Western Cape Government

Department of Infrastructure

# Road Asset Management Plan

Volumes 1 and 2 for 2024/25 to 2033/34

Western Cape Government

Department of Infrastructure

Transport Infrastructure

# Road Asset Management Plan

Volume 1 of 2: The Plan

for 2024/25 to 2033/34

For further information, please contact:

Chief Directorate Road Programme Management

Department of Infrastructure

9 Dorp Street Private Bag X9185
CAPE TOWN Cape Town
8001
Tel: +27 21 483 5400

Email: infrastructure@westerncape.gov.za

Website: www.westerncape.gov.za

Cover Picture by Mr Terry February.

# EXECUTIVE SUMMARY

This Road Asset Management Plan (RAMP) seeks to strengthen the alignment between the activities of the Transport Infrastructure Branch, the Strategic Goals of the Department of Infrastructure, and the Western Cape Government. The purpose of this RAMP is to:

- set out the elements of road infrastructure assets managed by the Branch;
- consider the required level of service to be provided by the infrastructure;
- indicate the level of service provided;
- assess the level of service gap and how to address this gap;
- estimate the financial resources required;
- provide details of the organisational and support plan structure;
- show how the infrastructure is managed and monitored;
- demonstrate responsible management;
- communicate and justify funding requirements;
- demonstrate compliance with regulatory requirements; and
- state the RAMP's limitations.

**Objectives and Policy**

The asset management objectives are derived from the Branch's Strategic Objectives. These asset management objectives are to:

- maintain road assets to ensure that roads are safe and smooth for private motorists, road-based public transport, and commercial vehicles;
- optimise asset preservation over the long term;
- prioritise road asset investments that support economic growth;
- improve road asset performance to reduce agency and user costs; and
- provide new asset capacity where demand exceeds capacity.

These objectives are supported by an Asset Management Policy that is based on international standards. This policy sets the direction and framework required for sustainable, road-related asset management and commits the Branch to continual improvement in asset management practices and asset management performance.

Asset management policy is implemented through the following strategies:

- road system performance;
- capital investment;
- road infrastructure preservation; and
- road use.

Currently, the preservation and some road use strategies are implemented. The capital investment strategies have been initiated. These three strategies will form the base of the road system performance strategy.

RAMP provides an assessment of the current level of asset management in the Branch. The maturity level according to THM 22 (Committee of Transport Officials, 2013) of asset management for road assets was assessed as "reasonably advanced" with some areas needing improvement, while the structures and other road assets were generally less mature with most areas needing improvement.

**Asset management approach and levels of service**

The RAMP provides a detailed description of the asset management approach that includes a summary of the levels of service and standards used. The approach strives to implement international best practice in asset management as well the learnings from the practical application of asset management in other road authorities.

**Situation analysis**

The RAMP provides a comprehensive view of the current state of the Branch's road infrastructure assets in terms of the levels of service, network conditions, asset value, and vehicle operating costs. Relevant trends of surveillance data are presented and discussed, the performance gap is determined, and the long-term consequences of applying the current Medium-Term Expenditure Framework (MTEF) Budget and various other funding mechanisms is discussed.

The road network is described in detail in the report. In addition, the levels of service pertaining to the types of surveillance measurements and the road classifications are described. The vast majority (73%, 5 477.90 km) of pavement ages are older than 25 years, and thus only 27% of the pavements are still operating within their design life. The total usage for the paved network is 30.6 million vehicle-km per day and for the unpaved network it is 1,05 million vehicle km per day, totalling 31.6 million vehicle-km per day, or 10,3 billion vehicle-km annually.

A comprehensive account of the engineering and functional condition of the road network is provided in the report. The network is classified into five classes according to the Road Classification and Access Management (RCAM) Manual. Smooth Travel Exposure (based on 2022 data) indicates less than satisfactory travel conditions for most RCAM classes. Several projects have been implemented on the RCAM Class 1 network which is evident when evaluating the satisfactory STE for these roads.. Based on low rut exposure (LRE), acceptable safety conditions were found for all RCAM classes. There is less than satisfactory High Texture Exposure for RCAM classes 1, 2 and 3. This can be ascribed to the age of the seals on these roads.

The user cost in terms of total vehicle operating cost was R97 billion and excess vehicle operating cost was R34 million. The latter represents only 0,03% of total vehicle operating cost.

In 2022, the current replacement cost of the road network was calculated as R119 billion, and the depreciated replacement cost was calculated as R94 billion. These values exclude all bridge and other structures as no valuation is currently available.

The Network Condition Number (NCN) provides a measure of the visual condition of the network and is weighted by length and vehicle-km. Although the NCN for the paved network weighted by length has declined over the past few years, it has seen improvement in 2022 with an NCN between 65 and 70. It is however still below the target of 70. NCN weighted by vehicle-km has been between 10% and 15% better than the NCN weighted by length. This difference is a measure of how effectively the Branch maintains the network for the benefit of the users, i.e. the objective to provide a greater benefit experienced by the users.

The trend in the NCN for the unpaved network weighted by length has steadily deteriorated over the last 5 years, with an NCN of between 50 and 55 in 2022, which is below the target of 60. The unpaved network has very limited gravel-wearing course and the thickness averages 13 mm, well below the desirable average of 75 mm.

There has been an upward trend in the Reseal Condition Number (RCN) over the last 10 years. The RCN remained steady between 2018 and 2021 and increased in 2022 to 45.0 This reflects the decrease in need for immediate resealing.

**Needs determination**

Infrastructure maintenance needs were determined by means of a lifecycle benefit-cost analysis that includes optimisation of technical solutions over the lifecycle of each asset and for each project in the network. This was done for four budgets using appropriate maintenance and rehabilitation strategies. Insight was gained into the optimal means to fill the gap between the current and the desired levels of service. The four budgets analysed are:

- the Provincial MTEF Budget - the current funding level;
- an Optimised Provincial MTEF Budget – the optimised current funding level;
- a Technical Needs Budget – a theoretical funding level that achieves the required level of service immediately; and
- an Intervention Budget – a funding level that will achieve the required levels of service within a reasonable time period.

The results of these four budgets are shown below. The Provincial MTEF Budget can easily be compared with the results of the three optimised budgets for each work type.

The consequences of the four budgets in terms of the performance of the road network were analysed and the Intervention Budget was selected as the desired budget for funding the maintenance and rehabilitation of the network.

| Average 5-year Provincial MTEF Budget, Rand (millions) | | | | | | |
|---|---|---|---|---|---|---|
| Re-gravel | Upgrade to Paved | Reseal | Light Rehab. | Rehab. | Other[1] | Total |
| 177 | 151 | 827 | 186 | 358 | 2450 | 4 149 |
| **Average 5-year Optimised Provincial MTEF Budget Rand (millions)** | | | | | | |
| 2 | 9 | 578 | 426 | 686 | 2450 | 4 151 |
| **Average 5-year Technical Needs Budget Rand (millions)** | | | | | | |
| 1423 | 1123 | 1355 | - | 4691 | 2450 | 11 042 |
| **Average 5-year Intervention Budget Rand (millions)** | | | | | | |
| 612 | 805 | 491 | 400 | 4 783 | 2450 | 9 541 |
| **Average annual shortfall between the MTEF and Intervention Budget, Rand (millions)** | | | | | | |
| 435 | 654 | -336 | 214 | 4425 | - | 5 392 |
| Note 1: Committed construction projects and routine maintenance activities are currently excluded from the lifecycle benefit-cost analysis. | | | | | | |

The average Intervention Budget over the next 5 years is R9 541 billion per annum. The required funding level of the Intervention Budget is R5 392 billion per annum more than MTEF funding level over the next 5 years.

The current average shortfall between the MTEF Budget and the Desired Budget is R6,2 billion per year over the next 10 years. This shortfall includes the requirements for the intervention budget, new infrastructure and the upgrading of existing paved road infrastructure.

Currently the Branch identifies new regional infrastructure, through multiple processes. Feasible projects are prioritised and combined into a programme input to road investment. In future, the Western Cape Transport model will supply the information required for compiling a Demand Management Plan that will be the basis for determining a comprehensive list of these priorities.

