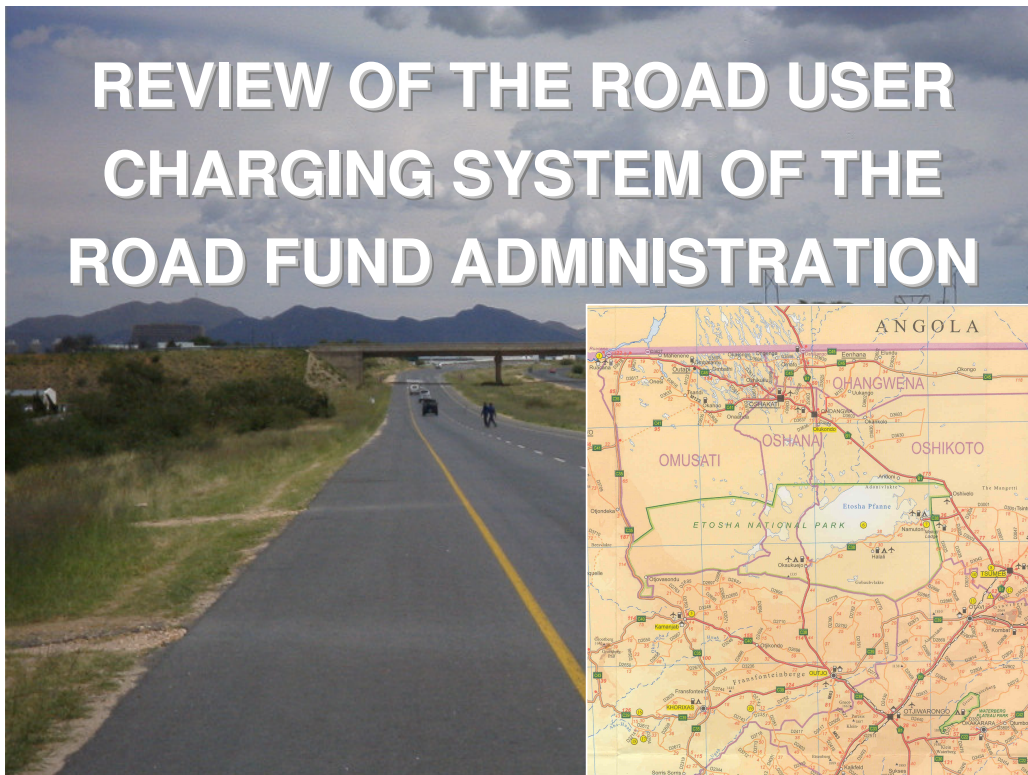




REVIEW OF THE ROAD USER CHARGING SYSTEM OF THE ROAD FUND ADMINISTRATION



PART B: STUDY ON MACRO-ECONOMIC IMPACTS OF ECONOMIC EFFICIENCY IN THE ROAD SECTOR

PHASE 1: REVIEW OF ROAD SECTOR

FINAL REPORT

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EXECUTIVE SUMMARY

The purpose of this report is to provide the findings of Phase 1: Review of the Road Sector, of Part B: Study on Macro-Economic Impacts of Economic Efficiency in the Road Sector, which forms part of the overall Road User Charges Review Study for the Roads Fund Administration.

The study was aimed at reviewing the road sector in terms of the following:

- Underlying road network development- and master plans within the road sector;
- Status of the current road network;
- Current road network investment;
- A review of the *Medium to Long Term Roads Master Plan*, and
- Maintenance and investment needs.

National- and transport network planning in Namibia is subjected to several development- and master plans that have been initiated, following the need for the development and maintenance of the road network. These include the following:

- National Development Plan (NDP 1&2);
- National Transportation Master Plan Study;
- Regional Road Master Plans;
- National Transport Development Plan;
- Medium to Long Term Roads Master Plan (MLTRMP).

The *National Development Plan* is an integrated strategic study, consisting of long and medium term development perspectives and focussing on sectoral development, while balancing economic development and socio-environmental demands and constraints.

The emphasis of the *National Transportation Master Plan Study* was on national transport infrastructure maintenance and development in the road, railway and air transport sectors, with the main purpose of the Study the formulation of a master plan for the development of the road- and rail network, as well as for airports. The aim was furthermore to provide the Government of Namibia and its affiliated agencies with guidance to the programmes and projects needed in order to comply with the agreed goals and strategies for transport infrastructure for the period up to the year 2012.

One of the main areas lacking in road network development and planning in Namibia is the northern regional parts of the country. For the purpose of addressing this matter, *Regional Roads Master Plans* have been drafted specifically for these regions, where the absence of adequate rural access is a primary limiting factor in social, agricultural and other economic development, and have formed the basic action plan for road infrastructure development in the northern regions for the past ten years. The focus of these plans was to establish an effective road infrastructure that would meet the existing and projected future transportation needs, and more importantly, to stimulate development. Rural access road projects were identified through community participation processes, consultation with local, regional and national authorities, review of previous studies and by applying sound engineering judgement (e.g. providing linkages to rural settlements/service centers from the higher order road network).

The *National Transport Development Plan* defines the main orientation for the future development of the transport system in Namibia, and states that the Namibian Transport system should contribute towards (1) the promotion of sustainable economic development, (2) supporting balanced social development and (3) contributing towards the alleviation of poverty. Two main directions for future strategic development within the transport sector were also identified, namely (1) regional development within Namibia, which should concentrate on projects of national or regional interest, and (2) the development of international transport corridors with Namibia as the western entry / exit gate (through the port of Walvis Bay as well as the possible new port at Cape Fria).

The *Medium to Long Term Roads Master Plan* was the first effort to determine in an economically efficient and disaggregated way the investment that is needed on a project and programme basis, in line with the supporting legislation, and was developed with the aim of achieving the following objectives:

- Address the backlog in road preservation in Namibia;
- Long-term sustainability concerning the levels and levying of road user charges;
- Expand the strategic planning horizon to a period of between 10 and 15 years;
- Integration of development and maintenance project management and funding in one package, for project analyses and for road network asset management;
- Provide in parallel for funding of projects in the development portion of the budget and funding of capital projects under Section 16(4) of the RA Act.
- Enable the RA to meet its obligations in terms of the enabling legislation and agreements with the RFA and the responsible Minister.
- Optimal economic benefits while meeting the social or development needs of Namibia in a responsible manner.

The MLTRMP furthermore aims at providing the Roads Authority (RA) and the Road Fund Administration (RFA) with a medium to long term view of road projects, programmes and funding needs, based on a robust and integrated analysis.

The MLTRMP was developed with the aim of establishing a procedure for identifying economically efficient projects or programmes, by referring to a master plan to be implemented over the medium to longer term. The MLTRMP furthermore aims to determine the extent of the level of RUC instruments, to sufficiently make provision for the maintenance requirements of the MLTRMP, and addresses the following elements:

- A framework for analysis and scenarios adopted in the development of the MLTRMP
- The MLTRMP for the paved and unpaved road network in Namibia, analysed for various scenarios and spanning a period of 20 years
- A Rural Areas Roads Development Policy (summarised in this document but presented in Volume 3 of the project documentation)
- A Rural Access Roads Development Programme (RARDP), based on the policy above and synthesising information from the various Regional Roads Master Plans (RRMPs) that were developed for various regions in Namibia (summarised in this document but presented in Volume 3 of the project documentation). This programme has also been included in the MLTRMP
- The overall funding requirements for the various scenarios that were analysed and its projected impact on the road user charging system over the next twenty years.

