604
510	108+504.702	8,492,854.129	94,269.852	230	160	0	111.304	8−06−36.244
511	108+616.007	8,492,960.090	94,302.966	0		0	11.498	21−58−25.305
512	108+627.504	8,492,970.752	94,307.268	−5,000		−5,000	159.508	21−58−25.309
513	108+787.012	8,493,119.599	94,364.584	0		0	758.453	20−08−45.151
514	109+545.465	8,493,831.649	94,625.804	0	160	300	85.333	20−08−45.151
515	109+630.798	8,493,910.209	94,658.926	300		300	41.928	28−17−40.591
516	109+672.726	8,493,945.621	94,681.312	300	160	0	85.333	36−18−08.266
517	109+758.060	8,494,009.242	94,738.066	0		0	328.472	44−27−03.705
518	110+086.532	8,494,243.721	94,968.095	0	160	−230	111.304	44−27−03.705
519	110+197.836	8,494,328.972	95,039.205	−230		−230	217.878	30−35−14.639
520	110+415.714	8,494,538.414	95,051.829	−230	160	0	111.304	336−18−41.214
521	110+527.018	8,494,631.590	94,991.474	0		0	260.022	322−26−52.149
522	110+787.040	8,494,837.735	94,832.995	0	160	230	111.304	322−26−52.150
523	110+898.345	8,494,930.910	94,772.640	230		230	345.946	336−18−41.214
524	111+244.291	8,495,227.312	94,877.026	230	160	0	111.304	62−29−26.763
525	111+355.595	8,495,262.104	94,982.448	0	160	−230	111.304	76−21−15.828
526	111+466.900	8,495,296.897	95,087.870	−230		−230	116.511	62−29−26.765
527	111+583.410	8,495,374.059	95,173.503	−230	160	0	111.304	33−27−59.733
528	111+694.714	8,495,475.300	95,219.049	0		0	985.186	19−36−10.668
529	112+679.900	8,496,403.385	95,549.579	0	160	−300	85.333	19−36−10.669
530	112+765.234	8,496,484.965	95,574.345	−300		−300	250.899	11−27−15.229
531	113+016.133	8,496,722.836	95,521.590	−300	160	0	85.333	323−32−09.613
532	113+101.466	8,496,786.297	95,464.656	0		0	131.904	315−23−14.174
533	113+233.370	8,496,880.195	95,372.018	1,000		1,000	312.330	315−23−14.175
534	113+545.700	8,497,132.914	95,190.655	0		0	319.691	333−16−56.824
535	113+865.391	8,497,418.472	95,046.924	0	190	−500	72.200	333−16−56.823
536	113+937.591	8,497,482.149	95,012.929	−500		−500	51.064	329−08−44.504
537	113+988.654	8,497,524.574	94,984.549	−500	190	0	72.200	323−17−39.235
538	114+060.854	8,497,580.301	94,938.671	0		0	49.060	319−09−26.918
539	114+109.914	8,497,617.415	94,906.586	0	160	270	94.815	319−09−26.915
540	114+204.729	8,497,692.544	94,848.959	270		270	71.392	329−13−03.509
541	114+276.121	8,497,757.968	94,820.908	270	160	0	94.815	344−22−03.104
542	114+370.936	8,497,851.507	94,806.219	0	210	−600	73.500	354−25−39.695

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
543	114+444.436	8,497,924.487	94,797.591	−600		−600	16.753	350−55−05.974
544	114+461.189	8,497,940.991	94,794.716	−600	210	0	73.500	349−19−06.645
545	114+534.689	8,498,012.589	94,778.159	0		0	302.939	345−48−32.925
546	114+837.628	8,498,306.284	94,703.892	0	230	−700	75.571	345−48−32.926
547	114+913.200	8,498,379.194	94,684.053	−700		−700	37.342	342−42−58.836
548	114+950.542	8,498,414.538	94,672.013	−700	230	0	75.571	339−39−35.377