**Asset management plans**

Asset management plans are provided for:

- renewals and replacement of roads; and

- new facilities and upgraded roads.

The objectives of the Expanded Public Works Programme and Provincial Road Maintenance Grant are included in the asset management plans listed above.

A Forward Works Programme is provided for road projects.

**Financial summary**

Full details of cash flow forecasts and desired funding estimates are provided for the period 2024/25 to 2032/33. Various sources of funding are examined, but the only realistic additional source of funding remains increased allocations from Provincial Treasury.

**Asset management enablers**

The role of asset management systems, together with asset information management, is a key enabler for effective asset management of the road network. An effective asset information management system ensures that the right information is available to the right users at the right time to support business objectives. Details of the framework for the management of asset information systems are discussed in the RAMP as well as the current IT Steering Committee to guide and direct all systems development in the Branch. The purpose and output of all road asset management systems is described, and categorised in terms of strategic, tactical and operational context. An evaluation of information availability and analysis capability indicates a high level of performance. The Branch continues to make more effective use of this data to improve the quality and scope of management information.

To support delivery, details of the organisational and support structure are discussed in the report. These include the enablers of:

- procurement and supply chain management – a good relationship enables alignment of procurement and supply chain management with asset management objectives and strategy.
- asset management leadership – the evaluation of leadership using the asset management maturity assessment tool is a high priority to identify gaps.
- organisational structure – The Branch's organogram was approved in 2020 and the filling of the new posts is essential to support the organisation with delivery.
- organisational culture – evaluation of culture using the asset management maturity assessment tool is a high priority to identify hindrances to effective delivery.
- Competence management – improving the skills of Branch staff to achieve competence in asset management is a high priority.

Competence management is the processes of systematically developing and maintaining an adequate supply of competent and motivated people to enable the fulfilment of asset management objectives. A framework for competence management is provided by the Institute of Asset Management. It can be used to assist with:

- writing or reviewing job descriptions;
- planning recruitment;
- defining selection criteria;
- identifying individual learning and development needs;
- managing individual and team performance;
- career planning; and
- performance review.

The skills development programme for engineers, technologists and technicians has been a success over the last 13 years with 50 graduates achieving registration with the Engineering Council of South Africa.

**Social responsibility**

The Branch strives to enhance job creation, training and contractor development in the delivery of projects.

**Strengths, weaknesses, opportunities, threats (SWOT)**

A SWOT analysis revealed the following:

- Asset management has significant strengths, but weaknesses with respect to aligning projects with strategic objectives. These weaknesses are being addressed.
- Well-developed asset information systems provide high-quality information. However, additional systems are needed to address the gaps.
- The current management team and professionals are dedicated and capable, but key positions remain vacant.
- Funding remains a key weakness for delivering priority projects.
- Challenges in the filling of posts within the new organisational structure are of a concern and needs to be urgently concluded for the recruitment of staff to commence.

**Risk analysis**

A risk analysis has identified the following institutional issues that require urgent mitigation:

- under-funding of maintenance, renewals and economic projects;
- organisational sustainability in terms of:
  - difficulty in attracting and retaining professional staff;
  - barriers to succession planning;
  - the large number of vacant posts undermining the ability of the Branch to manage its assets;
  - limited new appointments due to limitations on cost of employment;
- asset information governance;
- a change in the managing authority for borrow pits to the Department of Mineral Resources, causing delays in approvals
- lack of internal environmental expertise; and
- Staff are exposed to dangerous working areas in fulfilling their normal duties.

The infrastructure-related risks affecting the future economic viability of the road network of Western Cape are:

- suboptimal use of funds due to the exclusion of routine maintenance and new assets from the optimisation process;
- underperformance on national job creation targets;
- deteriorating condition of the road network to below acceptable levels of service;
- traffic demand on the network leading to congestion in the metropolitan area;
- impacts of climate change;
- scarcity of gravel and base aggregates;
- scarcity of water for compaction; and
- variable quality of bitumen supply.

**Conclusions**

- The Branch has provided a detailed analysis of the needs of the network and determined the minimum funding required for sustainability that will provide the levels of service required to support the economy of the Western Cape.
- This minimum funding is approximately R6,2 billion per year more than provided in the MTEF Budget over the next 10 years.
- Staffing of the Branch is critically low, jeopardising effective management of the road network.
- The Branch's asset management systems provide excellent support for effective management of the Branch.

**Recommendations**

It is recommended that the Branch should focus on the following issues to address the preservation of the network as effectively as possible for the available MTEF budget:

- expand the scope of work that is optimised in the Branch's resource allocation system;
- review level of service targets where appropriate;
- ensure the most appropriate design and delivery solutions are consistently chosen and implemented to appropriate standards;
- improve the effectiveness and efficiency of high-priority preservation and maintenance activities to reduce the rate of deterioration of the network, by:
  - waterproofing the network with reseals;
  - prioritising preventive over reactive maintenance; and
  - providing effective maintenance management to agreed levels of service and standards;
- minimise overheads;
- construct additional weighbridges to deter overloading; and
- implement measures to update information on bridges and other structures, including their asset value.

With respect to enabling the Branch, it is recommended that:

- The immediate filling of posts and sourcing of staff within the new organogram micro-structure to minimise the impact on service delivery;
- Utilise the asset management maturity assessment in accordance to TMH 22 (Committee of Transport Officials, 2013), to assist the Branch in identifying gaps and creating action plans for improving asset management; and
- Systems improvements are implemented to close identified gaps

# ROAD ASSET MANAGEMENT PLAN

# 2024/25 to 2033/34

# VOLUME 1: THE PLAN

# DEPARTMENT OF INFRASTRUCTURE

# TRANSPORT INFRASTRUCTURE

## Table of Contents

The **APPENDICES** can be found in **Volume 2** of the **Road Asset Management Plan**

The Western Cape Government, Department of Infrastructure has a matured level of road asset management and compiled a comprehensive Road Asset Management Plan (RAMP) as outlined in the table of contents above. A comparative evaluation between the "standard table of contents" submitted by National Department of Transport (NDOT) on the 19 October 2019 and this document's outline is provided in Appendix O, to show compliance with NDOT requirements and to guide the reader to the relevant sections of RAMP.

# Figures

# Tables

# Pictures

Note: This document is formatted according to the corporate branding of the Western Cape Government.

| ACRONYMS | | | |
|---|---|---|---|
| ABACUS | As built acceptance control utility system | EIA | Environmental impact assessment |
| AADT | Annual average daily traffic | EPWP | Expanded Public Works Programme |
| AIMS | Asset Information Management System | EUC | Excess user cost |
| AUC | Area-under-the-condition-curve | FTE | Full time equivalents |
| AAUC | Augmented-area-under-the-benefit-curve | FWD | Falling weight deflectometer |
| AFR | Asset Fund Reserve | FWP | Forward Works Programme |
| ASR | Asset sustainability ratio | GMFAM | Global Forum on Maintenance and Asset Management |
| BAS | Basic Accounting System | GIAMA | Government Immovable Asset Management Act |
| B&SMS | Bridge and Structures Management System | GIS | Geographic information system |
| CBD | Central business district | GRMS | Gravel Road Management System |
| CAPEX | Capital expenditure | GROMAMAS | Gravel Roads Maintenance Management System |
| CIDB | Construction Industry Development Board | GPSSBC | General Public Service Sector Bargaining Council |
| CoCT | City of Cape Town | HSWIM | High speed weigh-in-motion |
| COE | Cost of employment | HDM III | Highway Design and Maintenance Standards Model version III |
| CRC | Current replacement cost | HDM-4 | Highway Development and Management system version 4 |
| CSIR | Council for Scientific and Industrial Research | HTE | High texture exposure |
| DSL | Decision support level | IAM | Institute of Asset Management |
| dTIMS/ dTIMS™CT | Deighton Total Infrastructure Management System | IDMS | Integrated Design Management System |
| DRC | Depreciated replacement cost | IDP | Integrated development planning |
| DSC | Design standard certificate | IDZ | Industrial development zone |
| DM | District municipality | IMMS | Integrated Maintenance Management System |
| DCP | Dynamic cone penetrometer | IPAS | Integrated Provincial Accident System |
| DMR | Department of Mineral Resources | IPS | Infrastructure Preservation Strategy/ Integrated Procurement System |
| DPSA | Department of Public Service and Administration | IRR | Internal rate of return |