The major step in the process of developing a *MLTRMP* consisted of the modelling of the paved as well as unpaved road network. Various scenarios were analysed for these purposes.

With regard to the status of the current road network, Namibia's national road network can be categorised and summarised as follows:

Road Class	Road Surface (length in km)					Total
	Bitumen	Gravel	Earth	Salt	Proclaimed only	
Trunk	3 956	149	0	0	0	4 105
Main	1 410	9 586	299	75	0	11 370
District	110	14 562	11 946	145	746	27 508
Total	5 477	24 296	12 245	220	746	42 983

Source: RMS

The major part of the above national road network (85%) is characterised by low Annual Average Daily Traffic (AADT) figures, ranging between 0 and 100.

With regard to the age of the paved road network in Namibia, 64% of the bituminous surfacing on the road network is more than 10 years old, and 39% is older than 15 years. The major part of paved roads (93%) is in a fair to very good condition, with only a very small portion of paved roads (7%) in a poor condition.

With regard to road network investment, the total 5-year budgeted expenditure for the item "Management of the national road network" is approximately N\$ 3.707 billion, or N\$ 741 million per year on average. The revenue for the Road Fund is obtained from road user charges, loans, Government appropriations, bonds and donor grants.

With regard to maintenance and investment needs, the *MLTRMP* determined the following medium- to long term rehabilitation and maintenance needs under a scenario that will minimize total transport costs (road agency as well as road user costs):

- Paved network: N\$334 million per annum
- Unpaved network: N\$306 million per annum

The above implies a total annual average investment of N\$640 million per annum.

Based on the above review, it is evident that sustainable and sufficient funding is required for the sustainable maintenance of the Namibian road network.

When taking into consideration that analysis of the current recovery from domestic road users in the form of road user charges, as based on the current charge levels, with the NAMRUC Model, indicated that there is currently an under-recovery of N\$ 422.8 million, it is evident that the current road user charging system plays a significant role in ensuring that such funds are obtained.

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1. INTRODUCTION

1.1 BACKGROUND

During June 2003 Africon Namibia was appointed to conduct a review study of the current Road User Charges (RUC) System, with the main purpose of investigating and determining whether current revenue levels are sufficient and adequate and also whether the current RUC System adheres to the principles of equity and efficiency.

The study consisted of a *Study on the Macro-Economic Impacts of Economic Efficiency in the Road Sector (MIEERS)*, and a *Review of the Road User Charges*. This document represents Phase 1: Review of Road Sector, of the MIEERS Study.

1.2 PURPOSE OF THIS DOCUMENT

This report should be viewed as supplementary to the Draft Version 1.0 of the RUC Policy Document, Revised NAMRUC Model & RUC Strategy which also incorporated most aspects of the MIEERS Report, and which was submitted on 16 March 2004.

The purpose of this report is to deal with the Review of the Road Sector, which is a separate phase of the broader MIEERS study.

1.3 OUTLINE OF DOCUMENT

In order to address the above-mentioned purpose, the remainder of this report is structured as follows:

- Section 2 deals with the underlying development- and master plans pertaining to the road network;
- Section 3 provides an overview of the road sector, in terms of the status of the current road network and current road network investment;
- Section 4 deals with maintenance and investment needs;
- Section 5 concludes this report.

2. UNDERLYING ROAD NETWORK DEVELOPMENT- AND MASTER PLANS

2.1 INTRODUCTION

National and transport network planning in Namibia is directed to some extent by several development- and master plans that have been initiated following the need for the development and maintenance of the road network. These include the following:

- National Development Plan (NDP 1&2)
- National Transportation Master Plan Study
- Regional Road Master Plans
- National Transport Development Plan

The following section provides a brief overview of the above development- and masterplans.

2.1.1 National Development Plans (NDP 1&2)

The National Development Plan for Namibia is an integrated strategic study, consisting of long and medium term development perspectives and focussing on sectoral development, while balancing economic development and socio-environmental demands and constraints. The implementation of the NDP1 ended during the financial year 1999/2000. The NDP2 was prepared soon after completing the execution of the NDP1 and was launched during 2002. In terms of the NDP, the stated mission of the transport sector is to:

“contribute to national sustainable development through co-ordinated provision of transport services that are equitably distributed across regions and people, are environmentally friendly, and contribute to economic growth, employment creation, poverty alleviation and reduction of income inequalities in a safe, efficient, effective, reliable and affordable manner in partnership with the relevant stakeholders.”

In terms of the NDP, the goals and strategies with regard to the development of transport infrastructure include the following relevant statements:

- Provide **the regions with adequate access to transport infrastructure** to satisfy present needs and to stimulate local development.
- Development of the road network by providing, maintaining and improving **all roads**, including primary, secondary, tertiary and urban roads.
- The main focus of NDP2 will be on **maintenance and improvement. Construction of new roads will be mainly focused on previously neglected areas.**
- Funding of road projects, which do not qualify for funding from the Road Fund, such as social and strategic roads, will be sought from various other sources, mainly allocations by Government and Donor contributions.

2.1.2 National Transportation Master Plan Study (NTMPS)

During September 1998, the *National Transportation Master Plan Study* for the Government of the Republic of Namibia, through the MWTC, was completed. The main purpose of the Study was to formulate a master plan for the development of the road- and rail network, as well as for airports, and to give the Government of Namibia and its affiliated agencies guidance to the programmes and projects needed in order to comply with the agreed goals and strategies for transport infrastructure for the period up to the year 2012. The emphasis of the *National Transportation Master Plan Study* was on national transport infrastructure maintenance and development in the road, railway and air transport sectors.

Volume 2 of the NTMPS recognised that road funding will be based on commercially driven principles. New roads, road improvements and road maintenance would use revenues raised through road user charges and such works would be economically justifiable through the benefits they bring to the road user. The revenues raised from road users will be the major source of funding for roads, although parliamentary appropriations deposited into the Road Fund will also be required.

The NTMPS also recognises that certain roads would not be economically justified using conventional analyses due to lack of traffic. Such roads mainly occur in the under developed rural areas. Possible funding sources and the need for a policy on the provision of this type of road are implied in the NTMPS. This is particularly the case where national goals such as socio-economic upliftment form the basis for the identification of road projects.

2.1.3 Regional Road Master Plans (RRMS)

Although Namibia has a very good developed road network, one of the main areas lacking in road network development and planning is the northern regional parts of the country. For this reason, Regional Roads Master Plans have been drafted specifically for the northern regions of Namibia, where the absence of adequate rural access is a primary limiting factor in social, agricultural and other economic development, and have formed the basic action plan for road infrastructure development in the northern regions for the past ten years.

The focus of these plans was to establish an effective road infrastructure that would meet the existing and projected future transportation needs, and more importantly, to stimulate development. Rural access road projects were identified through community participation processes, consultation with local, regional and national authorities, review of previous studies and by applying sound engineering judgement (e.g. providing linkages to rural settlements/service centers from the higher order road network).