549	115+026.114	8,498,484.397	94,643.216	0		0	1.346	336−34−01.192
550	115+027.460	8,498,485.632	94,642.681	1,800		1,800	156.005	336−34−01.286
551	115+183.464	8,498,631.278	94,586.918	0		0	770.920	341−31−58.093
552	115+954.384	8,499,362.500	94,342.720	0	200	600	66.667	341−31−58.094
553	116+021.051	8,499,426.105	94,322.780	600		600	154.087	344−42−57.249
554	116+175.138	8,499,578.300	94,301.588	600	200	0	66.667	359−25−48.293
555	116+241.804	8,499,644.933	94,303.394	0		0	466.589	2−36−47.451
556	116+708.393	8,500,111.037	94,324.667	0	160	230	111.304	2−36−47.451
557	116+819.697	8,500,221.168	94,338.642	230		230	111.786	16−28−36.516
558	116+931.483	8,500,316.639	94,394.655	230	160	0	111.304	44−19−26.250
559	117+042.787	8,500,382.566	94,483.975	0		0	143.674	58−11−15.313
560	117+186.462	8,500,458.302	94,606.066	0	160	300	85.333	58−11−15.316
561	117+271.795	8,500,499.761	94,680.563	300		300	75.773	66−20−10.753
562	117+347.568	8,500,521.133	94,753.049	300	160	0	85.333	80−48−28.162
563	117+432.901	8,500,526.723	94,838.123	0		0	20.289	88−57−23.597
564	117+453.190	8,500,527.093	94,858.409	0	160	−230	111.304	88−57−23.600
565	117+564.495	8,500,538.046	94,968.882	−230		−230	142.154	75−05−34.536
566	117+706.648	8,500,613.448	95,086.725	−230	160	0	111.304	39−40−50.498
567	117+817.953	8,500,709.165	95,142.963	0		0	26.652	25−49−01.437
568	117+844.605	8,500,733.157	95,154.570	0	170	400	72.250	25−49−01.434
569	117+916.855	8,500,797.196	95,187.966	400		400	76.459	30−59−29.728
570	117+993.314	8,500,858.591	95,233.342	400	170	0	72.250	41−56−36.970
571	118+065.564	8,500,909.309	95,284.761	0		0	274.120	47−07−05.263
572	118+339.685	8,501,095.845	95,485.625	0	160	−300	85.333	47−07−05.262
573	118+425.018	8,501,156.756	95,545.279	−300		−300	142.227	38−58−09.824
574	118+567.245	8,501,284.047	95,605.688	−300	160	0	85.333	11−48−22.072
575	118+652.578	8,501,368.777	95,615.151	0		0	84.055	3−39−26.636
576	118+736.633	8,501,452.660	95,620.513	0	170	−400	72.250	3−39−26.632
577	118+808.883	8,501,524.843	95,622.949	−400		−400	101.766	358−28−58.345
578	118+910.649	8,501,625.138	95,607.413	−400	170	0	72.250	343−54−21.524
579	118+982.899	8,501,693.201	95,583.252	0		0	381.047	338−43−53.236
580	119+363.945	8,502,048.295	95,445.031	0	170	−400	72.250	338−43−53.237
581	119+436.195	8,502,114.781	95,416.819	−400		−400	92.125	333−33−24.942

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
582	119+528.321	8,502,191.837	95,366.699	-400	170	0	72.250	320-21-39.447
583	119+600.571	8,502,244.581	95,317.361	0		0	224.046	315-11-11.155
584	119+824.617	8,502,403.521	95,159.452	0	160	230	111.304	315-11-11.155
585	119+935.921	8,502,488.320	95,087.805	230		230	127.457	329-03-00.220
586	120+063.379	8,502,609.823	95,055.079	230	160	0	111.304	0-48-04.284
587	120+174.683	8,502,719.136	95,074.444	0	160	-270	94.815	14-39-53.347
