Road Management System: experience of Namibia

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RMS –Sub-Division

January 2026

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Global Road Infratech Summit & Expo
5-6 Feb2026 India

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Roads Authority: RMS –Sub-Division

January 2026

Scope of presentation

1. Road Sector Reform in Namibia and governance
2. Road Management System introduction
3. Role of RMS in Management of the Road Network in the context of the Road Sector Reform
4. Funding requirements and impacts
5. Learnings in the success of RMS implementation in the past four decades

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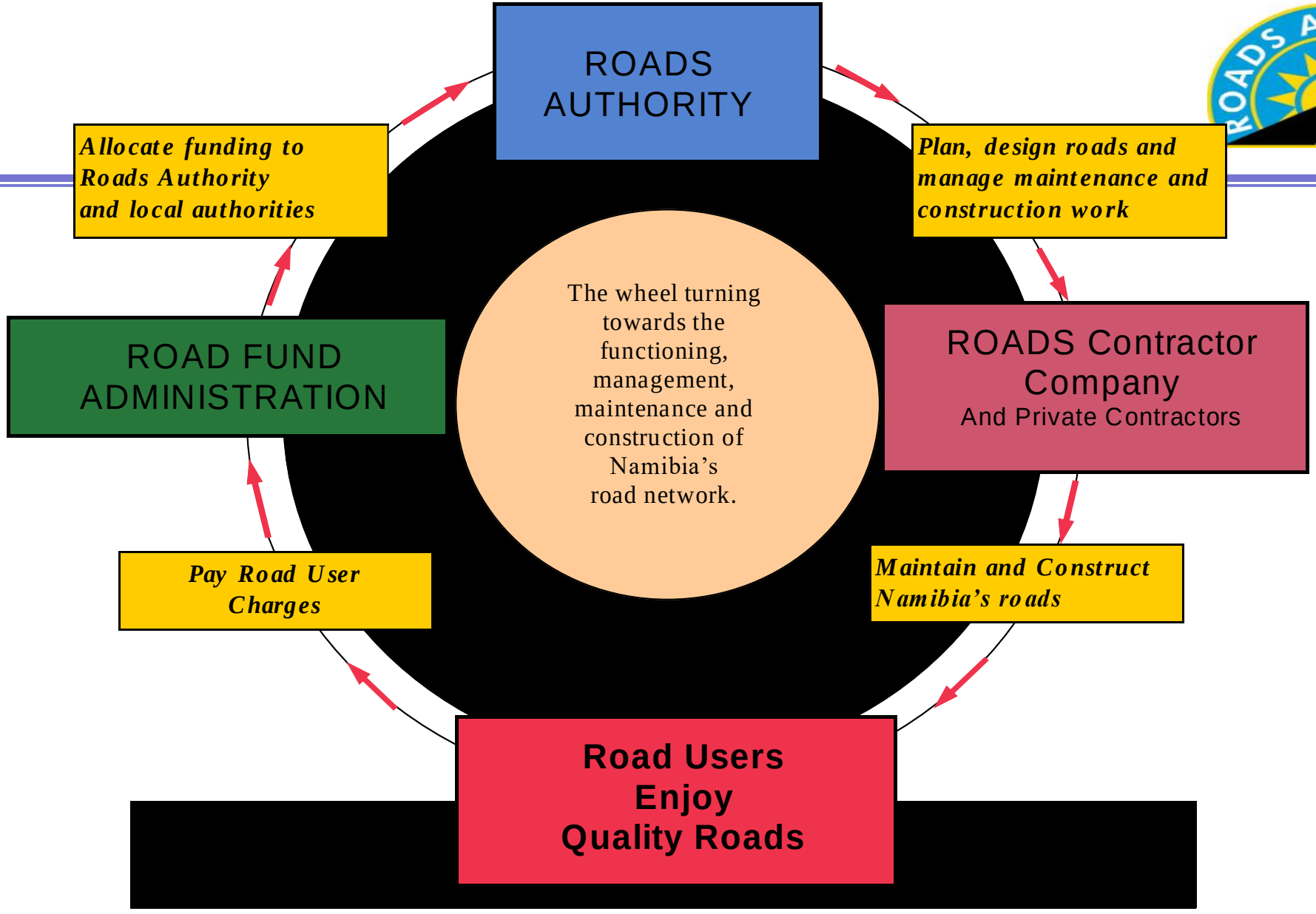
ROADS AUTHORITY MANDATE

The Roads Authority was established in accordance to the Roads Authority Act (Act 17 of 1999), with the statutory objective: "*To manage the national road network of Namibia and to provide for matters incidental thereto*." The objectives of the Roads Authority are defined in Section 16. of the above referred to Act.



Mandate RA

The **management of road network**, including the following and in accordance to Section 16 of the Roads Authority's Act:

a) The planning, designing, construction and maintenance of roads which are part of the national road network;

b) The quality control of materials required for the proper construction and maintenance of roads;

c) The supervision of work contracted out to consultants and contractors;

d) The operation of road management system;

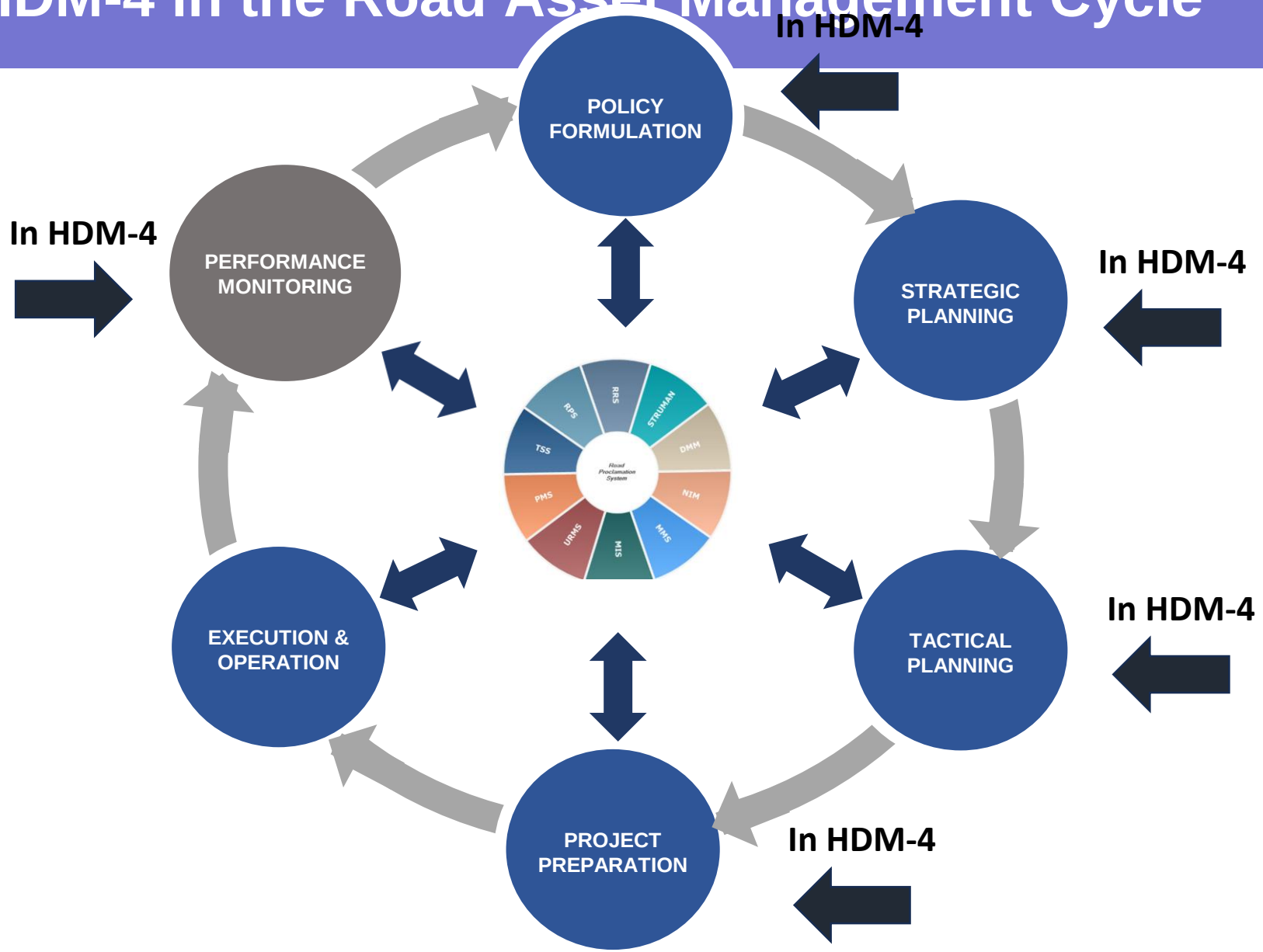
e) subject to any other law, the prevention of the excessive damaging of roads by road users or any other parties; and

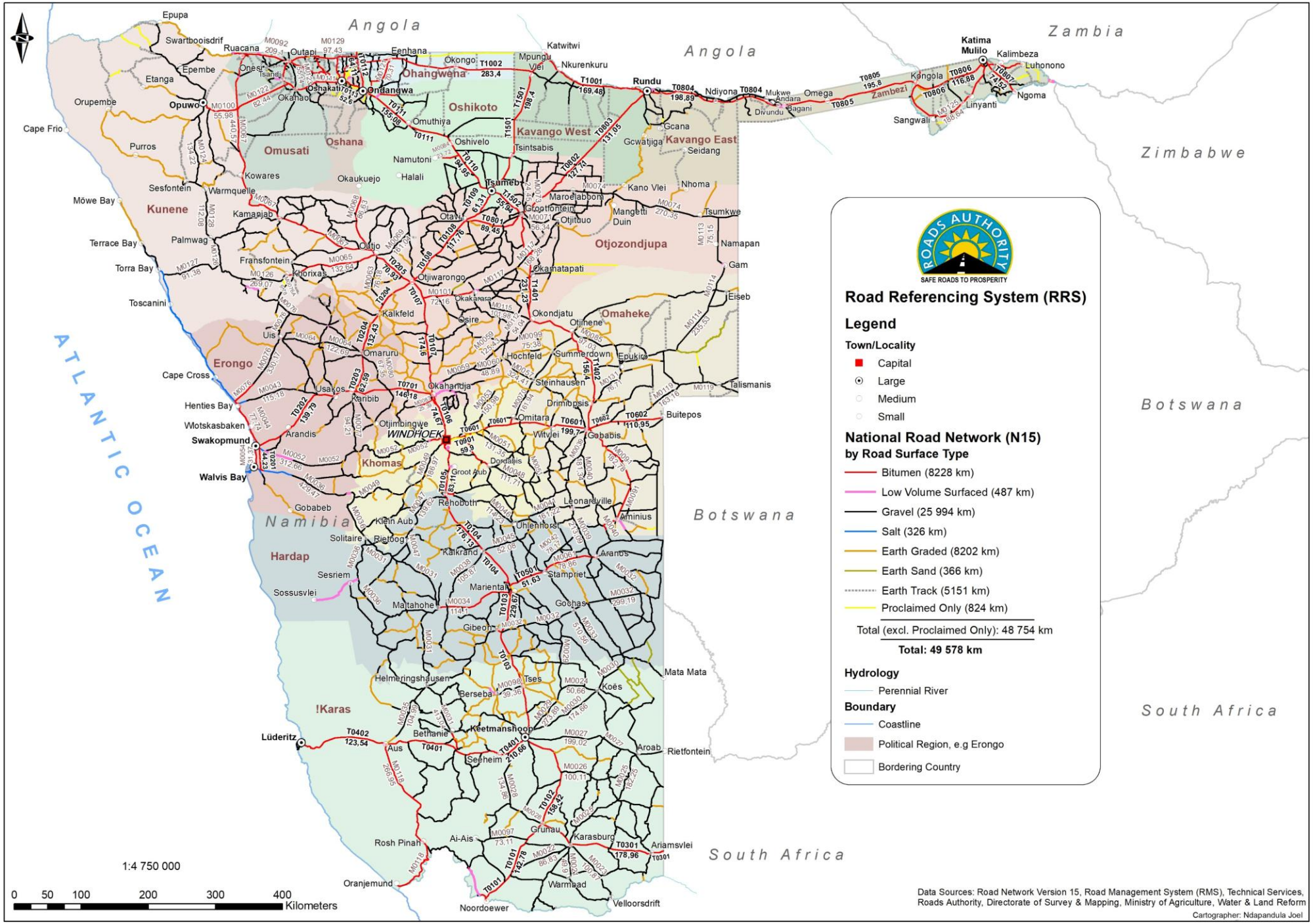
(f) the performance of any other function assigned