Seven of Namibia's thirteen regions, namely Kunene, Omusati, Oshana, Ohangwena, Oshikoto, Kavango and Caprivi, have been dealt with extensively, with only the commercial areas, urban areas and national parks being excluded from the study areas. An additional three regions, namely Erongo, Otjozondjupa and Omaheke, have been dealt with partially, with numerous regional council constituencies having been excluded from the study areas. The regions of Khomas, Hardap and Karas have not been addressed at all. Furthermore, the Master Plan for Roads in the Herero Region (Otjozondjupa and Omaheke regions) was drafted during 1992, updated during 1994 and is outdated. The remaining plans were drafted fairly recently, dating back to 1998.

The RA has however secured funding from the *Kreditanstalt fuer Wiederaufbau* (KfW) for the update of five of the regional master plans, namely:

- Kavango;
- Oshikoto;
- Ohangwena;
- Omusati; and
- Oshana.

It is believed that the update of these master plans will commence in July 2004 and will be finished during January 2005.

2.1.4 National Transport Development Plan

The aim of the Government with regard to regional integration and development can be divided in 2 main parts, namely (a) inter-regional links (the majority of inter-regional links are road projects and includes all individual projects, which may be seen primarily as components of corridor development) and (b) intra-regional links (required as access roads to various social services, including schools, clinics and shops).

In the National Transport Development Plan, which was completed in September 2000, the main orientation for the future development of the transport system in Namibia was defined. The Namibian Transport system should contribute towards:

- Promoting sustainable economic development;
- Supporting balanced social development;
- Contributing towards the alleviation of poverty.

In the development plan, two main directions for future strategic development within the transport sector were identified. These are:

- Regional development within Namibia, which should concentrate on projects of national or regional interest;
- The development of international transport corridors with Namibia as the western entry / exit gate (through the port of Walvis Bay as well as the possible new port at Cape Fria).

The *Medium to Long Term Roads Master Plan* is addressed separately in Section 4 of this report.

2.2 CONCLUSION

This section dealt with the underlying road network development- and master plans, which was developed as a result of the need for the continuous development and maintenance of the Namibian road network.

3. REVIEW OF ROAD SECTOR

3.1 INTRODUCTION

The purpose of this section is to provide a review of the Namibian road sector, with a focus on the status quo of the current road network and also investment in the road network. The section furthermore provides an overview of the Namibian road network in terms of infrastructure, accessibility and regional development and will also address investment in the road sector.

3.1.1 Status of Current Road Network

3.1.1.1 Road Network Description

In terms of the Roads Ordinance, 1972 (No 17 of 1972), the following three road categories of national roads are defined:

- **Trunk Roads:** A proclaimed road that is or will be part of the road system connecting Namibia as a whole with surrounding territories.
- **Main Roads:** A proclaimed road that connects or will connect important centres within Namibia.
- **District Roads:** A proclaimed road that carries or will carry a reasonable amount of traffic.

Farm roads are also proclaimed roads, but they do not form part of the national road network.

The total length of proclaimed roads in Namibia covers approximately 66 279 km. This includes 23 295 km of farm roads (Caprivi and Kavango Roads Master Plan). All farm roads are unpaved. The total length of the national road network is 42 983 km. This includes 746 km of roads that have been proclaimed only, but not yet constructed. The following table summarises the national road network in Namibia.

Table 3-1: Namibia National Road Network

Road Class	Road Surface (length in km)					Total
	Bitumen	Gravel	Earth	Salt	Proclaimed only	
Trunk	3 956	149	0	0	0	4 105
Main	1 410	9 586	299	75	0	11 370
District	110	14 562	11 946	145	746	27 508
Total	5 477	24 296	12 245	220	746	42 983

Source: RMS

Based on Table 3-1, the following comments can be made regarding the national road network in Namibia:

- The national road network represents 65% of the total proclaimed road length in Namibia;
- Trunk roads and main roads contribute about 36% of the national road network;
- Bitumen roads contribute 13% of the national road network;
- More than 50% of the national road network are gravel roads.

3.1.1.2 Road Network per Region

Namibia has 13 regions, which are indicated in the table below. The table below also indicates the national road network per region.

Table 3-2: National Road Network (km) per Region

Region	Trunk Road	Main Road	District Road	Total
Caprivi	191	187	258	636
Erongo	384	850	2 441	3 675
Hardap	350	2 171	4 075	6 596
Karas	938	1 754	4 853	7 545
Khomas	233	1 033	1 549	2 815
Kunene	24	1 378	3 211	4 613
Ohangwena	32	283	219	534
Okavango	520	200	967	1 687
Omaheke	365	1 222	3 467	5 054
Omusati	0	595	447	1 043
Oshana	32	79	185	296
Oshikoto	274	168	831	1 273
Otjozondjupa	762	1 449	5 006	7 217
TOTAL	4 105	11 370	27 508	42 983

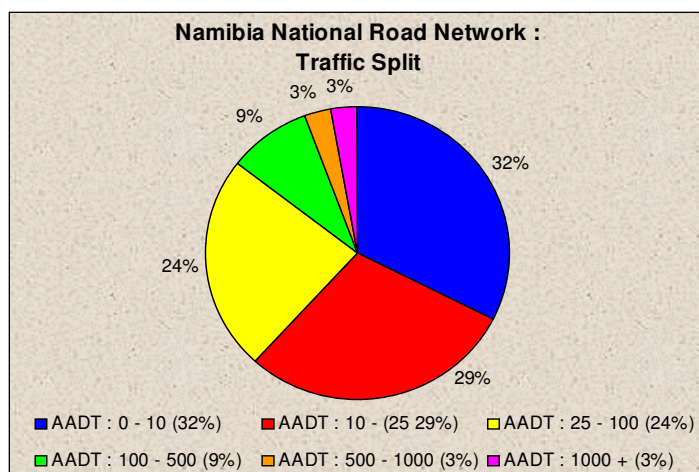
Based on the above table, the following comments can be made:

- Otjozondjupa and Karas are the regions with the longest road network (farm roads excluded). Both regions have more than 7000 km of roads.
- Oshana and Ohangwena are the regions with the shortest road network in Namibia.
- In all regions the trunk road network comprises more than 50% of the region's roads, apart from Omusati, Ohangwena and Caprivi.

3.1.1.3 Road Usage

The following figure indicates the road usage on the Namibia national road network.

Figure 3-1: Traffic Split on Namibia National Road Network



Source: RMS

Based on Figure 3-1, the following conclusions can be made:

- The major part of Namibia's national road network (85%) is characterised by low Annual Average Daily Traffic (AADT) figures, ranging between 0 and 100.
- Only 15% of the national road network has AADT figures in excess of 100 vehicles per day.

3.1.1.4 Road Condition

The discussion on the road condition in Namibia is based on a summary report by the RMS section, Namibia Roads Authority, titled "Pavement Management System: Current Situation and Estimated Stable Funding Requirement (Summary)", October 2001.

The highlights of this report, in particular the age of the road network, the condition of the surfaced road network, and funding requirements, will be discussed in the next sections.

3.1.1.4.1 Age of Paved Road Network

Road pavements are normally designed for a life of 20 years. The largest portion of the total paved road network in Namibia (76%) is more than 20 years old.