588	120+269.498	8,502,811.981	95,093.017	-270		-270	19.911	4-36-16.753
589	120+289.409	8,502,831.869	95,093.883	-270	160	0	94.815	0-22-45.955
590	120+384.223	8,502,925.977	95,083.446	0		0	119.338	350-19-09.364
591	120+503.562	8,503,043.616	95,063.379	0	160	270	94.815	350-19-09.361
592	120+598.376	8,503,137.724	95,052.942	270		270	115.879	0-22-45.954
593	120+714.255	8,503,249.913	95,078.173	270	160	0	94.815	24-58-10.769
594	120+809.070	8,503,330.492	95,127.895	0		0	254.733	35-01-47.359
595	121+063.803	8,503,539.080	95,274.112	0	160	-230	111.304	35-01-47.360
596	121+175.107	8,503,634.822	95,330.308	-230		-230	71.221	21-09-58.296
597	121+246.328	8,503,704.131	95,345.414	-230	160	0	111.304	3-25-27.362
598	121+357.632	8,503,814.574	95,334.156	0		0	102.312	349-33-38.299
599	121+459.944	8,503,915.192	95,315.617	0	170	400	72.250	349-33-38.300
600	121+532.194	8,503,986.582	95,304.674	400		400	130.497	354-44-06.588
601	121+662.691	8,504,116.172	95,313.921	400	170	0	72.250	13-25-39.166
602	121+734.941	8,504,185.285	95,334.889	0		0	485.364	18-36-07.457
603	122+220.305	8,504,645.292	95,489.717	0	160	-230	111.304	18-36-07.458
604	122+331.609	8,504,753.017	95,516.543	-230		-230	159.929	4-44-18.392
605	122+491.538	8,504,904.274	95,475.499	-230	160	0	111.304	324-53-53.918
606	122+602.842	8,504,983.663	95,397.900	0		0	145.827	311-02-04.852
607	122+748.669	8,505,079.401	95,287.901	0	160	300	85.333	311-02-04.853
608	122+834.002	8,505,138.357	95,226.316	300		300	38.670	319-11-00.290
609	122+872.672	8,505,169.169	95,202.993	300	160	0	85.333	326-34-08.040
610	122+958.006	8,505,244.448	95,162.970	0		0	161.954	334-43-03.481
611	123+119.960	8,505,390.889	95,093.802	0	160	-350	73.143	334-43-03.480
612	123+193.103	8,505,455.866	95,060.297	-350		-350	50.607	328-43-50.913
613	123+243.710	8,505,497.076	95,030.998	-350	160	0	73.143	320-26-46.971
614	123+316.853	8,505,550.066	94,980.633	0		0	56.912	314-27-34.401
615	123+373.764	8,505,589.928	94,940.013	0	160	300	85.333	314-27-34.403
616	123+459.098	8,505,652.458	94,882.059	300		300	21.286	322-36-29.846
617	123+480.383	8,505,669.814	94,869.743	300	160	0	85.333	326-40-24.739
618	123+565.716	8,505,745.165	94,829.858	0	160	-230	111.304	334-49-20.181
619	123+677.021	8,505,841.503	94,774.692	-230		-230	167.112	320-57-31.115
620	123+844.133	8,505,923.589	94,633.336	-230	160	0	111.304	279-19-44.071

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
621	123+955.438	8,505,923.752	94,522.321	0		0	17.857	265-27-55.012
622	123+973.295	8,505,922.340	94,504.520	4,000		4,000	206.761	265-27-55.007
623	124+180.056	8,505,911.326	94,298.076	0		0	254.728	268-25-36.867
624	124+434.783	8,505,904.333	94,043.444	-1,000		-1,000	306.952	268-25-36.867
625	124+741.736	8,505,849.315	93,742.686	0		0	17.180	250-50-23.405
626	124+758.916	8,505,843.676	93,726.458	0	160	300	85.333	250-50-23.407