| ACRONYMS | | | |
|---|---|---|---|
| DRE | District Roads Engineer | ITP | Integrated transport plan/ integrated transport planning |
| DOI | Department of Infrastructure | JV | Joint venture |
| ECSA | Engineering Council of South Africa | KPI | Key performance indicator |
| EmpIA | Empowerment impact assessment | LCBCA | Life cycle benefit-cost analysis |
| LCCA | Life cycle cost analysis | PM | Periodic maintenance |
| LC | Lifecycle costing | PMS | Pavement Management System |
| LOS | Level of service | PQMS | Pavement Quality Management System |
| LRE | Low rut exposure | PCI | Pavement Condition Index |
| LSWIM | Low speed weigh-in-motion | PDP | Professional Development Programme |
| LTPPMS | Long Term Pavement Performance Maintenance System | PLTF | Provincial Land Transport Framework |
| LVR | Lifecycle value realisation | PRMG | Provincial Road Maintenance Grant |
| M&R | Maintenance & Renewal | PSDF | Provincial Strategic Development Framework |
| MEDS | Micro Economic Development Strategy | PSG | Provincial Strategic Goal |
| MIMS | Materials Information Management System | RNIS | Road Network Information System |
| MMS | Maintenance Management System | ROPE | Road Network Information System |
| MSDF | Municipal Spatial Development Framework | RCI | Reseal condition index |
| MTAB | Metropolitan Transport Advisory Board | RCN | Reseal condition number |
| MTEF | Medium Term Expenditure Framework | RAMP | Road Asset Management Plan |
| NATMAP | National Transport Master Plan | RAMS | Road Asset Management System |
| NDP | National Development Plan | RCAM | Road Classification and Access Management Manual |
| NCN | Network condition number | RIS | Roads Investment Strategy |
| NDOT | National Department of Transport | RISFSA | Road Infrastructure Strategic Framework |
| NLTA | National Land Transport Act | RM | Routine maintenance |
| NLTSF | National Land Transport Strategic Framework | RSMS | Road System Management Strategy |

| ACRONYMS | | | |
|---|---|---|---|
| NLTTA | National Land Transport Transition Act, | RUMS | Road Use Management Strategy |
| NSDF | National Strategic Development Framework | SANS | South African National Standard |
| OD | Organisation design | SANRAL | South African National Roads Agency SOC Ltd. |
| OPEX | Operational expenditure | SARSAM | South African Road Safety Audit Manual |
| OSD | Occupation Specific Dispensation | SITA | State Information Technology Agency |
| PEMS | Plant and Equipment Management System | SPADS | Seal Planning and Design System |
| PAS | Provincial Accident System | SR | Spot regravel |
| PDI | Previously disadvantaged individual | STE | Smooth Travel Exposure |
| PFMA | Public Finance Management Act | SWOT | Strengths, weaknesses, opportunities, threats |
| TCS | Traffic Counting System | VO | Value optimisation |
| TDA | Transport and Urban Development Authority | VOC | Vehicle operating costs |
| TMH | Technical Methods for Highways | VOCS | Vehicle Operating Cost System |
| TRH | Technical Recommendations for Highways | WCG | Western Cape Government |
| TTC | Total transport costs | WCTM | Western Cape Transport Model |
| VCI | Visual Condition Index | | |

| GLOSSARY | |
|---|---|
| ABACUS | The operations-level application for the acceptance control of layerworks |
| Asset Information Management System | The system that defines and manages the use of asset information |
| Asset Fund Reserve | A reserve of funds obtained from Provincial Treasury for funding new strategic network improvements that support economic growth |
| Asset sustainability ratio | A ratio that is a measure of sustainability of the road network |
| Bridge and Structures Management System | The strategic information system for management of bridges and large culverts (formerly referred to as the Bridge Management System – BMS) |
| Current replacement cost | The maximum theoretical asset value. |

| GLOSSARY | |
|---|---|
| Deighton Total Infrastructure Management System | The term dTIMS or dTIMS™CT, refers to Deighton Associates life cycle cost optimisation software. The software is customised with the HDM pavement performance models, calibrated for the conditions in the Western Cape. It is used to predict the future consequences of maintenance and funding policies |
| Depreciated replacement cost | The current asset value, depreciated according to the condition of the road, or other method |
| Design standard certificate | A certificate which provides the design standards to be used on a road construction project |
| District municipality | In the Western Cape, these are: Cape Winelands, Garden Route, Overberg, Central Karoo and West Coast. For convenience, the City of Cape Town, although a metropolitan rather than a district municipality, has been included in the charts with the district municipalities |
| Dynamic cone penetrometer | An instrument for determining the resistance to penetration of a steel cone |
| Environmental impact assessment | An assessment of environmental impact required by environmental legislation |
| Empowerment impact assessment | An assessment of economic empowerment impact required by labour legislation |
| Expanded Public Works Programme | A national programme run in the Western Cape by the Department of Infrastructure |
| Excess user cost | Incremental road user cost on paved roads that is avoidable. This cost covers delays, accidents, and VOC. In this report, only VOC is used and EUC is the incremental cost incurred where the roughness exceeds an IRI of 3,1 |
| Forward Works Programme | The Forward Works Programme contains the list of optimised projects according to the delivery priority |
| Full Time Equivalents | A full-time equivalent job (FTE) refers to one person-year of employment. One person-year is equivalent to 230 person days of work. Person-years of employment = total number of person days of employment created for targeted labour during the year divided by 230. For task-rated workers, tasks completed should be used as a proxy for 8 hours of work per day. |
| Geographic information system | A system designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data |
| Gravel Road Management System | The strategic information system for unpaved roads |
| Gravel Roads Maintenance Management System | Tactical and operational management information system that is integrated with ROPE to manage periodic maintenance of the unpaved road network |
| High speed weigh-in-motion | Technology used to measure the mass of passing vehicles |
| Highway Development and Management system version 4 | A software system and models that are used to investigate road transport infrastructure |
| High texture exposure | The percentage length of road exposed to high texture |

| GLOSSARY | |
|---|---|
| Integrated Maintenance Management System | The tactical and operational information management system for costing of works in the Branch |
| Integrated Provincial Accident System | A strategic information system for analysing accidents on roads |
| International Roughness Index | Measurement in mm/m to indicate the riding quality of pavements |
| Intervention levels | The level at which it is necessary to intervene with a treatment, such as resealing, rehabilitation, regravelling, etc. |
| Lifecycle benefit-cost analysis | An analysis performed to determine the predicted performance and needs of a road network for predefined funding and policy approaches |
| Lifecycle costing | The analysis of cost implications for an asset or asset system over the organisation's period of responsibility |
| Life cycle cost analysis | An analysis that takes account of costs throughout the life cycle of the asset |
| Level of service | The desired level at which the service is provided |
| Long Term Pavement Performance Maintenance System | The system used to assist with the calibration of the HDM models |
| Low rut exposure | Low rut exposure is the safety efficiency of road system performance. It is the proportion of travel undertaken each year on roads with conditions above the targeted conditions for those roads |
| Lifecycle value realisation | The optimisation of both lifecycle costs and the value obtained from assets over the organisation's period of responsibility |
| Maintenance & Renewal | A roads budget that would allow for adequate maintenance and renewal |
| Maintenance | In this report, "maintenance" refers to the activities of regravelling, resealing, rehabilitation and upgrading to paved standards. Routine maintenance is excluded from the maintenance activities addressed in this report. The activities to rehabilitate paved roads and upgrade unpaved roads to paved standards are not strictly maintenance activities, but are included in the term "maintenance" for the purposes of this analysis report |
| Materials Information Management System | A tactical and operational information system for the management of material sources |
| Maintenance Management System | A system to assist with routine maintenance operations |
| Medium Term Expenditure Framework | The budget framework used by the Provincial and National Treasuries |
| National Development Plan | National Development Plan 2030: Our Future: Make it Work. (National Planning Commission, Department of the Presidency) |
| Net present value | The difference between the present value of the future cash flows from an investment and the amount of investment. Present value of the expected cash flows is computed by discounting them at the required rate of return |