- An Integrated Road Management System (RMS) is an all encompassing framework,
- including both information processing and human resources,
- for the integrated management of the road network,
- including the determination and optimization of economically warranted projects, programmes, strategies and budgets,
- for both development and maintenance.

- System not only computer – Road – People – Hardware – Software – Business Processes – Innovation and technology – fitting to the bigger picture of mandate of an organization and stakeholder's need

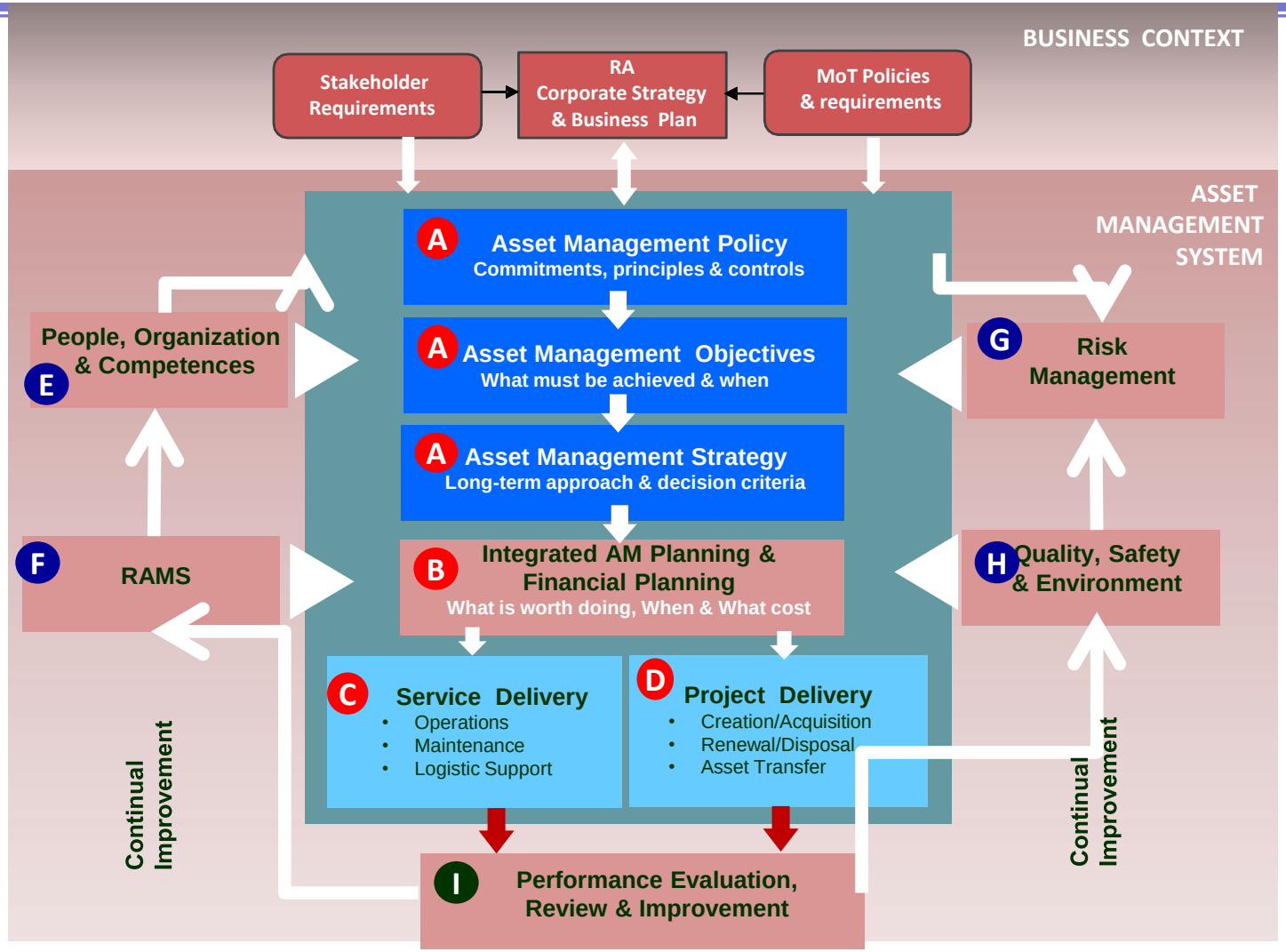
HDM-4 in the Road Asset Management Cycle




Angola
Zambia
Zimbabwe
Botswana
South Africa
Namibia
ATLANTIC OCEAN
WINDHOEK
Swakopmund
Walvis Bay
Lüderitz
Opuwo
Oshakati
Ondangwa
Ohangwena
Oshikoto
Kavango West
Kavango East
Omusati
Oshana
Kunene
Erongo
Otjozondjupa
Omaheke
Khomas
Hardap
!Karas
Rundu
Katima Mulilo
Road Referencing System (RRS)
Legend
Town/Locality
Capital
Large
Medium
Small
National Road Network (N15)
by Road Surface Type
Bitumen (8228 km)
Low Volume Surfaced (487 km)
Gravel (25 994 km)
Salt (326 km)
Earth Graded (8202 km)
Earth Sand (366 km)
Earth Track (5151 km)
Proclaimed Only (824 km)
Total (excl. Proclaimed Only): 48 754 km
Total: 49 578 km
Hydrology
Perennial River
Boundary
Coastline
Political Region, e.g Erongo
Bordering Country
SAFE ROADS TO PROSPERITY
1:4 750 000
0 50 100 200 300 400
Kilometers
Data Sources: Road Network Version 15, Road Management System (RMS), Technical Services, Roads Authority, Directorate of Survey & Mapping, Ministry of Agriculture, Water & Land Reform
Cartographer: Ndapandula Joel