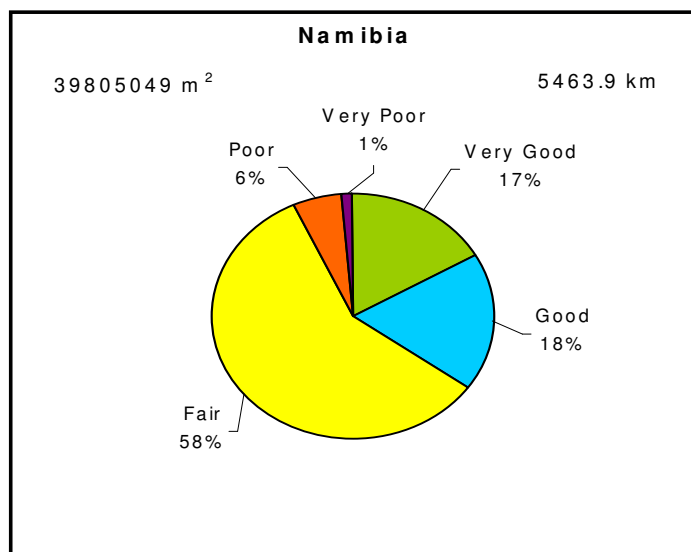
Due to the dry conditions, good road building materials and relative light traffic loads, the expected life of the road network can be extended with timeous routine maintenance (e.g. crack sealing, patching), and periodic maintenance (reseal). However, 206km of paved road in Namibia can be described as "Poor" and "Very Poor", and requires immediate structural rehabilitation. A further 497km is considered to be requiring attention within the next 5 years.

In Namibia, 64% of the bituminous surfacing on the road network is more than 10 years old, and 39% is older than 15 years.

3.1.1.4.2 Condition of Paved Road Network

The following figure indicates the condition of paved roads in Namibia.

Figure 3-2: Paved Road Condition



Source: RMS

From the above figure the following can be concluded:

- The major part of paved roads (93%) is in a fair to very good condition.
- Only a very small portion of paved roads (7%) is in a poor condition.

3.1.1.5 Network Performance

The following comments can be made with regard to Namibia's road network performance:

- The percentage of pavements classified as having a very good structural condition, decreased from about 45% (approximately 2400 km) during 1991, to about 30% (approximately 1650 km) during 2001.
- The percentage of pavements classified as having a poor or very poor structural condition, increased from about 0% during 1991 to about 5% (approximately 270 km) during 2001.
- The percentage of bituminous surfacing classified as being in a very good condition, decreased constantly since 1991. The percentage of surfacing in a good condition, however, increased slightly during 1996 and 1997, probably due to maintenance activities.

3.1.1.6 Development of Road Network

The SADC Regional Trunk Road Network in Namibia consists of 39 roads with a total distance of 3,365 km. The average age of the road network since upgrading/intervention is 21.92 years. Namibia's road network compare well against other SADC countries in terms of the total length of the existing road infrastructure and the condition of the road network. Comparison of kilometre

roads per 1000 of population with other countries however shows that Namibia is an extreme outlier with 34,2 km of roads per 1000 of population compared to an average of 4,2 km of roads per 1000 of population. This can be attributed mainly due to the size of Namibia and the sparseness of its population.

Although the existing road network is in a good condition, there is however a need for infrastructure development in rural areas, especially in the northern regions, as well as for infrastructure linkages with neighbouring countries. To address this, several development- and planning studies have been formulated, which are aimed at focussing on the development of rural accessibility, also in the more remote northern regions, as well as on improving and linking Namibia with its neighbouring countries. These include the Regional Roads Master Plans, Rural Access Roads Development Programme, the Walvis Bay – Trans-Kalahari – Maputo Corridor, Walvis Bay Trans-Capri – Lubumbashi Corridor, Walvis Bay – Angola Corridor, Trans-Kalahari – Angola link, Trans-Capri – Angola link, North - South Corridor and the Lüderitz Export Corridor.

3.1.2 Overview of Current Road Network Investment

The information on fund allocations was gathered from the **Road Fund Administration's 5-year Budget for the period 1 April 2002 until 31 March 2007**. The revenue for the Road Fund is obtained from road user charges, loans, Government appropriations, bonds and donor grants. The budgeted expenditure is indicated in Table 4.

Table 3-3: Budgeted Expenditure: April 2003 until March 2008 (N\$)

SUMMARY OF BUDGETED EXPENDITURE						
BUDGET ITEM	5-Year Total	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Management of national road network *	3 706 687 862	679 772 353	903 615 000	803 056 320	650 872 310	669 371 879
Administrative expenditure of the RFA	109 076 500	16 000 000	20 900 000	30 250 000	19 965 000	21 961 500
Local Authorities - Road maintenance	183 153 000	30 000 000	33 000 000	36 300 000	39 930 000	43 923 000
Traffic information systems (NATIS)	183 193 438	30 040 438	33 000 000	36 300 000	39 930 000	43 923 000
Traffic law enforcement/overload	131 331 094	19 018 894	24 200 000	26 620 000	29 282 000	32 210 200
Loan repayments (Government loans)	-	-	-	-	-	-
Loan / Bond repayments (RFA bonds)	364 000 000	39 000 000	65 000 000	87 750 000	92 300 000	79 950 000
Bond interest (RFA bonds)	-	-	-	-	-	-
TOTAL EXPENDITURE BUDGETED	4 677 441 894	813 831 685	1 079 715 000	1 020 276 320	872 279 310	891 339 579

Note: * See Table 3-4 for a further breakdown.

Source: RFA 5-year Business Plan - April 2003 - March 2008

The total 5-year budgeted expenditure for the item "Management of the national road network" is approximately N\$ 3.707 billion, or N\$ 741 million per year on average.

Table 3-4: Breakdown of Budget Item: Management of the National Road Network (N\$)

BREAKDOWN OF BUDGET ITEM: MANAGEMENT OF THE NATIONAL ROAD NETWORK						
BUDGET ITEM	5-Year Total	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Administration Costs of the RA	453 289 853	84 388 353	108 570 000	78 650 000	86 515 000	95 166 500
Network Planning & Compensation	29 294 480	4 790 000	5 280 000	5 808 000	6 388 800	7 027 680
Rehabilitation – Ongoing	488 641 720	130 615 000	209 642 000	112 421 100	35 963 620	-
Rehabilitation – New	13 835 000	3 000 000	9 625 000	1 210 000	-	-
Development - Ongoing *	52 680 300	18 500 000	20 350 000	13 431 000	399 300	-
Development – New	275 110 000	35 800 000	118 200 000	121 110 000	-	-
Labour-based Works - Ongoing	45 582 700	24 829 000	7 722 000	7 042 200	5 989 500	-
Labour-based Works - New	37 357 949	900 000	7 821 000	4 068 020	11 699 490	12 869 439
Project Planning	12 773 160	2 900 000	2 255 000	3 146 000	2 129 600	2 342 560
Maintenance	2 256 137 000	367 250 000	407 000 000	447 700 000	492 470 000	541 717 000
Road Management System	41 985 700	6 800 000	7 150 000	8 470 000	9 317 000	10248700
Functions assigned by Minister	-	-	-	-	-	-
TOTAL EXPENDITURE BUDGETED	3 706 687 862	679 772 353	903 615 000	803 056 320	650 872 310	669 371 879

Note: * Mainly funding for weighbridges.