| GLOSSARY | |
|---|---|
| Network condition number | A measure of the visual condition of the road network. See TRH 22, 1994, "Pavement Management Systems", CSRA, for further details |
| Occupation Specific Dispensation | Department of Public Service and Administration circular for remuneration of specified occupations including engineers, engineering technologists and technicians |
| Passability | The ability of traffic to pass over the road. Where conditions prevent traffic crossing a road, it is called impassable |
| Paved | Refers to upgrading of unpaved roads to paved standards |
| Paved roads | Refers to the roads managed by the Pavement Management System of the Western Cape Government |
| Plant and Equipment Management System | The system that assists with the management of plant in equipment |
| Provincial Accident System | The system that assists with the capture of accident data |
| Periodic maintenance | Planned maintenance that happens at frequencies from annually up to 15 years, depending on the condition of the asset. This includes resealing, regravelling and may also include activities such as planned cleaning of pipe culverts and side drains |
| Pavement Management System | The strategic information system for management of paved roads |
| Pavement Quality Management System | The system used to manage the quality of pavements in the Western Cape |
| Pavement Condition Index | An index that measures the condition of the pavement |
| Professional Development Programme | The development programme for engineers and technicians to assist them in obtaining professional registration |
| Provincial Road Maintenance Grant | A conditional grant provided by National Treasury |
| Provincial Transport Infrastructure Branch | The Branch of the Department of the Western Cape Government responsible for the management of the province's roads, excluding national roads and urban roads |
| Provincial Strategic Goal | Goals defined in the Western Cape Provincial Strategic Plan 2019 – 2024 |
| Reconstruction | A renewal of the road where the vertical and/ or horizontal alignment is improved and/ or the width is increased, perhaps by the addition of shoulders. In addition, one or more pavement layers are improved and/ or an additional layer/ s is/ are added. Through reconstruction, the structural capacity of the pavement is increased |
| Regional Operational Planning and Execution | Tactical and operational information system for maintenance management of routine maintenance |
| Regravel | Periodic maintenance by replacing the gravel-wearing course of an unpaved road |
| Rehabilitation | A renewal of a road where one or more pavement layers are improved and/ or an additional layer is added. Through rehabilitation, the structural capacity of the pavement is increased |
| Resealing | Periodic maintenance of a paved road by waterproofing the surface of a road. This includes chip seals and asphalt surfacing |
| Reseal condition index | An index that measures the condition of chip seals |

| GLOSSARY | |
|---|---|
| Reseal condition number | A number that measures network condition of chip seals |
| Reset values | The value of a pavement performance measure (e.g. distress), after a treatment |
| Road Asset Management Plan | A strategic asset management plan for the road network |
| Road Asset Management System | All systems making up the road asset management system |
| Road Classification and Access Management Manual | TRH26: South African Road Classification and Access Management Manual – version 1.0 August 2012 |
| Roads Investment Strategy | The Road Infrastructure Preservation Strategy translate road system performance objectives that are driven by community outcomes to priorities for managing the condition of road system assets |
| Road Infrastructure Strategic Framework | Road Infrastructure Strategic Framework for South Africa, Department of Transport, 2006. A framework for the classification and management of road networks in South Africa |
| Road length | Refers to the carriage way road length in kilometres, not the distance of the road network. The road length of a dual carriageway is therefore double the distance of the road because the pavement structures of the two carriageways are investigated separately in the Pavement Management System |
| Road network | Refers to all roads managed via the Pavement and Gravel Roads Management Systems of the Western Cape Government |
| Road Network Information System | The strategic information system for managing the location of the road network of the Branch |
| Routine maintenance | Routine maintenance is the day-to-day maintenance of the road surface, the drainage and the road reserve |
| Road System Management Strategy | Road System Management Strategy examines the community needs and expectations for the performance of all assets comprising the road system and establishes an over-arching hierarchy of performance-based levels of service and future vision of fit-for-purpose standards for the configuration, capacity, use and condition of the various road network assets |
| Road Use Management Strategy | Road use management strategies provide a framework for the management of road use, particularly for specific road user groups, such as freight vehicles, public transport, port access, and mining-related cartage |
| SealPro | The operational level application used for controlling the construction of seals |
| Seal Planning & Design System | A system that assists with the planning and design of chip seals |
| Spot regravel | Regravelling of short sections of road, also called large-scale patching |
| Smooth Travel Exposure | The proportion of travel undertaken each year on roads with conditions above the targeted conditions for those roads |
| Traffic Counting System | A strategic information system for management and storage of traffic counts |

| GLOSSARY | |
|---|---|
| Total transport cost | The total cost of transport including vehicle operating costs and agency costs |
| Unpaved roads | Refers to the roads managed by the Gravel Roads Management System of the Western Cape Government |
| Visual Condition Index | The index for visual condition according to TMH 9: Pavement Management Systems: Standard Visual Assessment Manual for Flexible Pavements (Committee of State Road Authorities, 1992) |
| Value optimisation | Considers the value of the asset system in addition to asset costs |
| Vehicle operating costs | Costs that vary with vehicle usage, including fuel, tyres, maintenance, repairs, and mileage-dependent depreciation costs. Projects that alter vehicle distance travelled, traffic speed and delay, roadway surfaces, or roadway geometry may affect travellers' vehicle operating costs, which should be considered in a benefit-cost analysis |
| Vehicle Operating Cost System | A system used for determining vehicle operating costs developed by the Branch |
| Western Cape Government | The provincial government of the Western Cape |
| Western Cape Transport Model | The envisaged transport model to be created for the Branch |

# CHAPTER 1.INTRODUCTION

The road network provides a foundation for sustaining the infrastructure of the Western Cape, thereby supporting economic and social development. The Western Cape Government Transport Infrastructure Branch ("the Branch") is inevitably challenged to balance competing demands in a constrained budget environment that does not support desired levels of service.

This Road Asset Management Plan (RAMP) seeks to strengthen the alignment between the activities of the Branch with the strategic goals of the DoI and the Western Cape Government and attempts to address some of the critical questions in managing roads infrastructure, such as:

- What is the quantum of funding required for a specified level of service?
- Is it possible to preserve the road assets to current performance standards given the available fund allocation?
- How should the available funds be split between the many needs and responsibilities of the Branch, to ensure optimal benefit for both road users and the Branch?
- What is an economic level of funding for asset preservation?

The RAMP provides the information in accordance with the draft TMH 22 template (Committee of Transport Officials, 2013), which was based on the draft of ISO 55001:2014 *Asset management - Management systems – Requirements*, which has been adopted without change as SANS 55001:2015 (International Standards Organization for Standardization, 2015). The purpose of this RAMP is to address the following issues that constitute a statement of the problem:

- set out the elements of road infrastructure assets managed by the Branch;
- consider the required level of service to be provided by the infrastructure;
- indicate the level of service provided;
- assess the gap in level of service and how to address this gap;
- estimate the financial resources expected;
- provide details of the organisational and support plan structure;
- show how the infrastructure is managed and monitored;
- demonstrate responsible management;
- communicate and justify funding requirements;
- comply with regulatory requirements; and
- state the RAMP's limitations.

In response to this challenge, the RAMP provides a comprehensive view of the Branch's current state of the road infrastructure assets in terms of the levels of service, network conditions, asset value, vehicle operating costs and trends, the performance gap and the long-term consequences of applying the current and other funding levels to maintain the road network assets.

This document reflects the final version of the 2024/25 to 2033/34 RAMP for submission the 31st of January 2024. Future developments and planned amendments to the document is indicated as follows:

Paragraphs that are marked in the margin with a green bar (see left) indicate future developments or intended course of action.

## 1.1 Background

### 1.1.1 The Owner of the Road Infrastructure and Road Authority

The owner of the provincial road infrastructure in the Western Cape is the Western Cape Government. The custodian is the Department of Infrastructure, Transport Infrastructure Branch ("the Branch").