Bad Roads Cost Money! = Asset Management! Less transport cost

RA Road Sector Asset Management Framework



- Planning & Doing
- Enabling
- Checking & Acting

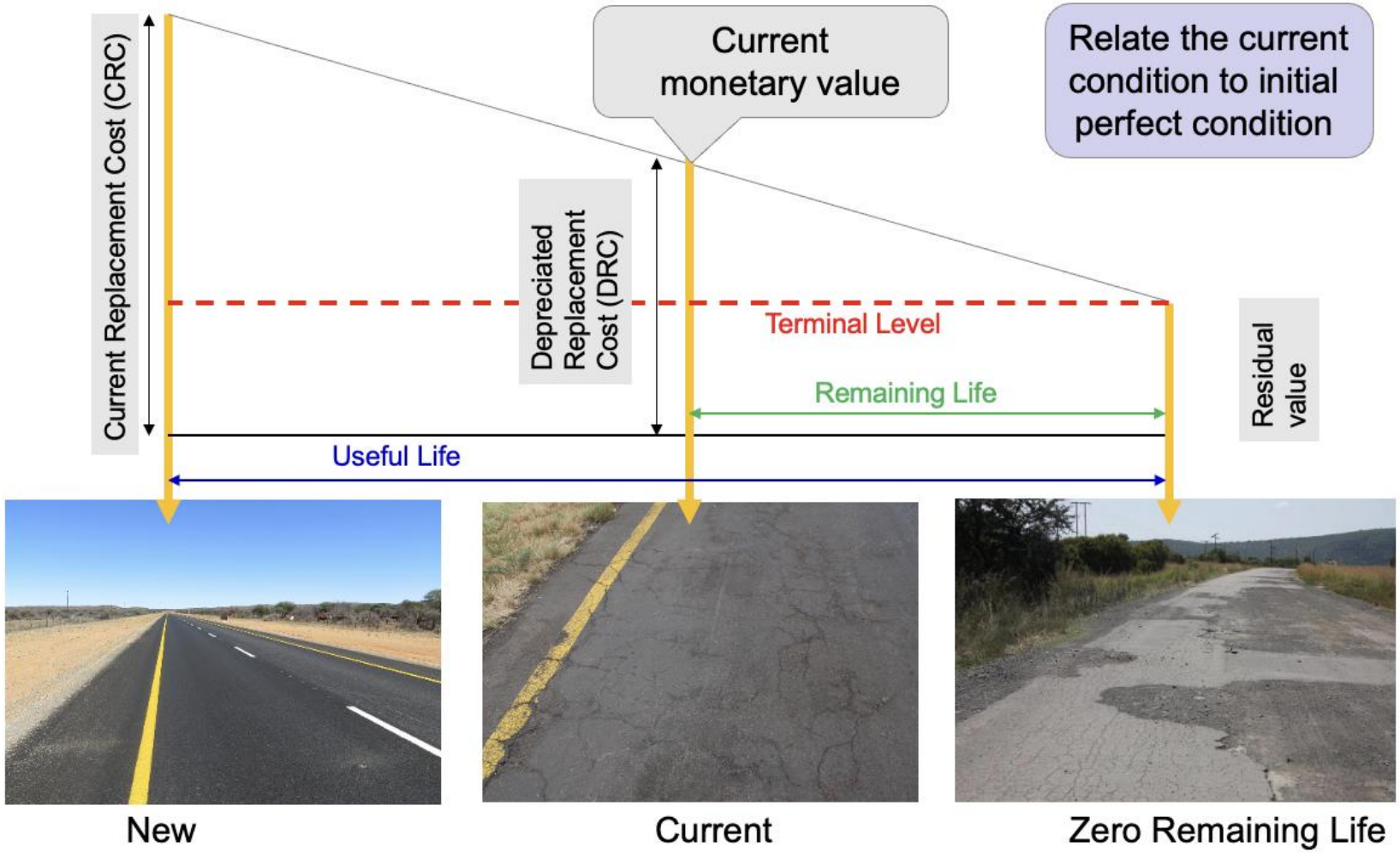
RA

REGIONS

Joint

ROAD ASSET VALUATION

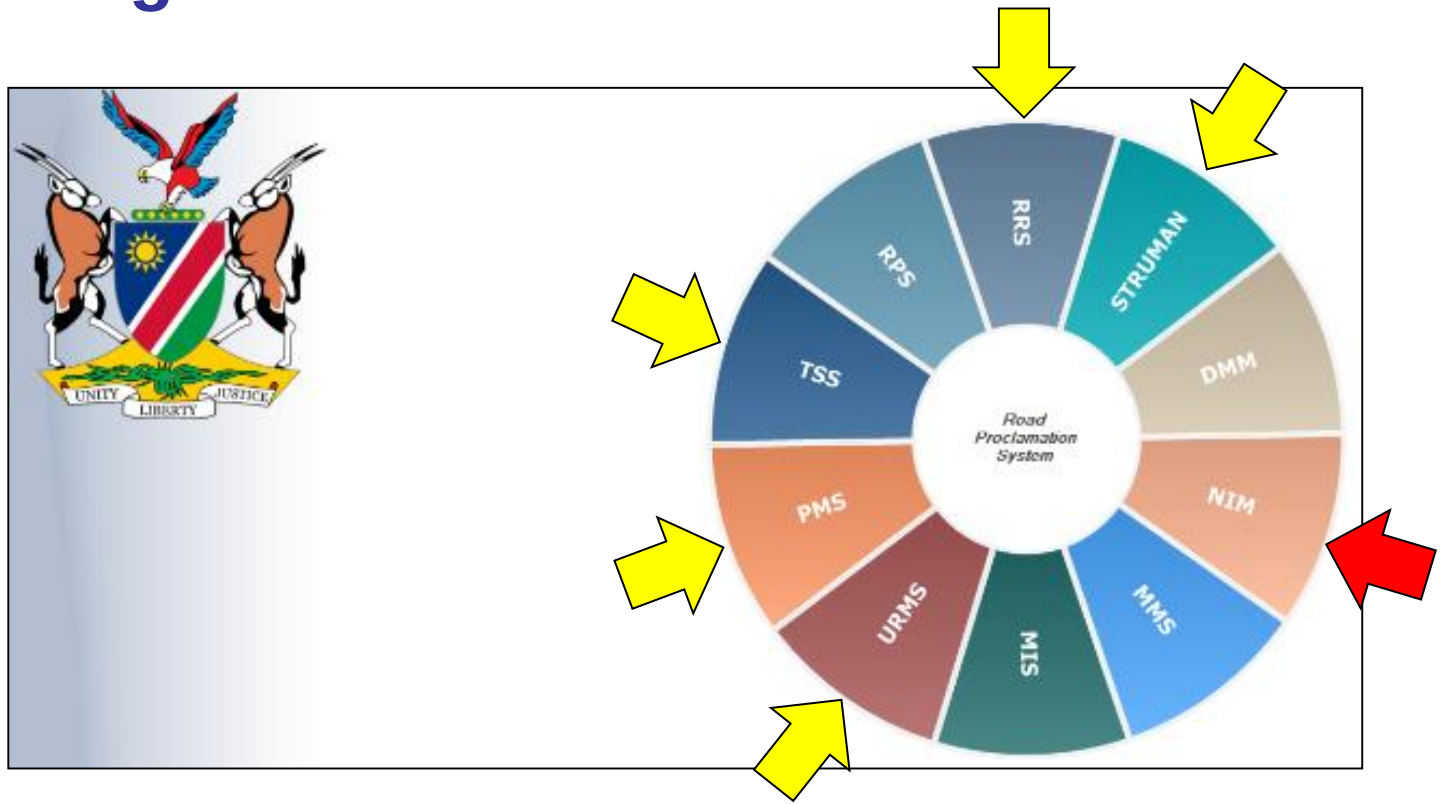
Replacement Cost (CRC) and the Depreciated Replacement Cost (DRC)



The goal is to maintain roads in a condition where they lose as little value as possible, prolonging their useful life and preventing expensive reconstruction

AVM within the IRMS

- The AVM integrates with several sub-systems
- Access to the AVM through the Network Integration Module



Regular Condition Assessm

Visuals

Profile

Deflection

ROADS AUTHORITY : NAMIBIA

Visual Assessment : Surfaced Roads

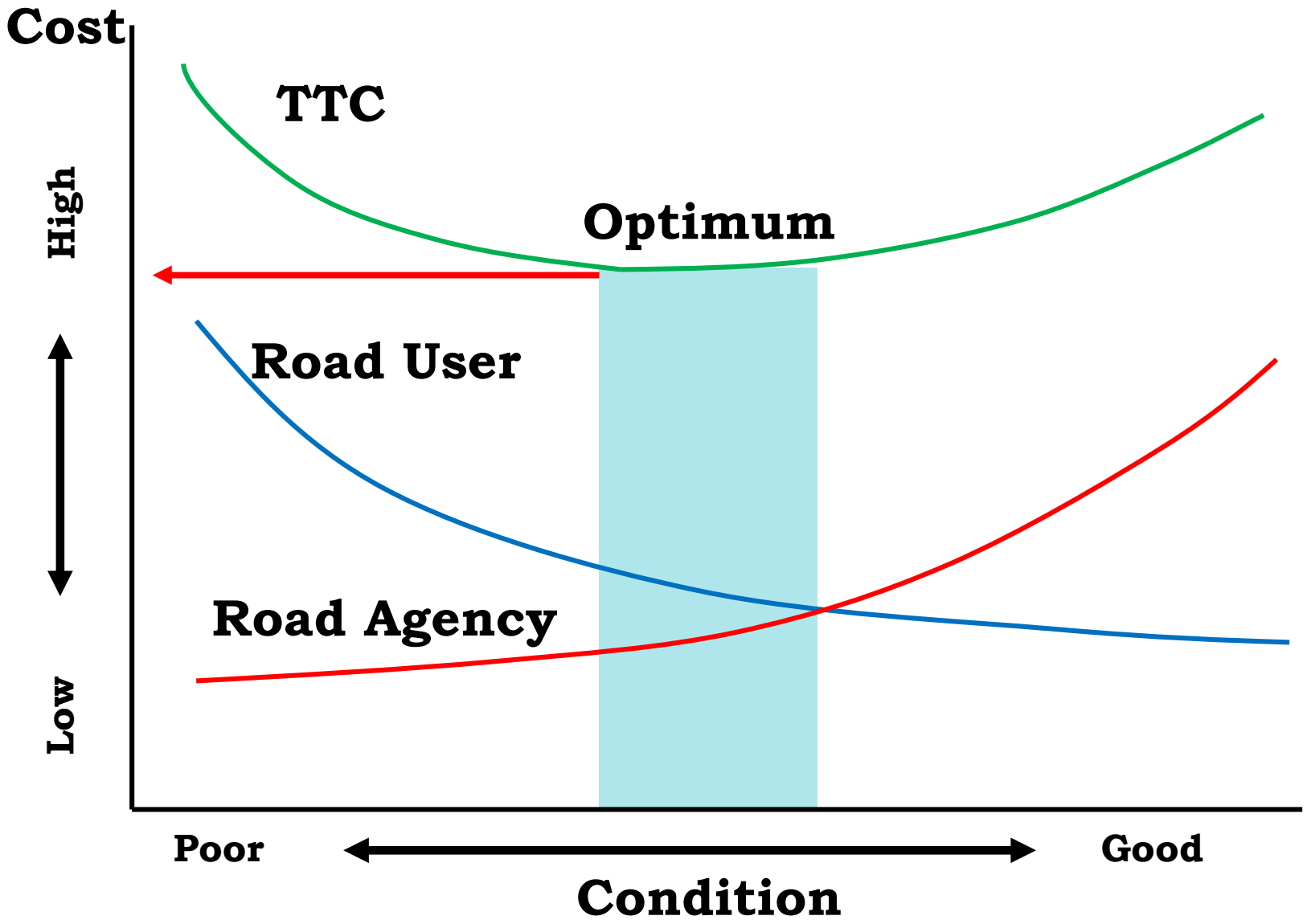
Road Number	D0212			Date	Date				
Carriageway	0	F	B	Assessor					
Position (km)	0.150			Climate	Dry	Mod	Wet		

CONDITION	Degree						
Texture	VF	F	M	C	VC	Var	
Binder	0	1	2	3	4	5	
Bleeding	0	1	2	3	4	5	
Aggregate Loss	0	1	2	3	4	5	
Edge Breaking	0	1	2	3	4	5	
Riding Quality	0	1	2	3	4	5	
Skid Resistance	0	1	2	3	4	5	

CRACKING	Degree						Extent	
Surfacing / Hardening	0	1	2	3	4	5		m
Longitudin: Wheelpath	0	1	2	3	4	5		m
Longitudinal: Edge	0	1	2	3	4	5		m
Longitudinal: Random	0	1	2	3	4	5		m
Transverse Cracking	0	1	2	3	4	5		Nr
Block Cracking	0	1	2	3	4	5		m
Crocodile Cracking	0	1	2	3	4	5		m