Source: RFA 5-year Business Plan for the period 1 April 2003 until 31 March 2008

3.2 CONCLUSION

In this section, a review of the road sector was supplied in terms of the status of the current road network, as well as current road network investment. The review indicated that, although the existing road network of Namibia is in fairly good condition, there is however a need for infrastructure development in rural areas, especially in the northern regions of the country, as well as for infrastructure linkages with neighbouring countries.

A review of budgeted expenditure for the national road network was also presented, and indicated that the total 5-year budgeted expenditure for the item *Management of the National Road Network* is approximately N\$ 3.707 billion, or N\$ 741 million per year on average.

4. REVIEW OF MLTRMP

4.1 INTRODUCTION

This section is aimed at providing an overview of the *MLTRMP*, and addresses the following aspects:

- Background to the *MLTRMP*;
- Approach followed for development of the *MLTRMP*;
- Institutional and legal framework underpinning the development of the *MLTRMP*;
- Interface of the *MLTRMP* with the Section 19(2) Rules and Principles of the RFA Act.

4.2 BACKGROUND

In the middle of 2001 Africon Namibia was appointed by the Roads Authority (RA) to develop a Medium to Long Term Roads Master Plan for Namibia, with the aim of achieving the following objectives:

- Address the backlog in road preservation in Namibia;
- Long-term sustainability concerning the levels and levying of road user charges;
- Expand the strategic planning horizon to a period of between 10 and 15 years;
- Integration of development and maintenance project management and funding in one package, for project analyses and for road network asset management;
- Provide in parallel for funding of projects in the development portion of the budget and funding of capital projects under Section 16(4) of the RA Act.
- Enable the RA to meet its obligations in terms of the enabling legislation and agreements with the RFA and the responsible Minister.
- Optimal economic benefits while meeting the social or development needs of Namibia in a responsible manner.

The *MLTRMP* was developed with the aim of establishing a procedure for identifying economically efficient projects or programmes, by referring to a master plan to be implemented over the medium to longer term. The *MLTRMP* furthermore aims to determine the extent of the level of RUC instruments, to sufficiently make provision for the maintenance requirements of the *MLTRMP*, and addresses the following elements:

- A framework for analysis and scenarios adopted in the development of the *MLTRMP*
- The *MLTRMP* for the paved and unpaved road network in Namibia, analysed for various scenarios and spanning a period of 20 years
- A Rural Areas Roads Development Policy (summarised in this document but presented in Volume 3 of the project documentation)
- A Rural Access Roads Development Programme (RARDP), based on the policy above and synthesising information from the various Regional Roads Master Plans (RRMPs) that were developed for various regions in Namibia (summarised in this document but presented in Volume 3 of the project documentation). This programme has also been included in the *MLTRMP*
- The overall funding requirements for the various scenarios that were analysed and its projected impact on the road user charging system over the next twenty years.

The MLTRMP is the first effort to determine in an economically efficient and disaggregated way the investment that is needed on a project and programme basis, in line with the supporting legislation and furthermore aims at providing the RA and the RFA with a medium to long term view of road projects, programmes and funding needs, based on a robust and integrated analysis. The major step in this process consisted of the modelling of the paved as well as unpaved road network. Various scenarios were analysed.

The MLTRMP was finalised in November 2003.

4.3 APPROACH FOLLOWED

The approach followed for the development of a MLTRMP was to provide an integrated strategy for the categories of road development, rehabilitation and maintenance for the medium terms, with a long-term view. The components of the strategy consisted of projects and programmes in these respective categories.

The following framework for analysis was adopted for the development of the MLTRMP:

- The MLTRMP for the paved and unpaved road network in Namibia, analysed for various scenarios and spanning a period of 20 years;
- A Rural Areas Roads Development Policy;
- A Rural Access Roads Development Programme (RARDP), based on the policy above and synthesising information from the various Regional Roads Master Plans (RRMPs) that were developed for various regions in Namibia;
- The overall funding needs for the various scenarios that were analysed and its impact on road user charges revenues over the next twenty years.

The approach followed focused on the following 4 phases:

- In Phase 1 an overview was provided with regard to the status quo of roads development in Namibia;
- In Phase 2 policy principles were developed for rural areas access roads, after a legal and development policy overview. During this phase consultation also took place with the RFA, the RA and the Department of Transport (DOT).
- During Phase 3 available information obtained from the Regional Roads Master Plans were synthesised and analysed, and a development programme for these roads were proposed based on common principles.
- The main phase, Phase 4, focused on the development of the MLTRMP and its supporting tools. This phase concentrated on three main tasks namely (a) the determination of the framework for future analysis of projects and programmes, including an evaluation of current systems and procedures, (b) the development of the Master Plan, by means of data collection, synthesis and compilation, an economic evaluation, sensitivity and scenario analysis, which culminated in a comprehensive and integrated strategy for road development, rehabilitation and maintenance, and (c) parallel activities, consisting of a construction industry capacity evaluation, counterpart training and development of a consultation process with stakeholders.

During the preparation of the *MLTRMP* a stakeholder consultation process took place during which the involvement of various role-players was taken into consideration for the planning process.

4.4 LEGAL AND INSTITUTIONAL FRAMEWORK

The following acts and agreements or statements define the roles, functions and responsibilities of parties involved in road financing and provision in Namibia, as well as procedures to be followed when determining investment priorities and budgets. They are the following:

- The Road Fund Administration Act 1999 (No 18 of 1999);
- Section 19(2) Rules and Principles of the RFA Act;
- The Roads Authority Act 1999 (No 17 of 1999);
- Procedures Agreement between the RA and the RFA;
- Performance Statement from the RA to the Minister responsible for Transport.

The above documents are discussed below in more detail.

4.4.1 The Road Fund Administration Act 1999

4.4.1.1 Functions of the RFA

The Road Fund Administration (RFA) was established in terms of the Road Fund Administration Act, 1999 (Act No. 18 of 1999). In terms of section 15 (1) of the Road Fund Administration Act, the functions of the RFA include the following:

- a) *to manage ... the (Road) Fund;*
- b) *to impose ... road user charges, to determine the rates of those charges and to collect the charges;*
- c) *to determine ... the amount of funding to be made available through the road user charging system;*
- d) *to determine ... the manner in which the funding ... shall be allocated;*
- e) *to implement appropriate measures for the effective monitoring of compliance by the Roads Authority ... and by an approved authority...*

4.4.1.2 Road User Charging

The RFA Act of 1999 defines the RUC System as being an independent system to regulate road funding to be based on the principles of economic efficiency and full cost recovery. The system furthermore comprises, in sequential order, the determination of (i) the amount of funding, (ii) the manner of allocation of funds, and (iii) the rates of road user charges.