627	124+844.249	8,505,819.541	93,644.689	300		300	30.809	258-59-18.847
628	124+875.058	8,505,815.218	93,614.199	300	160	0	85.333	264-52-21.367
629	124+960.391	8,505,815.673	93,528.943	0	160	230	111.304	273-01-16.807
630	125+071.695	8,505,830.433	93,418.914	230		230	455.627	286-53-05.871
631	125+527.322	8,506,199.546	93,310.530	230	160	0	111.304	40-23-13.524
632	125+638.627	8,506,271.450	93,395.112	0		0	244.023	54-15-02.588
633	125+882.649	8,506,414.017	93,593.156	0	160	-230	111.304	54-15-02.589
634	125+993.954	8,506,485.921	93,677.739	-230		-230	64.914	40-23-13.523
635	126+058.868	8,506,540.608	93,712.312	-230	160	0	111.304	24-12-58.080
636	126+170.173	8,506,647.855	93,740.992	0		0	145.027	10-21-09.016
637	126+315.200	8,506,790.521	93,767.053	0	160	-230	111.304	10-21-09.017
638	126+426.504	8,506,900.981	93,778.144	-230		-230	42.252	356-29-19.949
639	126+468.756	8,506,942.680	93,771.708	-230	160	0	111.304	345-57-47.927
640	126+580.061	8,507,044.655	93,727.830	0		0	236.530	332-05-58.864
641	126+816.591	8,507,253.692	93,617.149	0	160	230	111.304	332-05-58.863
642	126+927.895	8,507,355.668	93,573.271	230		230	300.630	345-57-47.928
643	127+228.525	8,507,612.330	93,684.384	230	160	0	111.304	60-51-13.979
644	127+339.830	8,507,650.120	93,788.769	0		0	31.654	74-43-03.045
645	127+371.484	8,507,658.463	93,819.304	0	160	-250	102.400	74-43-03.044
646	127+473.884	8,507,692.064	93,915.833	-250		-250	413.061	62-59-00.012
647	127+886.945	8,508,046.088	94,015.012	-250	160	0	102.400	328-19-00.342
648	127+989.345	8,508,124.947	93,949.988	0		0	144.823	316-34-57.309
649	128+134.168	8,508,230.141	93,850.450	1,300		1,300	315.923	316-34-57.309
650	128+450.090	8,508,483.619	93,663.191	0		0	186.920	330-30-23.293
651	128+637.011	8,508,646.317	93,571.166	0	160	300	85.333	330-30-23.291
652	128+722.344	8,508,722.430	93,532.755	300		300	143.049	338-39-18.732
653	128+865.393	8,508,862.855	93,513.807	300	160	0	85.333	5-58-31.793
654	128+950.726	8,508,946.427	93,530.671	0		0	304.969	14-07-27.232
655	129+255.695	8,509,242.177	93,605.091	0	160	-300	85.333	14-07-27.232
656	129+341.028	8,509,325.749	93,621.955	-300		-300	150.322	5-58-31.793
657	129+491.350	8,509,472.915	93,600.278	-300	160	0	85.333	337-15-57.996
658	129+576.684	8,509,548.076	93,560.033	0		0	463.638	329-07-02.556
659	130+040.322	8,509,945.979	93,322.057	0	160	300	85.333	329-07-02.557

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
660	130+125.655	8,510,021.140	93,281.812	300		300	108.407	337-15-57.994
661	130+234.062	8,510,126.450	93,258.693	300	160	0	85.333	357-58-13.148
662	130+319.396	8,510,211.556	93,263.754	0		0	347.175	6-07-08.585
663	130+666.571	8,510,556.753	93,300.761	0	160	-300	85.333	6-07-08.585
664	130+751.904	8,510,641.860	93,305.822	-300		-300	68.182	357-58-13.145
665	130+820.086	8,510,709.141	93,295.718	-300	160	0	85.333	344-56-54.323