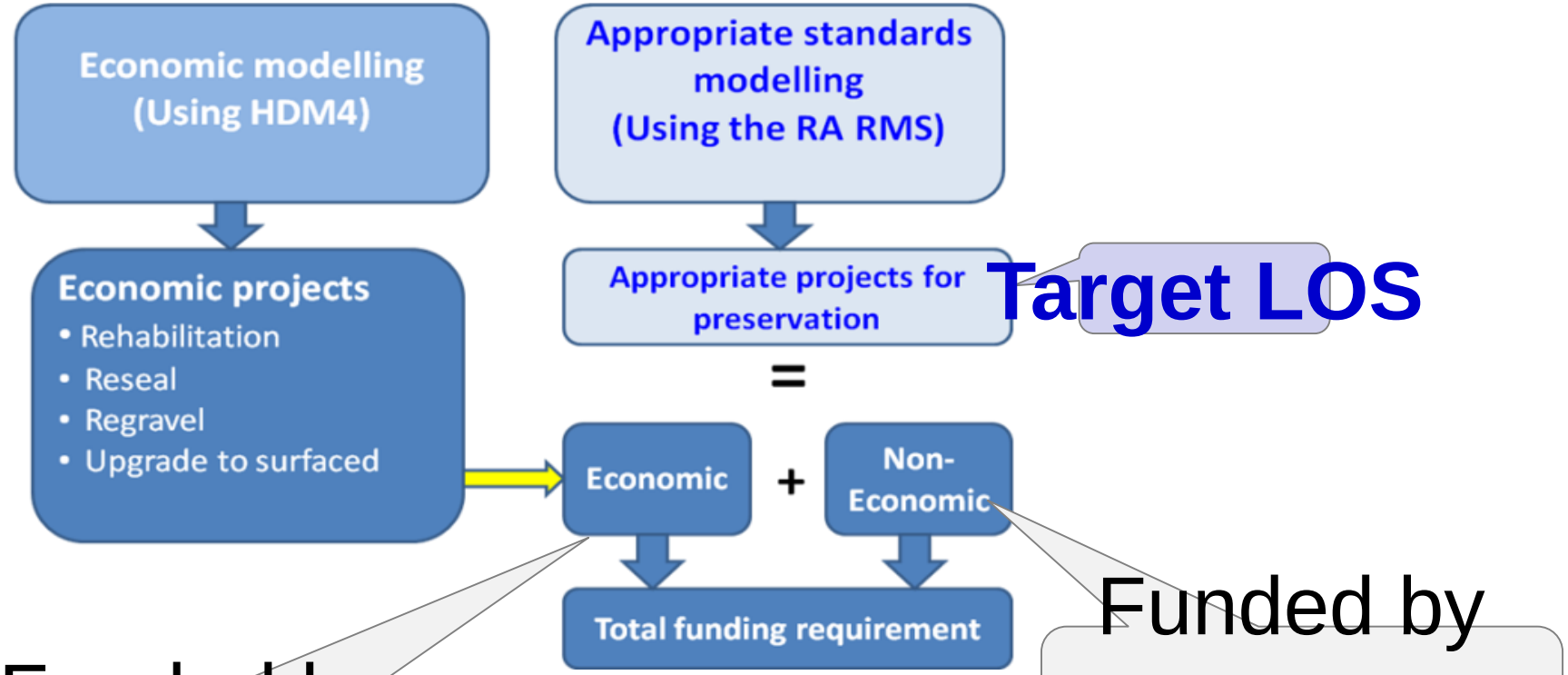
DISTRESS	Degree						Extent	
Pumping	0	1	2	3	4	5		m
Failures: Surfacing	0	1	2	3	4	5		m
Potholes: Structural	0	1	2	3	4	5		m
Patching: Surfacing	0	1	2	3	4	5		m
Patching: Structural	0	1	2	3	4	5		m
Deformation: Surfacing	0	1	2	3	4	5		m

Minimization of TTC Concept



Total requirements

- **Need to distinguish between economic and non-economic**



Vehicle Operating Cost

Cost components

ROAD USER COSTS

VEHICLE OPERATING COSTS

TIME COSTS

ACCIDENT COSTS

SOCIETY COSTS

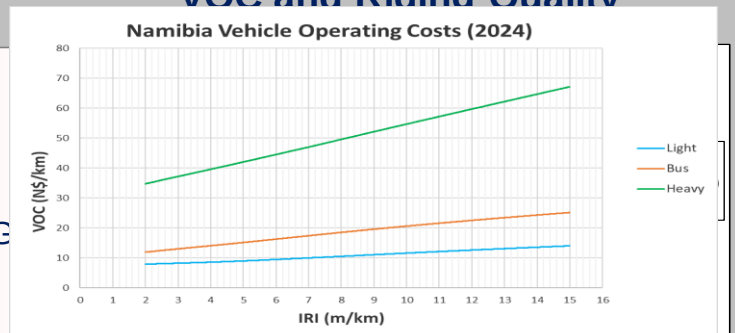
LOSS OF INCOME & ENVIRONMENTAL COSTS

AGENCY COSTS

MAINTENANCE COSTS

CONSTRUCTION COSTS

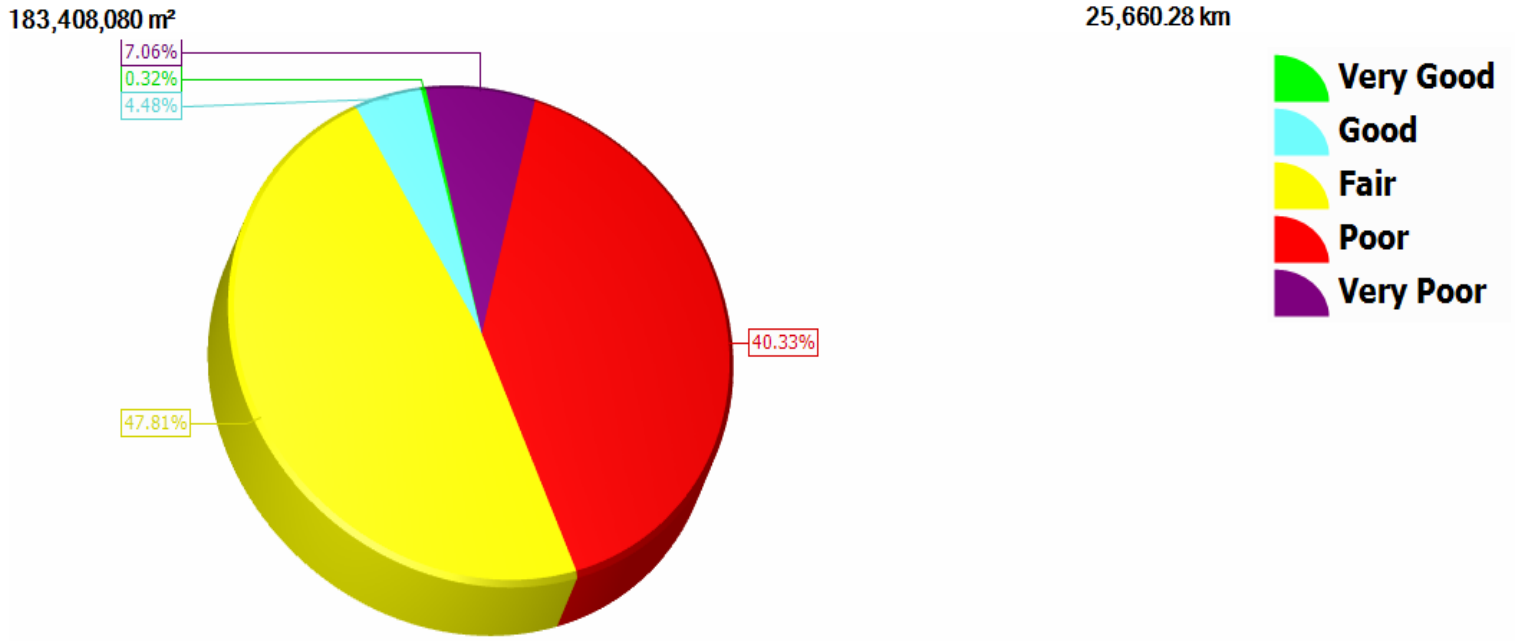
Direct relationship between VOC and Riding Quality



Vehicle Operating Costs (N$/km) - 2024				
Surfaced Road Condition				
IRI	2,5	3,5	4,5	6
Vehicle Type	Good	Fair	Poor	Very Poor
Light	8,03	8,35	8,72	9,42
Taxi	7,85	8,19	8,58	9,32
Bus	12,44	13,51	14,56	16,23
Heavy	35,95	38,36	40,78	44,49

URMS CONDITION GRAVEL ONLY OUTPUT

Gravel Roads Condition Distribution (Network 14 - 2024)



- Poor to very poor is 47.39%
- 25 660.28km assessed

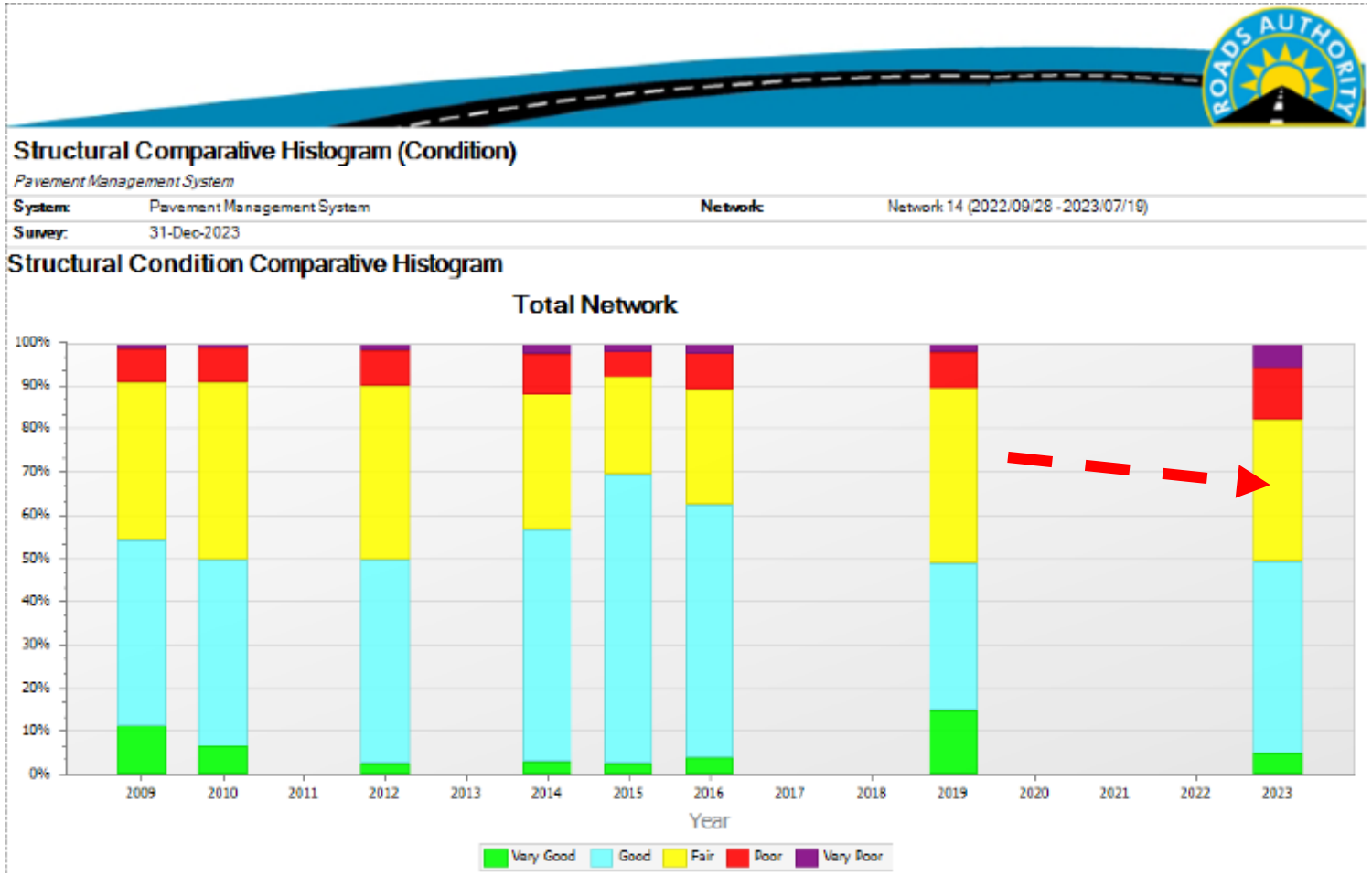
Road Network Condition

- **Unsealed road typical situations**

Very Good	Good	Fair	Poor	Very Poor
				
				
				