4.4.1.3 Utilisation of the Road Fund by the RFA

Section 17(1) of the RFA Act stipulates that the RFA shall utilise the Fund to:

- a) defray the cost of the management of the **national road network**;
- b) defray the **administrative expenditure** of the **RFA**;

- c) defray the cost of:
- the planning, construction and maintenance of any **major urban arterial road**;
 - the **traffic related maintenance** in respect of **any road** in any local authority area or any settlement area not being a road which is part of the national road network;
- d) make contributions towards the cost of the operation of any **traffic information system**;
- e) defray the cost of **traffic law enforcement** and adjudication functions including the control of the overloading of vehicles;
- f) make contributions towards the cost of operation of any **vehicle testing station** or **driving testing centre** (subject to the approval of the Minister);
- g) defray the cost of road **research** studies;
- h) defray the expenditure referred to in section 15 of **the National Road Safety Act**, 1972 (Act No. 9 of 1972) by way of transferring to the Central Road Safety Fund;
- i) make payments in respect of capital, interest and incidental costs or charges of any **loan** obtained by the **Government of Namibia** related to the management of the national road network;
- j) make payments in respect of capital, interest and incidental costs or charges of any **loan** obtained by the **Fund**;
- k) establish a **reserve fund**;
- l) make payment for any **compensation** due for any damage arising out of the RA's functions (except where such a damage is due to a deficiency in any standards referred to in section 16(5) of the RA Act);
- m) defray the cost of **insurance** against any claim for damage referred to in paragraph l); and
- n) for any **other expenditure** related to the achievement of the objects of the RFA Act as approved by the Minister.

In terms of Section 17(1)(c)(ii) of the RFA Act and Section 17(2) of the RFA Act, the RFA has an obligation regarding the funds made available for the traffic related maintenance of any road that is part of the national road network, which can include rural access roads.

4.4.2 Section 19(2) Rules and Principles of the RFA Act

Section 20 of the RFA Act stipulates that “...*the Roads Authority and every approved authority which requires funding from the (Road) Fund, shall submit to the (Road Fund) Administration... a budget in respect of the ensuing financial year and each of the following four financial years following thereafter.*”

Section 19 (2) of the RFA Act provides for Rules and Principles to be determined by the RFA that should be followed by the RA and every approved authority in proposing new projects and programmes or administrative expenditure.

Section 20(1) of the RFA Act stipulates that the RA and every approved authority which require funding from the Fund, shall submit a budget for the ensuing financial year as well as for the four years following thereafter to the RFA. Section 20(2) stipulates that the budget referred to in section 20(1) shall be prepared in accordance with the Rules and Principles.

Section 20(6) of the RFA Act stipulates that “*failure by the Roads Authority or any approved authority to comply with any provision of this section, except a failure to comply with the Rules*

and Principles contemplated in section 19(2), shall not prevent the (Road Fund) Administration from making an allocation to it...". Section 20(6) of the RFA Act should thus be interpreted that the non-compliance with economic efficiency as provided in the Rules and Principles can prevent the RFA from making allocations to the RA (or any other approved authority).

It is furthermore the general understanding that all projects, programmes and administrative expenses that comply with the Rules and Principles will qualify for funding from the Road Fund, to the extent that these are approved "in principle" in terms of section 20 (4) (a) of the Act. An actual funding allocation is made in terms of section 20(4)(b) (manner of funding determination) which is subject to the considerations in paragraph 20(4)(b)(i) to (ii) that controls funding allocations, notwithstanding any evaluation as to a particular project's economic viability or compliance with the Rules and Principles.

4.4.3 The Roads Authority Act 1999

4.4.3.1 General

The Roads Authority (RA) was established in terms of the Roads Authority Act, 1999 (Act No. 17 of 1999). Section 16 (1) of the Roads Authority Act stipulates that the Roads Authority "*shall undertake the management of the national road network¹*". Furthermore, section 16 (3) stipulates that the Roads Authority "*shall not itself undertake any work for the construction or maintenance of any road but shall cause such work to be done by any outside contractor...*".

The overall objective of the RA is to manage the national road network with a view to achieving a safe and efficient roads sector.

4.4.3.2 Functions of the RA

In terms of the RA Act, the specific functions of the RA are the following:

- To manage the national road network, including:
 - Planning, design, construction and maintenance of roads which form part of the national road network;
 - Quality control of materials;
 - Supervision of work;
 - Operation of road management systems;
 - Prevention of excessive damage of roads by road users.
- To make recommendations to the Minister regarding the application of the Act.
- To advise and assist the Minister or approved authority on matters regarding planning, design, construction and maintenance of all roads.

A Procedures Agreement between the RA and the RFA contains particulars necessary to enable the Administration to assess whether funds accruing to the Authority are efficiently utilised for the performance of its functions. The Roads Authority is subject to accounting

¹ The national road network is defined in the RA Act as "... consisting of every trunk, main and district road proclaimed in terms of Chapter III of the Roads Ordinance, 1972 (Ordinance 17 of 1972).

principles and must prepare annual reports. This ensures that the management of the RA is done based on sound business principles.

Based on the RA Act, it is apparent that the Roads Authority has an obligation to protect, preserve and manage the national road network of Namibia and to optimise the expenditure of funds.

The stipulation of section 16(4) of the RA Act is as follows: *"The Minister, after consultation with the (Roads) Authority, may give the (Roads) Authority a written direction to undertake any road project or programme which the Minister considers necessary in the national interest for improving accessibility to or within any area in Namibia, and the (Roads) Authority shall comply with a direction so given, but subject to the funding of such project or programme from moneys made available either through an appropriation by Parliament or any other source as may be agreed upon by the Minister, the (Roads) Authority and the (Road Fund) Administration"*.

Section 16(4) of the RA Act can be interpreted as referring to roads that are not part of the national road network and/or not necessarily economically viable in terms of conventional cost benefit analysis but are in the national interest for improving accessibility. This can include roads that can be classified as Rural Access Roads.

4.4.3.3 Conclusion

From the review of the RA Act, the following can be concluded:

- The RA is responsible for the management of the national road network.
- Section 16(4) of the RA Act can be interpreted as referring to roads which are not part of the national road network and/or not necessarily economically viable in terms of the Act, and that are within the national interest.
- The RA could, however, in terms of agreement under section 15(1)(c) of the RA Act, advise the Minister on all road projects in rural areas that do not qualify for funding from the RFA but which should be investigated in terms of a directive issued by the Minister in terms of section 16(4), providing funding is available.

4.4.4 Procedures Agreement between the RA and the RFA

Section 17 of the Roads Authority Act provides for a Procedures Agreement between the RA and the RFA. The first Procedures Agreement was valid for the period from 1 April 2000 until 31 March 2003. The purpose of the Procedures Agreement is for the RFA to obtain particulars about various matters so as to enable the RFA to assess whether funds accruing to the RA will be efficiently utilized to perform its functions, including:

- a) the management and financial systems to be implemented by the RA, and measures to be introduced to ensure:
 - i. compliance with the RFA Rules and Principles contemplated in section 19 (2) of the RFA Act; and
 - ii. the efficient utilisation of the funds allocated to the RA in respect of projects and programmes.

- b) the principles to be applied in budgeting for administrative expenditure, including the cost of acquiring immovable property for administrative purposes;
- c) the procedures to be followed by the RA in the calling for, evaluation of and awarding of tenders, and in the negotiation of agreements; and
- d) any other matter relating to the performance of the RA's functions under the RA Act which the RFA may require.