### 1.1.2 Preparation of the Road Asset Management Plan

This RAMP was updated by a team comprising of staff and consultants:

- A November Pr. Eng. BSc Eng. (Hons) (UCT)
- W Moolman Pr. Eng. (SU)
- J Neethling Pr. Eng. M.Eng. (SU)
- M Hofmeyr Pr. Eng. MSc.Eng. (SU)
- C Papadouris M.Eng. (UP)
- M van Wyngaardt Pr. Eng. B. Eng. (Industrial) Hons (Industrial) (UP)

### 1.1.3 Purpose

The purpose of this RAMP is to:

- set out the elements of infrastructure assets managed by the Branch;
- consider the required level of service to be provided by the infrastructure;
- indicate the level of service provided;
- assess gaps in level of service and how to address these gaps;
- estimate the financial resources expected to be made available;
- demonstrate how the infrastructure is managed and monitored;
- demonstrate responsible management;
- communicate and justify funding requirements; and
- comply with regulatory requirements.

Finally, this RAMP seeks to further strengthen the alignment between the activities of the Branch and the vision-inspired priorities of the Western Cape Government.

### 1.1.4 Service delivery model

The service delivery model comprises the following elements:

- planning, in which needs are identified using both own resources and consulting engineers;
- design of solutions using both own resources and consulting engineers;
- preparation of a Roads Programme using own resources;
- delivery of the projects and programmes in the Roads Programme with own resources and on contract;
- management of the use of the road network using own resources; and

- measurement of performance across all phases using both internal and external resources.

## 1.2 Goals and objectives of the RAMP

The goals and objectives of the RAMP are to communicate the Branch strategy that supports the Department of Infrastructure (DOI) vision and mission (Department of Infrastructure, 2023). The DOI strategic vision and mission are:

### *Vision*

"To enable infrastructure-led growth and investment for the Western Cape that will benefit the communities we serve."

### *Mission*

"To pursue tirelessly the delivery of infrastructure that is: resilient, inclusive, safe and seeks to heal, skill, integrate, build social cohesion, connect, link and empower Western Cape citizens, driven by passion, ethics and a steadfast commitment to the environment with our people as our cornerstone."

### *Strategic and Departmental Goals*

The Strategic Objective indicators and targets are higher order indicators that are linked to the strategic objectives in the Strategic Plan (Department of Infrastructure, 2023). These indicators are developed into the 2024/25 Annual Performance Plan (Department of Infrastructure, 2023) for the Branch.

Note: The indicators are currently output-based and this drives efficiency regardless of effectiveness in moving closer to the Department's vision. The inclusion of outcome-based indicators will incentivise outcomes that are more closely aligned with the DOI vision. This will encourage the Branch to improve the alignment between the Roads Programme and the Branch strategic objectives and, in turn, promote both effectiveness and efficiency in moving closer towards the DOI vision.

| **Branch Strategic Objectives** |
|---|
| To achieve the stated Departmental vision, two strategic objectives were adopted by the Transport Infrastructure Branch:<br><br>• to enable an efficient road-based transport infrastructure network[1] through maintenance and repair; and<br>• to support economic growth and empowerment through road-based transport infrastructure investment. |

1 "Effectiveness of road-based transport infrastructure" is an omission in this objective.

| Branch Asset Management Objectives |
| --- |
| The following asset management objectives were derived from the Branch's two strategic objectives:<br>1. Maintain road assets to ensure that the road is safe and smooth for private motorists, road-based public transport and commercial vehicles.<br>2. Optimise asset preservation over the long term.<br>3. Prioritise road asset investments that support economic growth.<br>4. Improve road asset performance to reduce agency and user costs.<br>5. Provide new asset capacity where demand exceeds capacity. |

### 1.2.1 Relationship with other planning documents

This plan is mainly informed by the following documents:

Strategic Plan 2023 to 2028, Department of Infrastructure, Provincial Government of the Western Cape

- Annual Performance Plan 2024/25, Department of Infrastructure, Provincial Government of the Western Cape

Furthermore, the intention of the Plan is to align provincial road asset management with government-wide strategic goals, which are outlined in the National Development Plan, the Medium-Term Strategic Framework (MTSF), the Western Cape Provincial Strategic Plan and Spatial Development Framework, as well as the Provincial Land Transport Framework.

The RAMP is therefore aimed to align with The DoI Outcome 1: An infrastructure foundation and capability for development, and the MTSF 2: Economic Transformation and Job Creation. This plan gives effect to National Transport Sector Strategic Priority 3: Infrastructure Build That Grows the Economy. The RAMP is a key prerequisite for the realisation of the WCG's Vision Inspired Goals (VIP) 2: Growth and Jobs.

### 1.2.2 Key stakeholders of the RAMP

Good roads are essential for economic development and growth and it follows that all developmental agencies, private and public, are key stakeholders in this RAMP.

The Branch is committed to managing its road network on behalf of those who live, work and invest in the Western Cape, providing high-value services in a legally and environmentally compliant and sustainable manner, without compromising the health and safety of employees, service providers, contractors or customers. The key stakeholders in such a transactional environment would be those benefiting from a well-managed road network that meets desired standards and service levels, as well as those who would contribute to the integrity, sustainability and safe utilisation of the asset. Such stakeholders include:

- road users and commuters on the provincial road network, including private motorists, road-based public transport and commercial road users carrying freight, as well as pedestrians and cyclists;
- suppliers of essential services that have an impact on the road reserve, e.g., water, fuel lines, electricity, communications (collectively known as statutory service providers),

who have equipment on and under the road that needs its own monitoring and maintenance;

- other transport suppliers, bus rapid transit, trains, buses and taxis, and non-motorised transport;
- SANRAL (South African National Roads Agency Ltd), that is responsible for most of the national roads that have an impact on the provincial road reserve;
- municipalities, including the five district municipalities which act as the agents of the Branch in the maintenance of certain roads, as well as all the other municipalities in the Western Cape and municipal structures such as the City of Cape Town transport authority Transport for Cape Town (TCT), who receive financial assistance for the maintenance and upgrading of certain roads;
- other government agencies with an interest in the employment-generating capacity of road maintenance and construction;
- Provincial Treasury which, through National Treasury, requested the compilation of this RAMP; and
- the National Department of Transport (NDOT) through its RAMP Guidelines issued under draft TMH 22: Road Asset Management Manual (Committee of Transport Officials, 2013).

## 1.3 RAMP Framework

### *Introduction*

The framework of this RAMP closely follows the recommendations in draft TMH 22 (Committee of Transport Officials, 2013). However, this could change once draft TMH 22 has been finalised. The current asset management maturity level practiced by the Branch is provided in the Appendix C – Gap Analysis.

### *Road network*

This RAMP includes all road networks within the Western Cape that the Branch is accountable for. In addition, reference is made to SANRAL road networks that are also within the area of jurisdiction.

The road network of the Branch is represented by a GIS map (Appendix F – Maps of the road network) highlighting the roads that are under the jurisdiction of the Branch, as well as online at https://rnis.westerncape.gov.za.

### *Level of service*

It is necessary to adopt appropriate levels of service and standards under the current budget constraints and asset conditions. This is assessed at intervals with the objective of optimal management of road assets that is in alignment with the Branch's objectives and the Departmental vision.

A summary of levels of service and standards used in this RAMP is provided below. These levels of service and standards are from draft TMH 22 (Committee of Transport Officials, 2013). Where no standards are provided in draft TMH 22, the standards used are documented.

### *Situation analysis - current asset condition and performance*

This section presents an analysis of the current situation pertaining to the Branch's road assets, comparing the actual conditions and service levels being provided against the minimum requirements documented in Chapter 3 of this RAMP.

### *Needs determination*

#### Current needs

Road asset maintenance and rehabilitation needs are determined for current assets using a lifecycle benefit-cost analysis for an analysis period of 10 years, using appropriate maintenance treatments and network optimisation as required for Level 4 of the asset management maturity scale. The following budgets are covered:

- The Current Budget, providing the expected impacts on the road network of the current budget;
- An Optimised Budget that maximises the preservation of assets while minimising total transportation costs, providing the expected impacts derived from the optimum investment allocation per treatment category in comparison with the planned allocation of the current budget;
- A Technical Needs Budget determined by an analysis that has the objective of achieving immediate compliance with the levels of service as described Chapter 3; and
- An Intervention Budget determined by the desired level of service needs analysis, that provides the impacts and the optimum investment needs per treatment category to achieve the level of service as described Chapter 3 within a reasonable time period.