Pavement Structural Condition

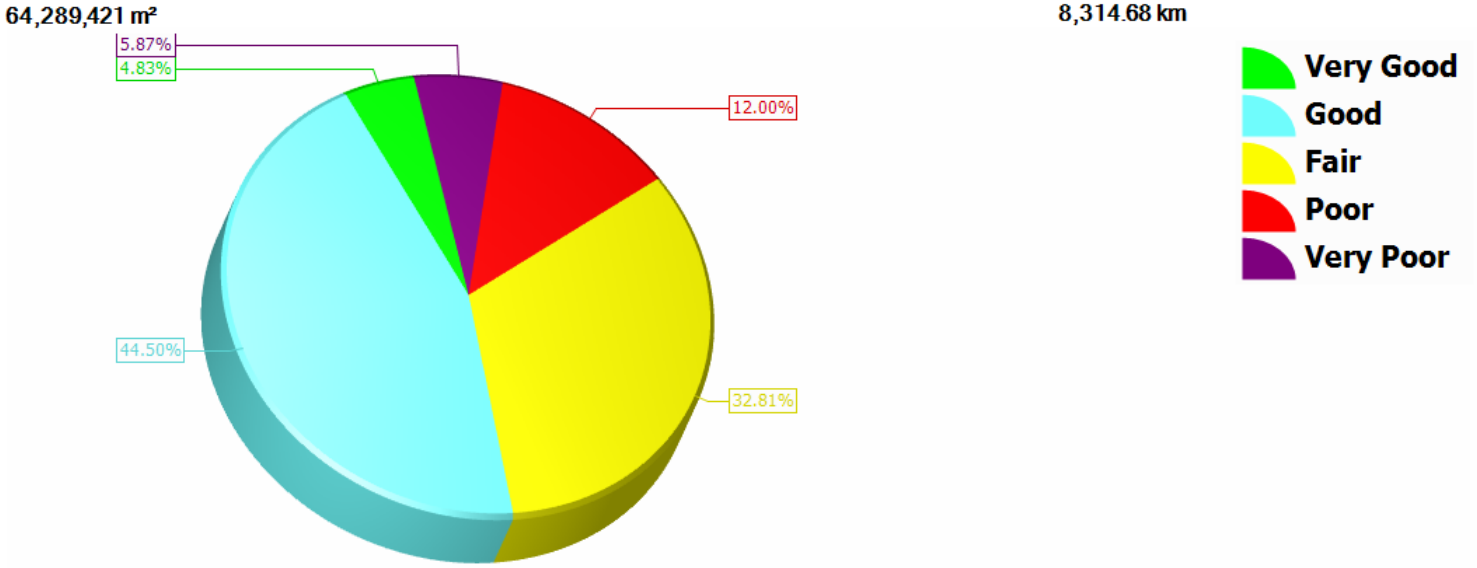
	Pavement Structural Condition (% Poor-Very Poor)
Target	10
2007/2008	6
2009/2010	9
2010/2011	9
2011/2012	10
2013/2014	11
2014/2015	8
2015/2016	11
2019/2020	10.6
2023/2024	17,9



PMS CONDITION STRUCTURAL CONDITION

Poor to Very Poor is 17.87% 8 314.68Km assessed

Structural Condition Pie Chart



Types of Structures – Budget required 72 mill

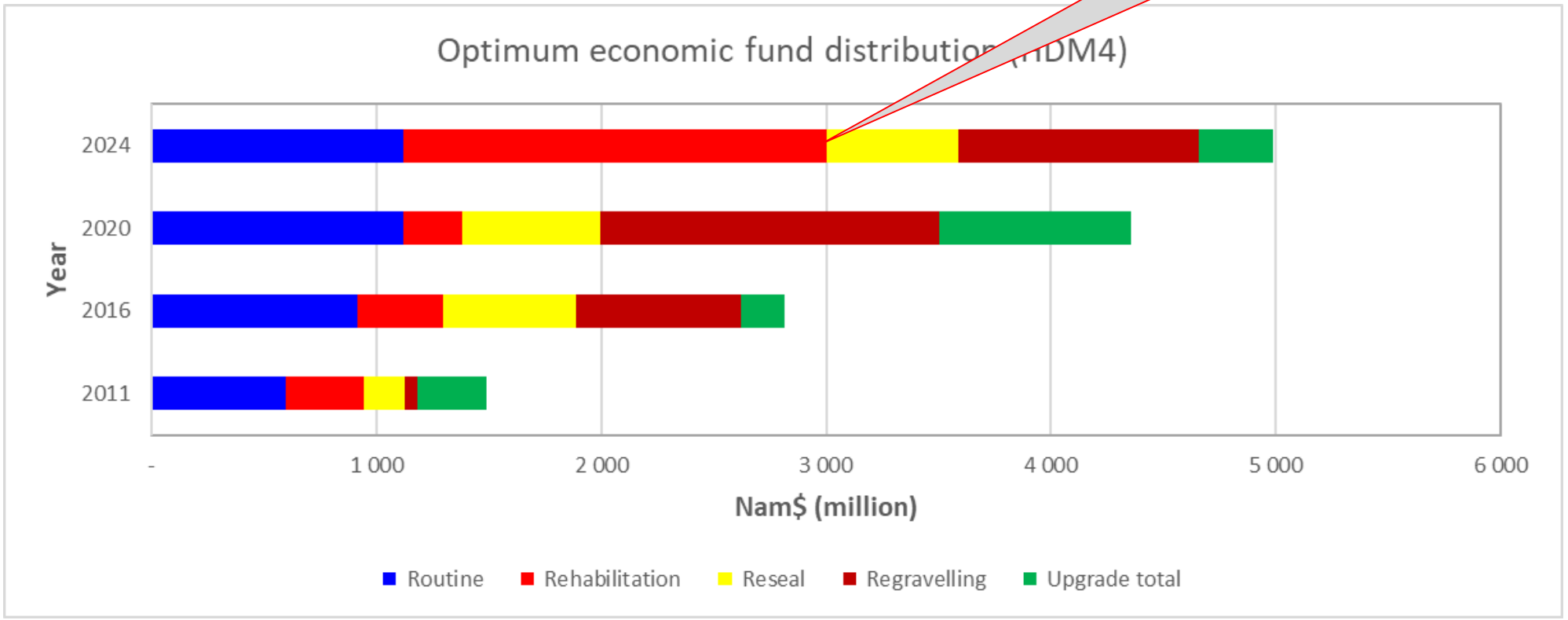
BMS

Structure class	Structure Type	
	Bridge	Culvert
Very Large Bridge		No representative photo
Large Bridge		
Medium Bridge		