4.4.5 Performance Statement from the RA to the Minister responsible for Transport.

Section 18 (1) of the RA Act provides for a Performance Statement which will enable the Minister of Works, Transport and Communication to assess the performance of the RA ("the Authority").

The first Performance Statement is valid for a period of three years from 1 April 2000 until 31 March 2003. Section 18 (1) of the RA Act stipulates that the Performance Statement shall include the following particulars:

- a) the Authority's short and medium term operational objectives;*
- b) the general strategy which the Authority intends to employ in order to achieve its objectives;*
- c) the manner in which the Authority will implement the standards and measures prescribed under section 16 (5)²;*
- d) the principles which will be applied by the Authority in relation to its policies of appointment and promotion of staff of the Authority; and*
- e) particulars of any other matter relating to the performance of the Authority's functions under this Act as may be required by the Minister.*

4.5 INTERFACE OF MLTRMP WITH SECTION 19(2) RULES AND PRINCIPLES OF THE RFA ACT

The *MLTRMP* was developed in accordance with Section 19(2) of the RFA Act, which stipulate that the RA and every approved authority in proposing new projects and programmes or administrative expenditure should follow the Rules and Principles as determined by the RFA. The Rules and Principles that is provided for in Section 19(2) of the RFA Act were finalised in October 2002. An overview of the Rules and Principles highlights the following broad aspects:

- Interpretation of "economic efficiency" in relation to the road sector and a project or programme;
- Calculation of economic evaluation criteria;
- Procedure for identifying economically efficient projects or programmes;
- Principle to be applied where economic efficiency is difficult to quantify;
- Amendment of Rules and Principles;
- Amendment of budget determinations;
- Deviation during times of financial constraints.

² Section 16 (5) of the RA Act refers to minimum standards and measures which the Minister of Works, Transport and Communications may describe for the management and maintenance of the national road network. These minimum standards and measures are aimed at *a) achieving a safe road system, b) ensuring compliance with the international obligations of the State, and c) causing the least possible disruption of the environment, but subject to the provisions of any other law.*

These are discussed in more detail below.

4.5.1 Interpretation of “economic efficiency” in relation to the road sector and a project or programme

The meaning of the term “economic efficiency” as it is used for purposes of the road sector, refers to minimisation of total transport costs (e.g. road user costs and agency costs). For purposes of a project or programme, the term “economic efficiency” refers to projects or programmes which are economically viable compared to the base option in terms of the economic evaluation criteria (Net Present Value (NPV), Internal Rate of Return (IRR), the Benefit Cost Ratio (BCR), location on the efficiency frontier and optimised timing).

4.5.2 Calculation of Economic Evaluation Criteria

The RFA Rules and Principles specifically refer to the use of “international best practice” and “appropriate currently validated parameters/variables” when calculating economic evaluation criteria. The RFA Rules and Principles also refer to taking account of “risks or uncertainties” of future parameters/variables. In other words, risk and/or sensitivity analysis needs to be applied when calculating economic evaluation criteria.

4.5.3 Procedure for identifying economically efficient projects or programmes

This section of the RFA Rules and Principles refers to a master plan needed by the RA containing every project or programme to be implemented over the medium to long term. According to the RFA Rules and Principles, the master plan needs to be reviewed at least every three years. This plan is the topic of this report.

Presentation of these projects in tabular form is required, indicating their phasing according to optimal levels of funding as well as within a constrained budget.

4.5.4 Principle to be applied where economic efficiency is difficult to quantify

This section of the RFA Rules and Principles specifically refers to an evaluation of aspects difficult to quantify by a committee.

4.5.5 Amendment of Rules and Principles

The Amendment of Rules and Principles section refers to consultation of the RA as well as other relevant parties if the RFA intends to amend the Rules and Principles. Amendment of the Rules and Principles may apply to any budget proposal of the RA.

4.5.6 Amendment of Budget Determinations

This section stipulates that the RFA may after consultation with the RA or other relevant parties may amend any budget determination if the objective of economic efficiency was not achieved in the most effective way.

4.5.7 Deviation during times of Financial Constraints

This section stipulates that the RFA may deviate from the Rules and Principles after consultation with the RA and the Minister of Finance during times of financial constraints.

4.5.8 Conclusion

From the review of the RFA Act and the Rules and Principles, the following can be concluded:

- The RFA must implement measures for the effective monitoring of compliance by the RA and every other approved authority with the provisions of a Procedures Agreement.
- The RFA has an obligation regarding the funds made available for the traffic related maintenance of any road that is part of the national road network. This can include rural access roads.
- The general understanding is that all projects, programmes and administrative expenses that comply with the Rules and Principles as set out in Section 19(2) of the RFA Act will qualify for funding from the Road Fund, which specifies that the roads must be economically efficient to qualify for funding.
- Section 20(6) of the RFA Act should be interpreted that the non-compliance of the RA with the economic efficiency principle in the Rules and Principles could prevent the RFA from making an allocation to the RA.
- The Rules and Principles as set out in Section 19(2) of the RFA Act refers to economic efficiency of the road sector as the minimisation of total transport costs in line with best international practice.
- The Rules and Principles also determine that a master plan should be considered by the RA for the projects and programmes to be implemented in the medium to long term.

4.6 SCENARIOS ANALYSED FOR MLTRMP

Various scenarios were analysed taking section 19(2) Rules and Principles of the RFA Act into consideration with the view of economic efficiency in terms of minimisation of total transport costs (road user costs and agency costs).

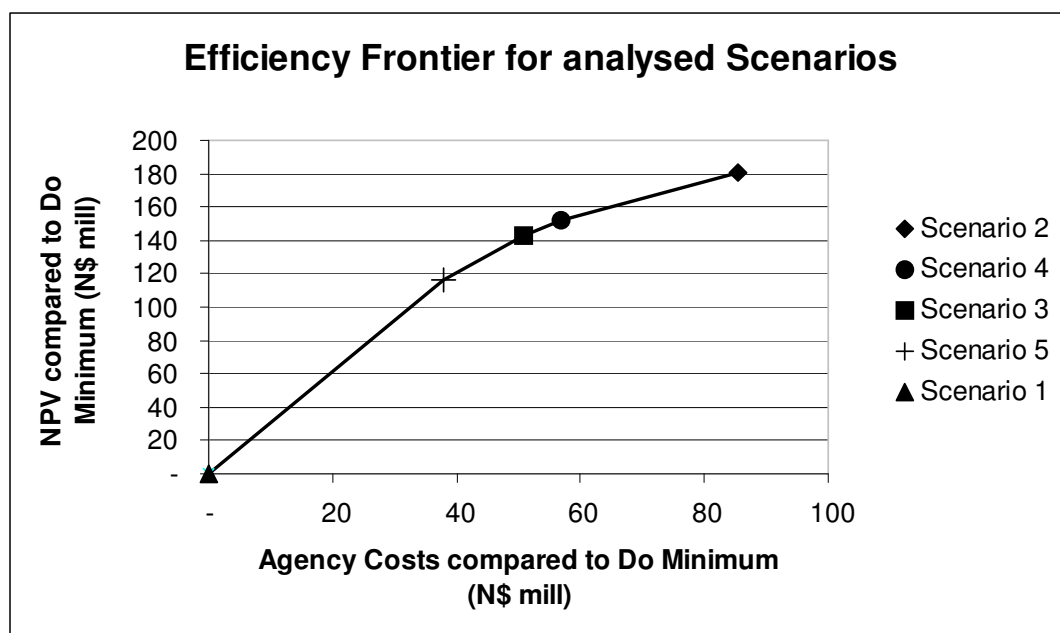
The following scenarios were analysed:

- Scenario 1: Base option (do minimum);
- Scenario 2: Minimised total transport costs (TTC) (total of road user costs and roads agency costs);
- Scenario 3: Maintain current network condition;
- Scenario 4: (Budget constraint: 80% of Minimised TTC);
- Scenario 5 (Budget constraint: 60% of Minimised TTC).