666	130+905.420	8,510,789.007	93,265.882	0		0	234.791	336-47-58.883
667	131+140.210	8,511,004.811	93,173.387	1,000		1,000	301.381	336-47-58.883
668	131+441.592	8,511,295.402	93,097.876	0		0	205.865	354-04-03.247
669	131+647.457	8,511,500.165	93,076.599	0	160	-300	85.333	354-04-03.249
670	131+732.790	8,511,584.452	93,063.779	-300		-300	95.907	345-55-07.809
671	131+828.698	8,511,672.203	93,026.097	-300	160	0	85.333	327-36-06.890
672	131+914.031	8,511,739.540	92,973.806	0		0	5.419	319-27-11.469
673	131+919.450	8,511,743.658	92,970.284	0	250	500	125.000	319-27-11.451
674	132+044.450	8,511,841.876	92,893.105	500		500	97.701	326-36-54.551
675	132+142.151	8,511,928.173	92,847.631	500	250	0	125.000	337-48-39.048
676	132+267.151	8,512,047.361	92,810.247	0		0	18.030	344-58-22.158
677	132+285.181	8,512,064.775	92,805.572	0	200	400	100.000	344-58-22.147
678	132+385.181	8,512,162.283	92,783.705	400		400	145.990	352-08-05.251
679	132+531.171	8,512,307.316	92,790.267	400	200	0	100.000	13-02-46.904
680	132+631.171	8,512,402.452	92,820.851	0		0	200.095	20-12-30.006
681	132+831.266	8,512,590.230	92,889.970	0	350	700	175.000	20-12-30.006
682	133+006.266	8,512,751.685	92,957.162	700		700	112.759	27-22-13.108
683	133+119.025	8,512,847.222	93,016.826	700	350	0	175.000	36-35-58.993
684	133+294.025	8,512,978.451	93,132.417	0		0	52.963	43-45-42.098
685	133+346.988	8,513,016.702	93,169.050	0	230	700	75.571	43-45-42.093
686	133+422.560	8,513,070.326	93,222.286	700		700	170.923	46-51-16.184
687	133+593.482	8,513,170.904	93,359.958	700	230	0	75.571	60-50-40.914
688	133+669.054	8,513,205.318	93,427.228	0		0	167.422	63-56-15.002
689	133+836.476	8,513,278.875	93,577.626	0	160	300	85.333	63-56-15.005
690	133+921.809	8,513,312.662	93,655.903	300		300	94.064	72-05-10.441
691	134+015.873	8,513,327.205	93,748.446	300	160	0	85.333	90-03-04.202
692	134+101.207	8,513,319.057	93,833.312	0		0	239.906	98-11-59.642
693	134+341.113	8,513,284.840	94,070.766	0	160	-300	85.333	98-11-59.643
694	134+426.446	8,513,276.692	94,155.632	-300		-300	432.153	90-03-04.203
695	134+858.599	8,513,537.451	94,453.323	-300	160	0	85.333	7-30-57.642
696	134+943.933	8,513,622.652	94,456.422	0		0	184.897	359-22-02.200
697	135+128.830	8,513,807.538	94,454.380	0	160	-230	111.304	359-22-02.202
698	135+240.135	8,513,918.087	94,444.219	-230		-230	61.268	345-30-13.136

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
699	135+301.402	8,513,974.674	94,421.209	-230	160	0	111.304	330-14-28.052
700	135+412.707	8,514,060.945	94,351.340	0		0	683.277	316-22-38.987
701	136+095.983	8,514,555.569	93,879.944	1,000		1,000	307.456	316-22-38.988
702	136+403.439	8,514,806.999	93,705.102	0		0	423.494	333-59-36.290
703	136+826.934	8,515,187.612	93,519.410	-1,000		-1,000	496.362	333-59-36.290
704	137+323.295	8,515,562.705	93,202.136	0		0	306.370	305-33-14.311