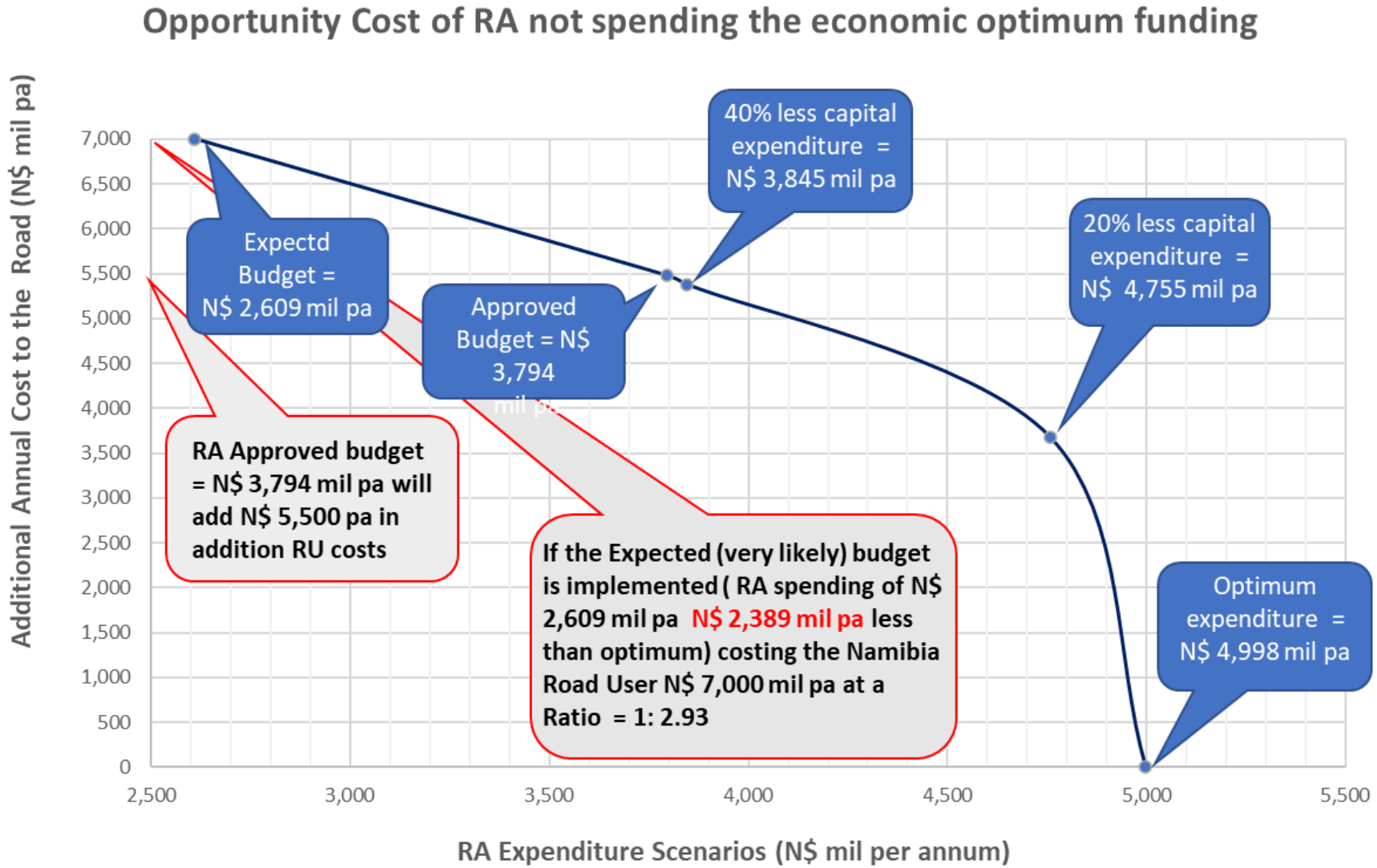
Funding requirement changes

- **Insufficient funding**
- **Better distribution**

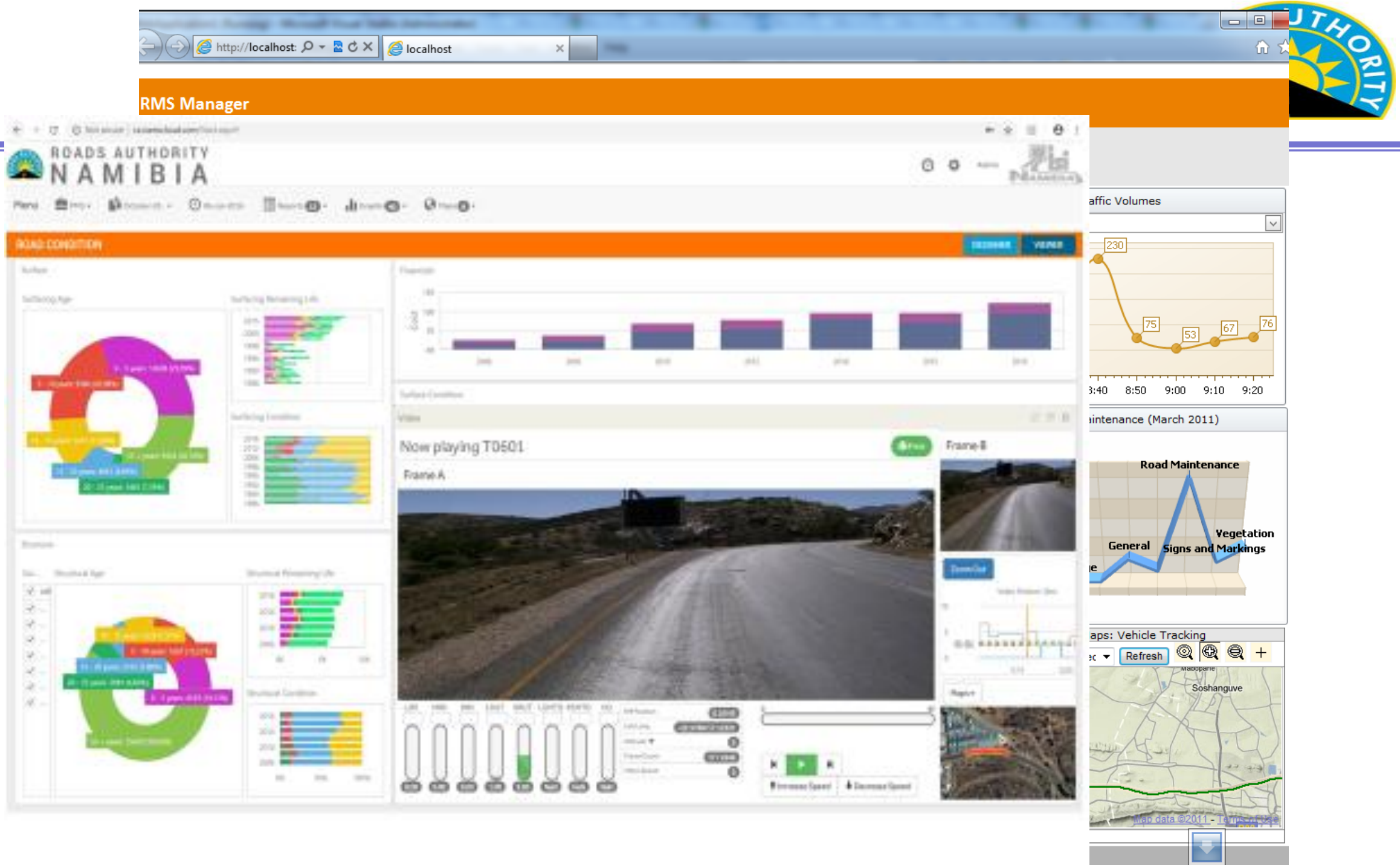
Lack of resealing result in high need for rehabilitation



Tactical Analysis Results



RMS Manager


http://localhost
localhost
ROADS AUTHORITY
NAMIBIA
ROAD CONDITION
Now playing T0501
Frame A
Frame B
affic Volumes
230
75
53
67
76
8:40
8:50
9:00
9:10
9:20
intenance (March 2011)
Road Maintenance
General
Signs and Markings
Vegetation
aps: Vehicle Tracking
Refresh
Soshanguve
Map data ©2011 - Terms of Use

Integrated Central Dashboard - Namibia

Namibia Network

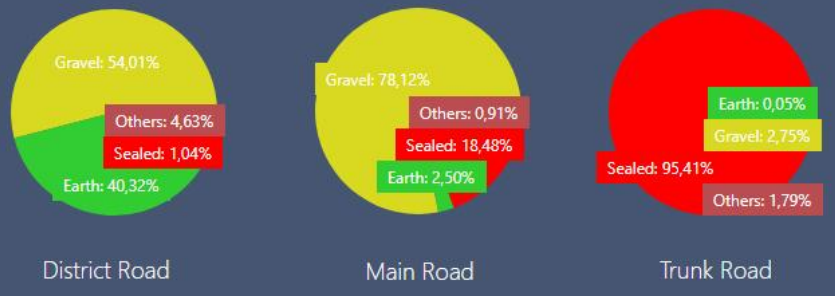
Network
- Network 14
- Network 13
- Network 12
- Network 11
- Network 10
- Network 9
- Network 8
- Network 7
- Network 6
- Network 5

Area Type
- Magisterial District
- Maintenance Area
- Maintenance District
- Maintenance Region
- Road Region
- Roads Board

Surface
- Earth
- Gravel
- Proclaimed Only
- Salt
- Sealed

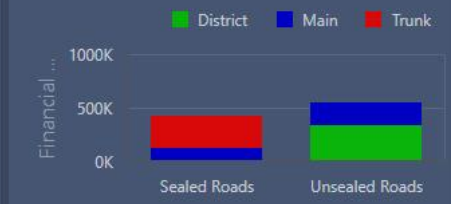
- District Road
- Main Road
- Trunk Road

Road Class Distribution



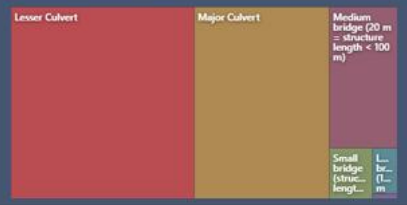
Matrix
- Network 10 Strategic
- Network 11 Strategic
- Network 12 Strategic
- Network 12 Strategic 2020
- Network 12 Tactical
- Network 5: Ver 6 - Strategic 2006...
- Network 6 Strategic