#### New assets

A Demand Management Plan (DMP) has not yet been compiled. The basis of demand determination is described given national road policies (i.e. RISFSA), as well as provincial and local strategic development plans that are likely to influence demand, such as economic and social strategies, spatial development initiatives, and land-use developments. A gap analysis that will identify backlogs in road infrastructure provision as well as accessibility to economic and social amenities will be included in future. In the interim, identified candidate new roads and upgrades, and infrastructure facilities to be planned for the next 10 years are provided here.

### *Asset management plans*

The strategic analysis of this section supports the decision on the final budget most likely to be available for the next 10 years. The agreed multi-year optimised tactical plans based on this approved budget for the management of the road infrastructure assets are also included.

### *Financial summary*

This section summarises the financial requirements that are discussed in Chapter 5 and Chapter 6 of the RAMP, together with the desired investment scenario.

### *Organisational support plan structure*

Details of the Branch's capability to effectively execute the RAMP are provided in the plan.

### *Plan improvement and monitoring*

The RAMP itself is guided by draft TMH 22 (Committee of Transport Officials, 2013). The key areas identified will be monitored to determine whether there has been an improvement.

### *Job creation and skills development*

This section provides the number of jobs created during maintenance, repair and new construction of road assets over the previous years of the RAMP. Emphasis is placed on the use of the Provincial Road Maintenance Grant (PRMG) for labour-intensive construction methodologies, contractor development to optimise the job creation potential of routine road maintenance, upgrading, regravelling, black-top patching and limited rehabilitation works. Progress made on contractor development and the number of job opportunities created is included.

### *Analysis of strengths, weaknesses, opportunities, threats*

The record of a comprehensive SWOT analysis is provided.

### *References*

The list of documents used as source material for the development of the RAMP is provided.

### *Declarations*

The Declaration of the RAMP is provided in Appendix B. The Branch is implementing within a Level II RAMS for the road and structure assets. This section also shows the completeness and the maximum age of data in each of the data sets.

## 1.4 The Asset Management Approach to Planning

The Branch applies best practice in infrastructure asset management.

### 1.4.1 Asset management defined

Asset management is defined by SANS ISO 55001:2015 (International Standards Organization for Standardization, 2015) as the "coordinated activity of an organisation to realise value from assets".

At the simplest level, it means an organisation is making the best decisions it can about its assets, based on a clear understanding of its long-term objectives and purpose (mission). Asset management is the discipline that seeks to achieve this.

### 1.4.2 Asset Management Framework

The aim of providing an Asset Management Framework is to provide a vision and best practice guideline for how asset management should be implemented in the Branch.

#### *The IAM Conceptual Asset Management model*

The IAM (Institute of Asset Management, 2015b) scope of asset management is shown in Figure 1-1 and includes the following:

- asset information;
- organisation and people;
- asset management decision-making;
- strategy and planning;
- lifecycle delivery, which includes the processes of acquisition, operation, maintenance and disposal of assets; and
- risk and review.

The significance of "asset information" and "organisation and people" as enablers for asset management is clearly shown in the diagram. These enablers are discussed further in Chapter 8.

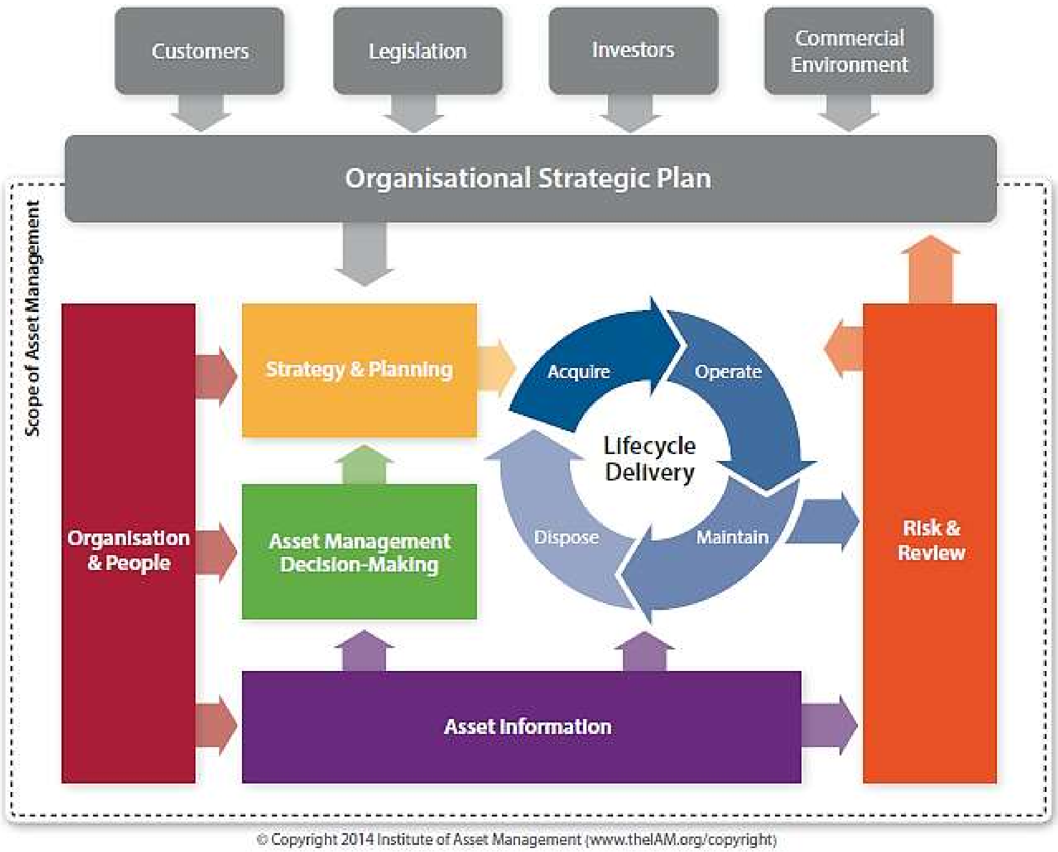



Figure 1-1: The IAM conceptual model of the scope of asset management

### *Guide to a Road System Manager for the Western Cape*

A draft "Guide to a Road System Manager for the Western Cape" (Henderson, 2015) was written as a comprehensive guideline for best practice in asset management for provincial road networks. The guide draws on many documents and standards, including:

- Guide to Asset Management, Austroads, Australia (Austroads, 2009);
- The Interim Guide to the RSM Framework within Transport and Main Roads, Queensland Department, 2010 (TMR, 2010);
- Transportation Asset Management Guide, American Association of State Highway and Transportation Officials, 2002. (AASHTO, 2002);
- SANS 55001:2015: Asset management, International Standards Organisation, 2014 (International Standards Organization for Standardization, 2015); and
- Asset Management – an anatomy Version 2. The Institute of Asset Management, UK, 2015 (Institute of Asset Management, 2015b).

The essence of the guide is described by the business framework shown in Figure 1-2. At the heart of the business processes lie the seven phases with their feedback loops.