705	137+629.665	8,515,740.850	92,952.884	0	160	-230	111.304	305-33-14.311
706	137+740.969	8,515,797.919	92,857.660	-230		-230	106.226	291-41-25.246
707	137+847.196	8,515,813.407	92,753.521	-230	160	0	111.304	265-13-41.152
708	137+958.500	8,515,786.519	92,645.812	0		0	286.970	251-21-52.087
709	138+245.470	8,515,694.818	92,373.887	0	160	230	111.304	251-21-52.086
710	138+356.775	8,515,667.930	92,266.178	230		230	69.161	265-13-41.153
711	138+425.935	8,515,672.548	92,197.432	230	160	0	111.304	282-27-24.649
712	138+537.240	8,515,713.598	92,094.286	0		0	11.790	296-19-13.709
713	138+549.030	8,515,718.825	92,083.718	0	160	-300	85.333	296-19-13.712
714	138+634.363	8,515,752.964	92,005.595	-300		-300	71.357	288-10-18.273
715	138+705.720	8,515,766.984	91,935.799	-300	160	0	85.333	274-32-36.514
716	138+791.054	8,515,765.660	91,850.553	0	160	230	111.304	266-23-41.075
717	138+902.358	8,515,767.624	91,739.555	230		230	97.726	280-15-30.140
718	139+000.084	8,515,804.633	91,649.901	230	160	0	111.304	304-36-11.380
719	139+111.389	8,515,881.538	91,569.839	0		0	60.971	318-28-00.445
720	139+172.360	8,515,927.180	91,529.412	0	160	230	111.304	318-28-00.446
721	139+283.664	8,516,015.940	91,462.734	230		230	28.656	332-19-49.512
722	139+312.320	8,516,042.081	91,451.040	230	160	0	111.304	339-28-07.975
723	139+423.624	8,516,150.949	91,429.313	0		0	133.724	353-19-57.039
724	139+557.349	8,516,283.769	91,413.787	1,400		1,400	318.599	353-19-57.040
725	139+875.948	8,516,601.680	91,412.965	0		0	328.944	6-22-16.866
726	140+204.892	8,516,928.593	91,449.469	0	160	300	85.333	6-22-16.868
727	140+290.225	8,517,012.779	91,462.934	300		300	74.135	14-31-12.304
728	140+364.360	8,517,081.533	91,490.155	300	160	0	85.333	28-40-43.863
729	140+449.694	8,517,152.121	91,537.968	0		0	16.497	36-49-39.296
730	140+466.191	8,517,165.326	91,547.856	0	160	-270	94.815	36-49-39.300
731	140+561.005	8,517,244.305	91,600.082	-270		-270	46.805	26-46-02.709
732	140+607.811	8,517,287.708	91,617.443	-270	160	0	94.815	16-50-06.250
733	140+702.625	8,517,380.918	91,634.092	0		0	332.320	6-46-29.657
734	141+034.945	8,517,710.917	91,673.296	0	170	400	72.250	6-46-29.659
735	141+107.195	8,517,782.348	91,683.970	400		400	85.769	11-56-57.948
736	141+192.964	8,517,863.720	91,710.555	400	170	0	72.250	24-14-05.587
737	141+265.214	8,517,927.675	91,744.110	0		0	14.612	29-24-33.877

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
738	141+279.826	8,517,940.404	91,751.285	0	160	−230	111.304	29−24−33.879
739	141+391.130	8,518,041.189	91,797.834	−230		−230	133.273	15−32−44.815
740	141+524.403	8,518,172.583	91,795.416	−230	160	0	111.304	342−20−44.747
741	141+635.708	8,518,271.587	91,745.191	0	160	230	111.304	328−28−55.684
742	141+747.012	8,518,370.591	91,694.966	230		230	301.675	342−20−44.747
743	142+048.687	8,518,634.316	91,790.543	230	160	0	111.304	57−29−48.085