Budget per Road Category

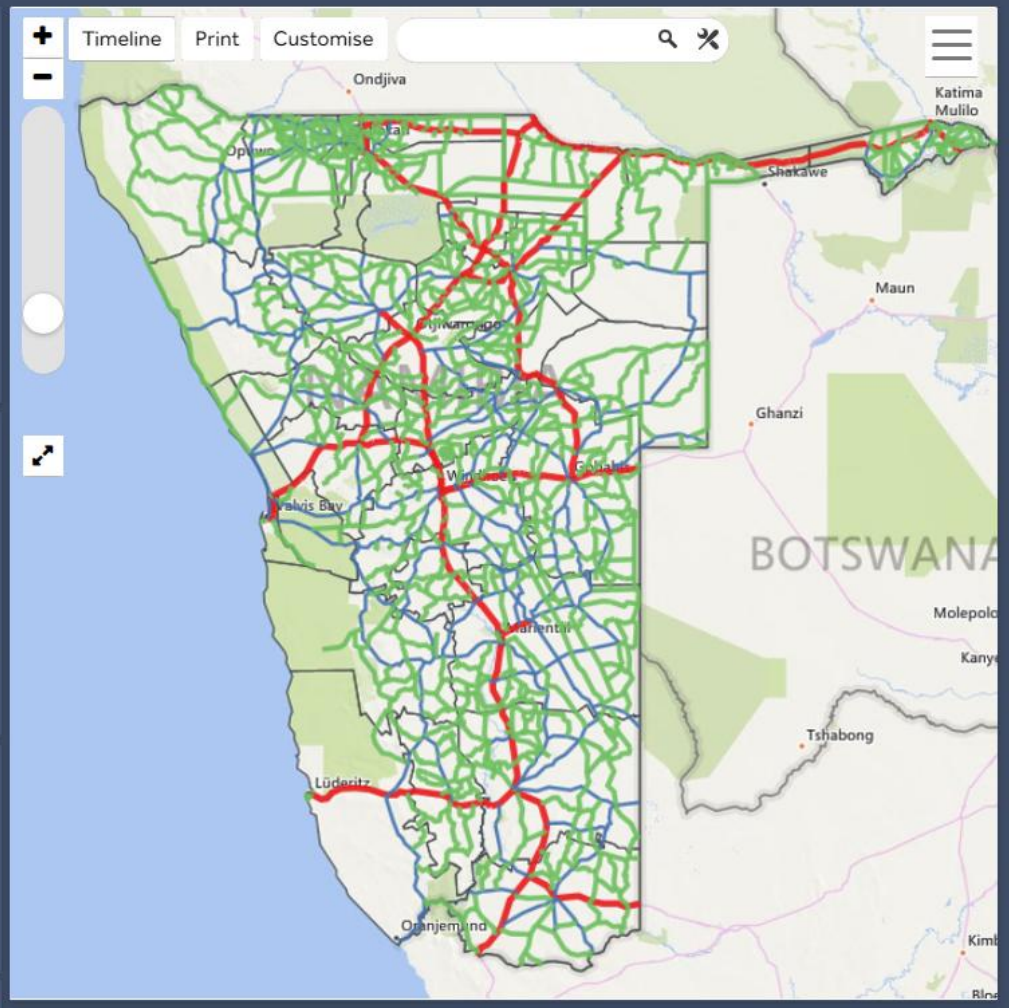


Condition

Distribution of Size Category

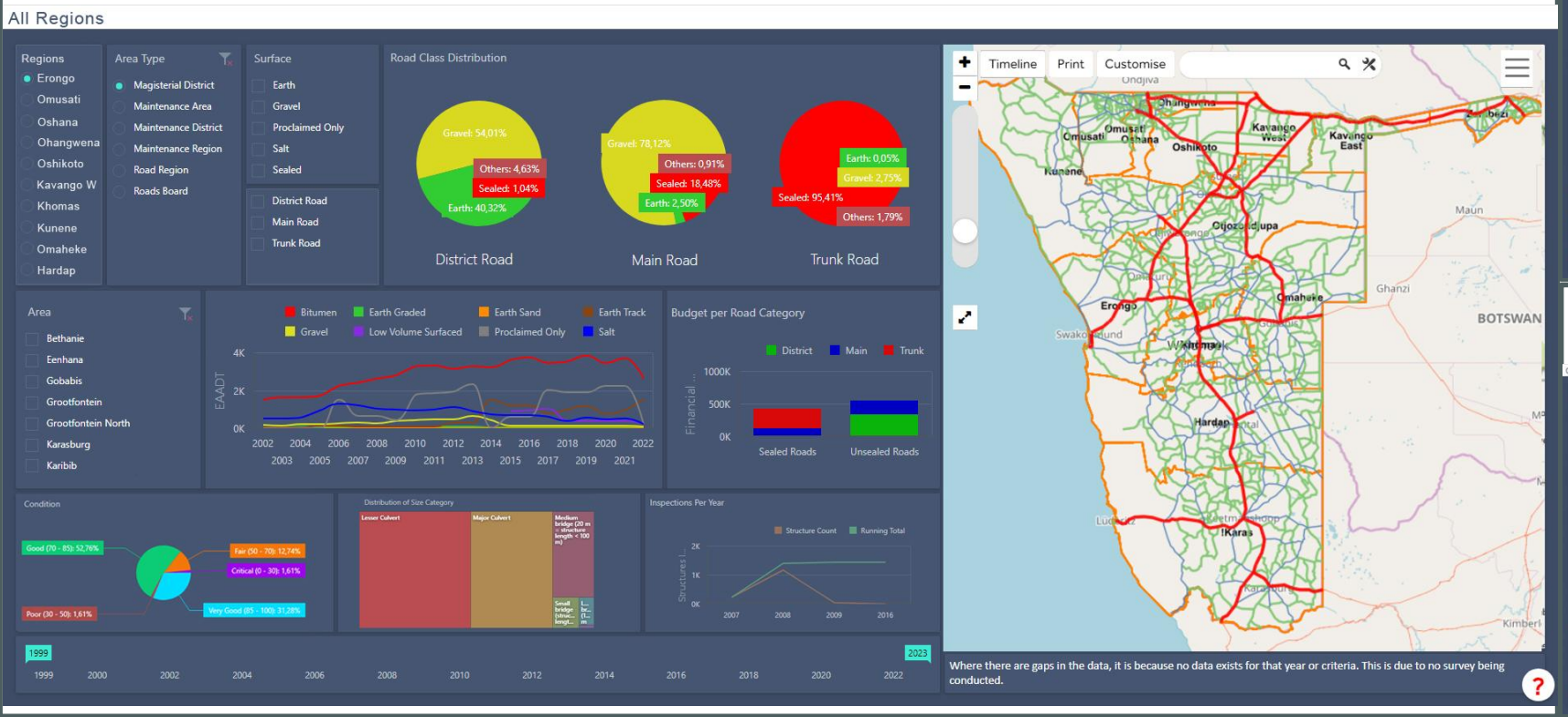


Inspections Per Year

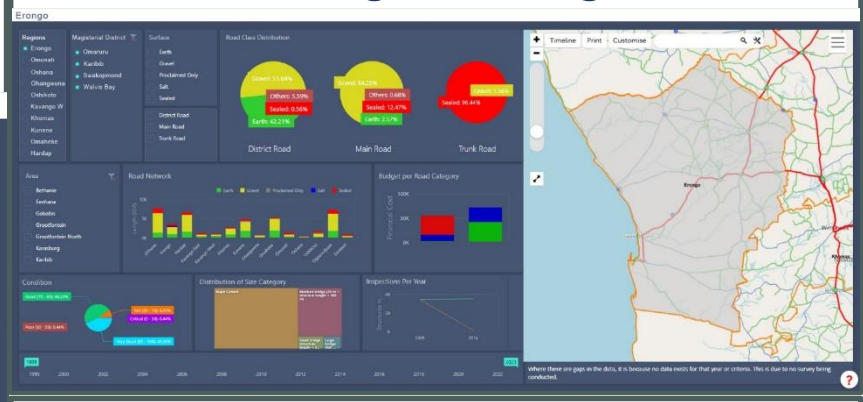


Where there are gaps in the data, it is because no data exists for that year or criteria. This is due to no survey being conducted.

All Regions

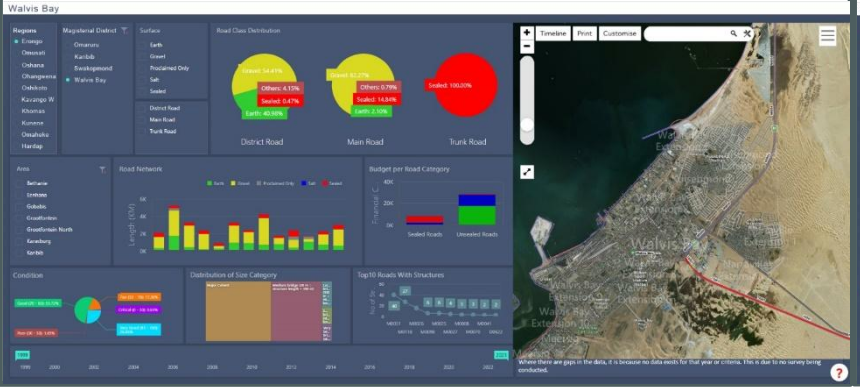


Road Region: Erongo

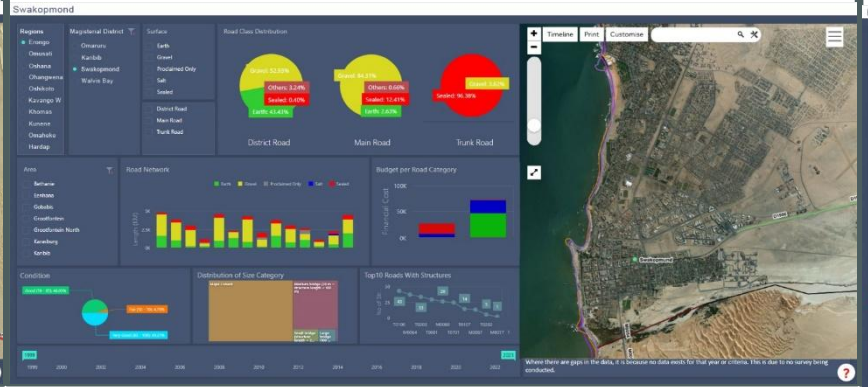


Magisterial District: Omaruru

Magisterial District: Walvisbay



Magisterial District: Swakopmond



Magisterial District: Karibib

5. LESSONS LEARNED – Success

1. For any development of a System a Master Plan and Architectural System Design is a MUST (completed in 1997 – visionary document)
2. Development Life Cycle needs to be followed for every sub-system development
3. Training is essential for staff so that the systems are understood and run efficiently
4. Expert advice needed for every module – team of experts needed – RMS becoming more complex
5. HDM-4 calibration and implementation needs to be properly planned and managed
6. Local conditions and expertise important – especially with donor community
7. ***HDM-4 is only a tool and not a PMS system*** – RMS is still needed for Road Agencies
8. RMS not a computer model but engineering – engineering judgement essential in all the output

Lessons Learned – (2)

9. Champion needed for any RMS implementation - passion for the systems
10. Budget spent for RMS will save in millions by assisting good decision making (RMS budget <4% of maintenance + construction budget)
11. Good governance can be instilled though a reliable RMS – monitoring function
12. Networking and sharing important not to re-invent the wheel
13. Selling of RMS still a challenge in developing and developed countries

Capacity Building – RMS on the MAP
Piarc Asset Management – 1st in Afric

1. Asset Valuation phase1 module Finalized – Phase 2 commenced HDM-4
2. Project Control System – almost finalized – deployment remaining
3. Social Roads
4. Technology Use

PROJECT FEEDBACK – AUGUST 2024

PCS PROJECT CONTROL SYSTEM

Introducing systematic budgeting, monitoring of programme performance, project execution and management to ensure full transparency of all projects within the RA.

Key Features

- Co-ordinated Monitoring of all Projects
- Standardisation of feedback forms
- Timeous identification of project outliers
- Automated monthly reports
- Optimised usage of funds
- Facilitates future budgeting
- Reduced duplication of data
- Promotional flyer for each project
- KPI Tracking
- Promotes Accountability & Good Governance

The Project Control System is about project performance accountability. The integrated PCS provides an operational, tactical and high-level view of all capital projects through an easy to use management portal.

CONTINUOUS FEEDBACK

Physical Progress → **Financial Commitment & Expenditure** → **Social Economic Benefit** → **Potential Risks**

Project Definition: Upgrade of the Maintenance Management System (MMS) to a Project Control System (PCS) to incorporate Capital Projects and Feasibility Projects for Division: Network Planning.

History: The original PCS formed part of the Maintenance Management System(MMS). Technology is outdated and functionality limited.

Start Date End Date: Phase 1 15 nov 2023 to 15 March 2025

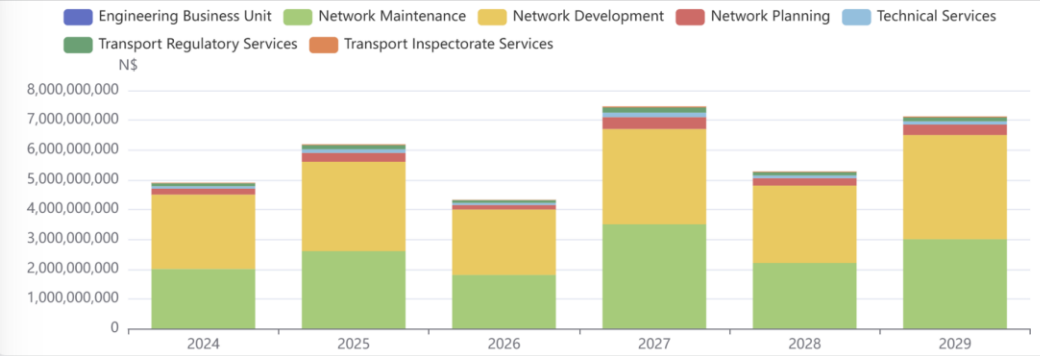
Next phase: Phase 2: 15 May 2025 to 15 Nov 2025 6 months extension time only no cost.