Furthermore, a Scenario 0 (do nothing) was developed for theoretical purposes in order to demonstrate the impact on the road network if no maintenance or rehabilitation is carried out.

The efficiency frontier for all analysed scenarios is shown in Figure 4-1. It should however be noted that roads with traffic levels less than 800 AADT as well as road works already committed in terms of the RA 5-year budget were excluded from the efficiency frontier.

Figure 4-1: Efficiency Frontier for the Analysed Scenarios



Source: Medium to Long Term Roads Master Plan. Version 5.0. November 2003.

From Figure 4-1, it is evident that all analysed scenarios are economically efficient compared to the “Do Minimum Option” (i.e. Scenario 1), as all scenarios are located on the efficiency frontier. Scenario 2 (the minimised total transport costs approach) is the optimal option under unconstrained budget conditions³. In the event of budget constraints, scenarios 3, 4 and 5 are optimal depending on the severity of budget constraints. Against the background of economic efficiency, the MLTRMP proposed that Scenario 2 should be implemented, funding permitting.

4.7 CONCLUSION

This section provided a brief overview of the *Medium to Long Term Roads Master Plan*, in terms of the background, approach followed for developing the *MLTRMP*, the legal and institutional framework required, the interface of the *MLTRMP* with the Section 19(2) Rules and Principles of the RFA Act, and the various scenarios analysed for the *MLTRMP*.

³ According to the incremental net benefit approach Scenario 2 is the most efficient, as it lies the furthest to the right on the efficiency frontier.

5. MAINTENANCE AND INVESTMENT NEEDS

5.1 GENERAL

A regional comparison among SADC countries showed that Namibia has a well-developed road network, which is currently relatively well maintained. The current road network seems adequate for the long term, considering current and future traffic. However, the road network is insufficient in the northern regions, which represent approximately 50% of the population of the country.

Although the majority of Namibia's paved road network is in a fair to good condition, certain important factors are responsible for the slow deterioration of the network pavements. The sparse distribution of the relatively small population has resulted in relatively low traffic volumes on rural and inter-urban roads, which means that the structural loading of the pavements is thus spread over a long time period.

Given the low traffic volumes the condition of paved roads mainly deteriorates as a result of ultra-violet light and extremely high temperatures, resulting in some cracking of paved roads. Low average annual rainfall over large parts of Namibia resulted in very low pavement moisture conditions with associated low pavement deterioration rates.

Many of Namibia's paved roads are older than 20 years, and several are older than 30 years. Continuous "rejuvenation" efforts on the paved road network can be seen as preventative maintenance and will slow down the deterioration process considerably.

5.2 INVESTMENT NEEDS FOR PAVED AND UNPAVED ROADS

A summary report by the RMS section, Namibia Roads Authority, titled *"Pavement Management System: Current Situation and Estimated Stable Funding Requirement (Summary)"*, October 2001, estimates that a minimum of N\$ 115m per annum is required for reseal and rehabilitation to maintain the current bitumen road network condition.

However, higher funding levels for reseal and rehabilitation are required to increase the average remaining life to more than 10 years. The mentioned report estimates that a funding level of N\$ 153m per year will ensure an average remaining life for paved roads in Namibia of 11 years and will eliminate the backlog within 10 years. This amount however is in excess of the 5-year average that was budgeted for rehabilitation of the whole national road network.

Adding an average routine maintenance requirement of N\$ 57m per annum to the funding level of N\$ 153m per year, this brings the total estimated requirement for surfaced roads to N\$ 210m per year.

In the *MLTRMP* that was developed, the following medium- to long term rehabilitation and maintenance needs were determined under a scenario that will minimize total transport costs (road agency as well as road user costs):

- Paved network: N\$334 million per annum

- Unpaved network: N\$306 million per annum

This implies a total annual average investment of N\$640 million per annum.

5.3 ROAD MAINTENANCE NEEDS

With out a comprehensive transport database it is not possible to fully analyse or evaluate long-term effects of different strategies to maintenance standard assessments. For this purposes the RA implemented of a Namibian Road Management System (RMS). The management of the road system falls under the responsibility of the RA's Section: Road Management System, of which the aim is to develop and operate co-ordinated and integrated support tools or systems to facilitate the efficient management of the road network and to provide information on the network to all the stakeholders.

5.4 CONCLUSION

This section provided a brief overview of the maintenance and investment needs. The *MLTRMP* indicated that N\$334 million per annum was needed for medium- to long term rehabilitation and maintenance of the paved road network, and N\$306 million per annum for the unpaved road network.

6. CONCLUSIONS

This report provided the findings of Phase 1: Review of the Road Sector, of Part B: Study on Macro-Economic Impacts of Economic Efficiency in the Road Sector, which forms part of the overall Road User Charges Review Study for the Roads Fund Administration.

The study reviewed the road sector in terms of the following:

- Underlying road network development- and master plans within the road sector;
- Status of the current road network;
- Current road network investment;
- A review of the *Medium to Long Term Roads Master Plan*, and
- Maintenance and investment needs.

With regard to the status of the current road network, Namibia's national road network can be categorised and summarised as follows:

Road Class	Road Surface (length in km)					Total
	Bitumen	Gravel	Earth	Salt	Proclaimed only	
Trunk	3 956	149	0	0	0	4 105
Main	1 410	9 586	299	75	0	11 370
District	110	14 562	11 946	145	746	27 508
Total	5 477	24 296	12 245	220	746	42 983

Source: RMS

With regard to the age of the paved road network in Namibia, 64% of the bituminous surfacing on the road network is more than 10 years old, and 39% is older than 15 years. The major part of paved roads (93%) is in a fair to very good condition, with only a very small portion of paved roads (7%) in a poor condition. The review furthermore indicated that road network development and planning in the northern regions of Namibia is lacking.

With regard to road network investment, the total 5-year budgeted expenditure for the item "Management of the national road network" is approximately N\$ 3.707 billion, or N\$ 741 million per year on average. The revenue for the Road Fund is obtained from road user charges, loans, Government appropriations, bonds and donor grants. With regard to maintenance and investment needs, the *MLTRMP* indicated that N\$334 million per annum is required for the medium- to long term rehabilitation and maintenance needs for the paved road network, and N\$306 million per annum is required for the unpaved road network. This was determined under a scenario that will minimize total transport costs (road agency as well as road user costs).

The review indicated that sustainable and sufficient funding is required for the sustainable maintenance of the Namibian road network, and that the current road user charging system plays a significant role in ensuring that such funds are obtained.

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