744	142+159.992	8,518,678.154	91,892.537	0	160	230	111.304	71−21−37.148
745	142+271.296	8,518,705.050	92,000.244	230		230	48.187	85−13−26.211
746	142+319.483	8,518,704.021	92,048.332	230	160	0	111.304	97−13−40.459
747	142+430.787	8,518,672.542	92,154.790	−900		−900	155.190	111−05−29.524
748	142+585.977	8,518,629.424	92,303.670	0		0	75.056	101−12−42.561
749	142+661.034	8,518,614.831	92,377.294	0	160	−230	111.304	101−12−42.560
750	142+772.338	8,518,602.085	92,487.575	−230		−230	330.607	87−20−53.497
751	143+102.945	8,518,811.832	92,706.062	−230	160	0	111.304	4−59−24.134
752	143+214.249	8,518,922.541	92,697.826	0		0	283.104	351−07−35.070
753	143+497.353	8,519,202.257	92,654.156	0	160	230	111.304	351−07−35.072
754	143+608.657	8,519,312.966	92,645.919	230		230	87.708	4−59−24.133
755	143+696.365	8,519,396.802	92,669.824	230	160	0	111.304	26−50−21.027
756	143+807.670	8,519,486.520	92,735.208	0		0	8.290	40−42−10.094
757	143+815.960	8,519,492.804	92,740.615	−900		−900	246.022	40−42−10.091
758	144+061.982	8,519,698.792	92,873.730	0		0	20.485	25−02−26.082
759	144+082.467	8,519,717.352	92,882.400	0	200	400	100.000	25−02−26.091
760	144+182.467	8,519,806.049	92,928.431	400		400	164.630	32−12−09.192
761	144+347.097	8,519,923.654	93,041.974	400	200	0	100.000	55−47−02.686
762	144+447.097	8,519,972.772	93,128.999	0		0	8.858	62−56−45.776
763	144+455.954	8,519,976.801	93,136.888	0	180	−450	72.000	62−56−45.788
764	144+527.954	8,520,011.237	93,200.096	−450		−450	220.931	58−21−44.603
765	144+748.885	8,520,167.779	93,352.845	−450	180	0	72.000	30−13−57.323
766	144+820.885	8,520,231.812	93,385.721	0		0	486.769	25−38−56.139
767	145+307.654	8,520,670.616	93,596.422	1,300		1,300	397.067	25−38−56.140
768	145+704.721	8,520,996.973	93,819.875	0		0	23.642	43−08−56.900
769	145+728.364	8,521,014.222	93,836.044	0	160	−230	111.304	43−08−56.902
770	145+839.668	8,521,101.067	93,905.198	−230		−230	285.357	29−17−07.837
771	146+125.025	8,521,366.878	93,876.052	−230	160	0	111.304	318−11−58.392
772	146+236.330	8,521,436.674	93,789.722	0	160	230	111.304	304−20−09.328
773	146+347.634	8,521,506.470	93,703.392	230		230	51.630	318−11−58.393
774	146+399.264	8,521,548.482	93,673.569	230	160	0	111.304	331−03−40.218
775	146+510.568	8,521,653.004	93,636.157	0		0	426.103	344−55−29.284
776	146+936.672	8,522,064.443	93,525.334	0	160	230	111.304	344−55−29.283

No	Station	Xcoordinates	Ycoordinates	Beginning of Radius	Parameter	End of Radius	Length	Chord Angle
777	147+047.976	8,522,173.614	93,505.186	230		230	80.239	358−47−18.349
778	147+128.215	8,522,252.511	93,517.375	230	160	0	111.304	18−46−36.965
779	147+239.519	8,522,350.511	93,569.531	0		0	1.202	32−38−25.968
780	147+240.721	8,522,351.524	93,570.179	−1,200		−1,200	157.073	32−38−26.030
781	147+397.794	8,522,488.950	93,646.013					25−08−27.140

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