Phase 3: Next phase deployment: 17 Nov 2025 – 17 May 2026 Extension – in process to procurement

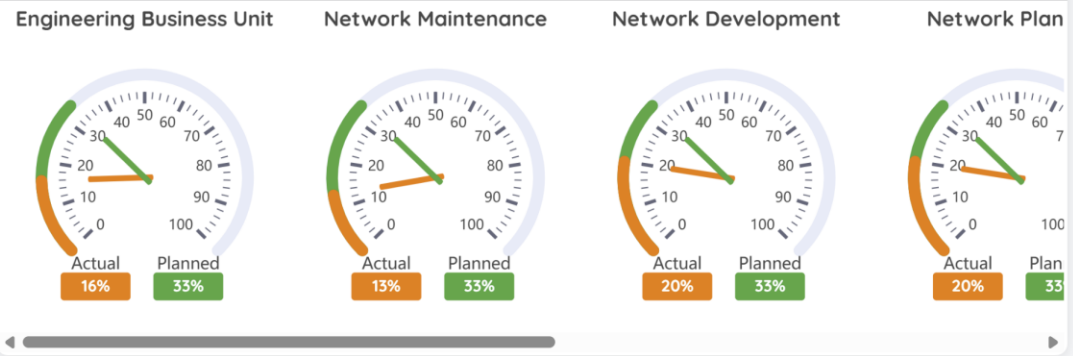
Phase 4 Final stage – support for one year and capacity building – Interface with IBMS

RMS RA | Quick Menu | PCS Beta | Dashboards | New network based on network 15 | Reports | Graphs | Tools | Search for outputs | admin

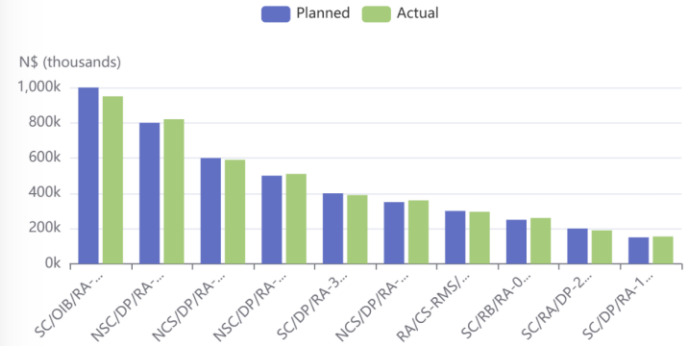
Total Annual RA Divisional Budgets



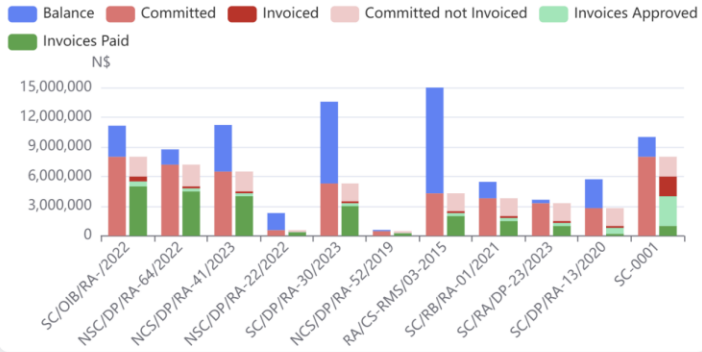
Planned Expenditure vs. Actual Expenditure as at June 2025



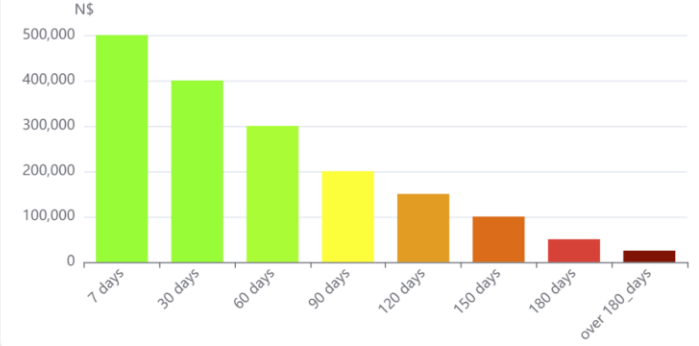
Top 10 Projects (FY 2025)



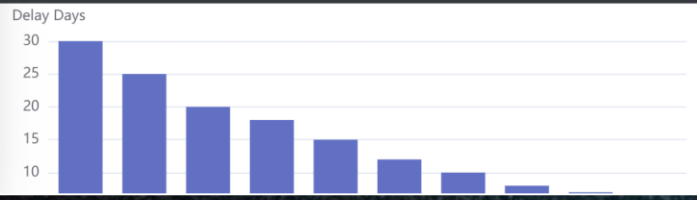
Budget Utilisation (FY 2025)



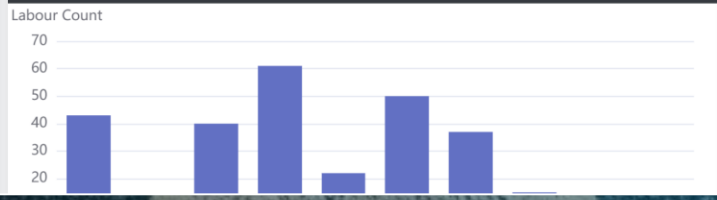
Invoice Age Analysis (2025)



Most Delayed Projects in Days (2025)



Top Labour-Intensive Projects (June 2025)



Annual Budget per Division per Funding Source

PCS Demo

Project Progress

Reporting Period:	Jan 2024 - Mar 2024	**Project Details**	
Project Name:	CONSTRUCTION OF TR 9/1 WINDHOEK TO HOSEA KUTAKO INTERNATIONAL AIRPORT TO DUAL CARRIAGEWAY STANDARDS: PHASE 2B - DORDABIS INTERCHANGE to HOSEA KUTAKO INTERNATIONAL AIRPORT INTERCHANGE	**Project Stage:**	ENVIRONMENTAL IMPA
		Start Date:	01 Apr 2023
Project Objective:	Construction of the freeway from Windhoek to Hosea Kutako International Airport	**Plan End Date:**	30 Nov 2025
Project Control Engineer:	N/A	**Revised End Date:**	N/A
Activity:	DETAILED ENGINEERING DESIGNS - Cost Estimate, DETAILED ENGINEERING DESIGNS - Traffic Accommodation, Earthworks, ENVIRONMENTAL IMPACT ASSESSMENT (if the Clearance Certificate has expired) - Environmental Impact Assessment	**Estimated Completion Date:**	TBD
		Completed:	No
Project Reference:	RA/DC-CR/06-2014/2B	**Project Constituency:**	Namibia

Project Size:	Total Estimated Cost:	Project Regions	Est. Nr. of Workers	Est. Nr. of Women	Project Financing	Funds Allocation
0.0km	N$0	Windhoek	0	0	RFA	N$200,000,000

Project Contracts				Consultancy and/or Contractor Project Costs			
Supplier Name	**Supplier Category**	**Description**	**Contract Amount**	**Original Cost**	**Project Cost Revision**	**Revised Total Cost**	**Revised Cost**
SMEC Namibia Consulting Engineers	Consultant	Design, contract admin and site supervision	N$190,000,000.00	N$196,000,000.00	N$0.00	N$196,000,000.00	0%

Comments:

Project Budget					Financial progress Overall						
Fin Year	**Plan Budget**	**Approved Budget**	**Actual Budget**	**Actual Plan**	**Total Certified**	**Total Paid**	**Unpaid Amount**	**Payment Rate**	**Tot. Act Bud.**	**Avg. Bud. Util.**	**Funding Gap**
2023/24	N$200,000,000.00	N$200,000,000.00	N$300,000.00	N$200,000,000.00	N$200,000,000.00	N$0.00	N$200,000,000.00	N$-0.10	1.00	N$-0.10	N$-0.10

Project Physical Progress						Project Expenditure	
Fin Year	**Progress Date**	**Planned Progress**	**Actual Progress**	**Progress in Period (Months)**	**Total Unit Size**	**Total Certified (N$)**	**Total Paid (N$)**
2023-2024	31 Mar 2024	0.00 %	0.00	-9			

Performance Comments	Cost & Time Tracking	
Progress comments not supplied.	**Time elapsed:**	22.1%
	Amount Certified to Contract:	96.9%
	Physical Progress:	15%
	Time elapsed to Original Plan:	105.2%

Financial Year - From
2025

Financial Year - To
2029

Revision
FY 2024-2025 - Rev 1 - Pending Approv

Division
Technical Services (Road Management

Cost Centre
All Below

Search Budget Items

Enter budget line item...

Search | Clear

Quick Actions

- Division Budget
- Projects
- Orders
- Budget Virement

Annual Cost Centre Budget

Division
Technical Services (Road Management System, Lab Services, and Research & Dev.) FY2025 - 2029

Cost Centres	AfDB N$	EXIM N$	GRN N$	KFW N$	RFA N$
Divisional Manager: Technical Services	355.00	0.00	0.00	0.00	47,000,524.55
Research And Development	0.00	0.00	0.00	0.00	70,731,594.00
Road Management System	0.00	0.00	0.00	0.00	219,783,598.00
Roads Technical Training Unit	0.00	0.00	0.00	0.00	0.00
Windhoek Lab	0.00	0.00	0.00	0.00	111,250,000.00

Divisional Manager: Technical Services
Cost Centre funding sources FY2025 - 2029

Source	2025	2026	2027	2028	2029
AfDB N$	0.00	22.00	333.00	0.00	0.00
EXIM N$	0.00	0.00	0.00	0.00	0.00
GRN N$	0.00	0.00	0.00	0.00	0.00
KFW N$	0.00	0.00	0.00	0.00	0.00
RFA N$	46,999,824.55	100.00	300.00	200.00	100.00

Divisional Manager: Technical Services
Cost Centre Budget Line Items

Add Item

Objective	Hierarchy	Dimension	Source	2025 N$	2026 N$	2027 N$	2028 N$	2029 N$	Total N$	Actions
Consultation RMS Policy	Technical Services	635020 - A	RFA	2300000	100	300	200	100	**2,300,700.00**	Delete
NIM Develop & Operatior	Technical Services	635020 - A	RFA	5999998.04	0	0	0	0	**5,999,998.04**	Delete
GIS/RRS Operations	Technical Services	635020 - A	RFA	2100000.01	0	0	0	0	**2,100,000.01**	Delete
PMS RD Cond Survey Op	Technical Services	635020 - A	RFA	19299909	0	0	0	0	**19,299,909.00**	Delete
Traffic Survaillance Eqpr	Technical Services	635020 - A	RFA	4000000	0	0	0	0	**4,000,000.00**	Delete
Asset Register Developm	Technical Services	635020 - A	RFA	2500000	0	0	0	0	**2,500,000.00**	Delete
BMS Development and o	Technical Services	635020 - A	RFA	1200000	0	0	0	0	**1,200,000.00**	Delete

RA Dashboard Inspections

https://ra.iramscloud.com/

6 Conclusion

- **The RMS is inevitable for the efficient, effective and safe management**
- **of the RA and optimizes value for money for the Road User.**
  - ❑ Record and update road infrastructure asset information
  - ❑ Assist the RA in strategic and tactical planning
    - Monitoring condition of the network (KPIs)
    - Identification and prioritisation of projects
    - Funding requirements and impact analyse

    - The Heart of an organization is RMS

The Role of RMS within the Roads Authority

RMS –Sub-Division

January 2026