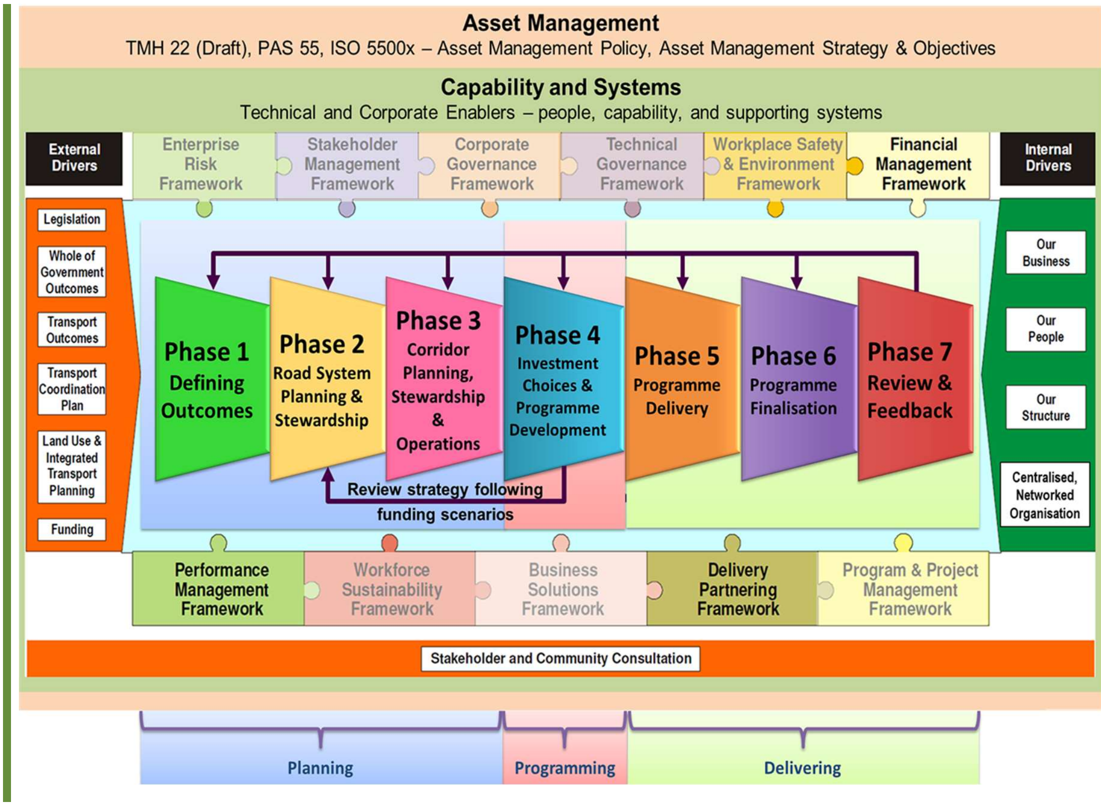



Figure 1-2: Proposed business framework for the Branch

### 1.4.3 Developing the Branch Asset Management Policy

The implementation of the Branch's Strategic Plan for its road assets relies on a planning approach and methodology that is grounded in asset management policy, strategies and plans. The Asset Management Policy is the link between the Organisational Plan of an organisation and its Asset Management Strategy. It is typically a set of principles or guidelines to steer asset management activity towards achieving the organisation's objectives. It specifically covers the "what" needs to be done and the "why" it needs to be done. The Branch's Asset Management Policy is included as Appendix A – Road Asset Management Policy.

### 1.4.4 Developing asset management strategies

#### ***Background***

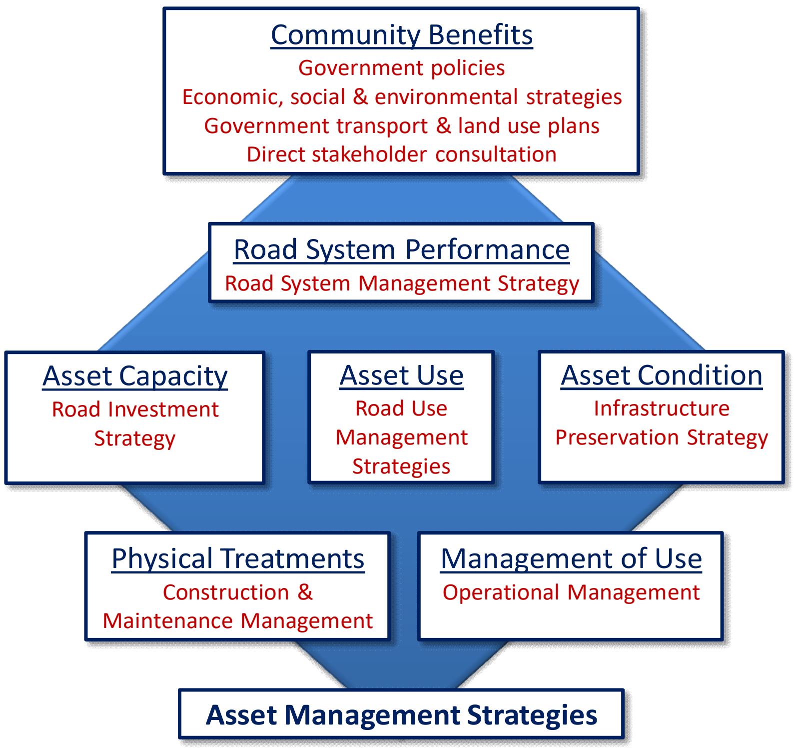
Asset management strategies direct an organisation's asset management activity. It will determine the **high-level asset management objectives** that are needed from the activity to deliver the organisation's objectives and it will define the approach to planning that will be taken.

As part of the total asset management task, it is useful to develop separate but integrated strategies (Austroads, 2009) that focus on:

- road system performance;
- capital investment;
- road infrastructure preservation; and
- road use.

This approach is based on a hierarchy of road asset management strategies, as shown in Figure 1-3. The figure illustrates the key elements of asset management for road networks. All elements are interrelated. The blue, solid background is a representation of such relationships which, if shown, would appear as an extremely complex diagram. Although only the preservation strategy, described in this RAMP, and some road-use strategies currently exist, the synthesis of a road system management strategy and a road investment strategy is envisaged in the future. These will provide the complete framework for managing the road network. A description of these documents follows:

- Roads System Management Strategy;
- Road Investment Strategy;
- Road Use Management Strategy; and
- Infrastructure Preservation Strategy.




©Austroads (Austroads, 2009)

Figure 1-3: Hierarchy of road asset management strategies

### *Envisaged Road System Management Strategy*

The envisaged Road System Management Strategy (RSMS) will examine the community needs and expectations for the performance of all assets comprising the road system. The focus of the RSMS is to establish an over-arching hierarchy of performance-based levels of service and future vision of fit-for-purpose standards for the configuration, capacity, use and condition of the various road network assets (Austroads, 2009). These levels of service reflect the strategic function and level of use of different routes in the road network to achieve the desired performance. The envisaged RSMS will set the direction of asset management for many decades to come. The road system management strategy is a strategic document that will demonstrate the relationship between the directions of development of the road system and the community's directions of economic development, social development and environmental management. The latter are commonly presented in government policies, strategies and plans, supplemented by direct community consultation.

The RSMS will also demonstrate to government and key stakeholders the synergies of targeted investments in the management and development of the road system together with other initiatives to achieve government policy outcomes. Furthermore, the RSMS will present the rationale behind fit-for-purpose performance targets and corresponding standards for the capacity, condition and use of various components of the road system (Austroads, 2009).

Until such time that the strategy has been compiled, reference is made to the various government Acts and policies, as well as Branch policies for the identification, planning and design of projects.

### *Envisaged Roads Investment Strategy*

The envisaged Road Investment Strategy (RIS) translates road system performance objectives, driven by community outcomes, into priorities for investments in road system capacity. The RIS will identify and prioritise capital investments in the road system that will progressively achieve the target network configuration and capacity identified in the RSMS, while recognising forecast patterns of road use demand and funding availability. The envisaged RIS articulates the priorities and effectiveness of capital investments in improving the capacity of the road system.

The RIS will be used for the guidance of planners, project designers and developers of road investment proposals (Austroads, 2009).

### *Infrastructure Preservation Strategy*

The Infrastructure Preservation Strategy (IPS) provides the strategic framework for managing the condition of the road network by translating road system performance objectives into preservation treatment priorities, as illustrated and outlined in Figure 1-4. This is achieved by a technique known as lifecycle value realisation (LVR) and includes:

- forecasting patterns of deterioration of asset condition;
- the effects of treatment programmes on lifecycle costs of the asset; and
- the effect of asset condition on road user costs, ride quality and safety.

It enables the development of sustainable maintenance and the renewal programmes to achieve and maintain the asset condition objectives in terms of levels of service and target standards developed in the Road Use Management Strategy (RUMS). The IPS guides the branch in terms of maintenance management for the road network.

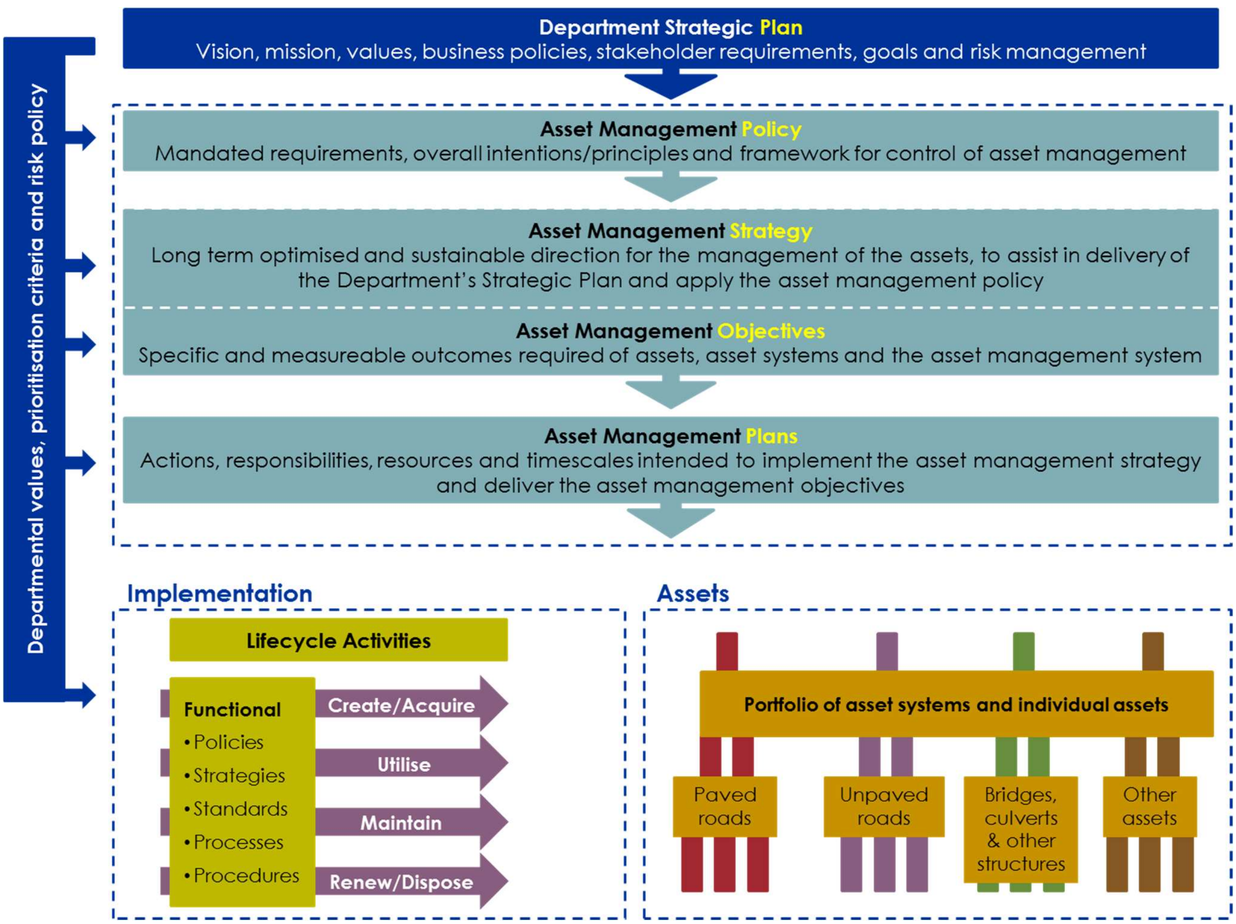
This RAMP supersedes the Road Preservation Report that previously provided the Infrastructure Preservation Strategy.

#### Lifecycle value realisation

LVR covers all the activities undertaken by the Branch to establish the desired balance for the costs and benefits of different interventions for the maintenance, renewal and disposal of road assets. In practice, this is a combination of capital investment decision-making and operations and maintenance decision-making techniques to optimise the value obtained from assets (Institute of Asset Management, 2015c). LVR requires the optimisation of both lifecycle costs in comparison with the value obtained from assets over the organisation's period of responsibility.

To achieve this outcome, it is necessary to apply both lifecycle costing (LC) and value optimisation (VO) techniques. If a required asset performance is met, then the lowest LC corresponds to the best-value method of delivering this requirement for the organisation. Sometimes LC is called "total cost of ownership". VO considers the value of the asset system in addition to the asset cost. It aims to deliver the best ratio of benefits (in terms of delivering organisational strategic goals) and LC; in other words, the best value-for-money.

The typical applications of LC and VO in the Branch at different levels of managing assets are illustrated in Figure 1-5.




©Institute of Asset Management

Figure 1-4: Planning and implementation elements of an asset management system

LC and VO are applied at three levels, namely, portfolio, system and asset, as described below.

### Portfolio-level application of LC and VO

The Branch has a large portfolio of assets and asset systems within its control (i.e. paved roads, unpaved roads, bridges, culverts, retaining walls, signage, fences, weighbridges, etc.), all of which present competing demands on scarce resources. Therefore, it is essential to analyse the costs, capabilities, and risks within the entire portfolio of assets to produce a refined suite of plans and deliverables. The current implementation of this approach in the Branch is comprehensive for the paved and unpaved roads only, but is limited for other asset types, such as bridges, culverts, etc.

### System-level application of LC and VO

When value is being created at the system level, i.e. the paved and unpaved road networks, it is necessary to evaluate and optimise performance, delivery, cost and risk across the assets in the system from the top down. System-wide LC, risks and performance are estimated by aggregating the impact of all assets by modelling the capability of the system holistically. The current implementation of this approach is comprehensive for the paved and managed unpaved roads only.

### Asset-level application of LC and VO

Where optimisation of capital investment decision-making and operations and maintenance decision-making for an individual asset is carried out, asset-level decisions need to consider the asset’s contribution at the system level. The current implementation of this approach in the Branch is comprehensive for the paved and managed unpaved roads, but is limited for bridges, culverts and the other assets.

The concept of the differing levels of application of LC and VO is illustrated in Figure 1-5.

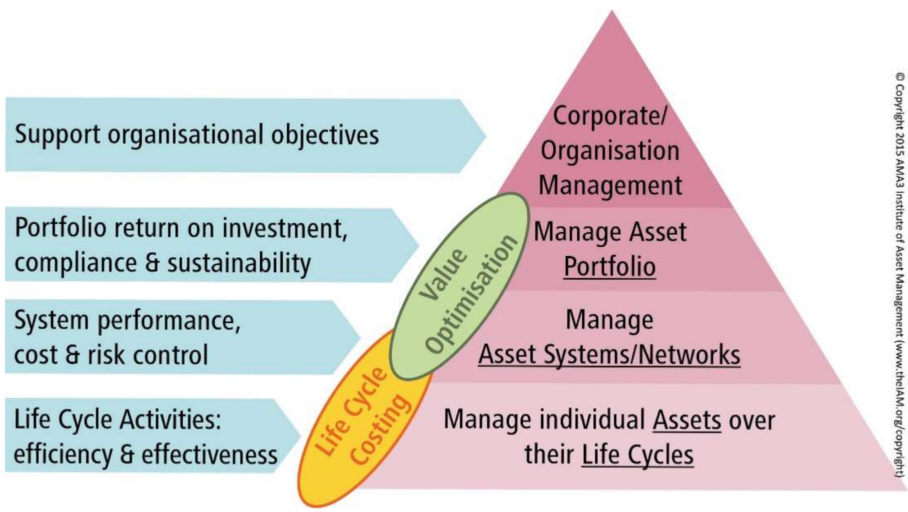



Figure 1-5: LC and VO at different levels of managing assets

LC and VO combine capital investment decision-making with operations and maintenance decision-making processes to support asset management decisions. These decisions are made in relation to costs, risks and value opportunities, taking account of both the immediate/short term impacts and any longer-term consequences. The correct application of LC and VO can produce:

- increased financial and economic benefits;
- improved decision-making effectiveness;
- better communication with stakeholders; and
- improved cross-disciplinary governance and consistency.

LC and VO help to ensure that the right decisions are made about:

- what to do;
- how much to spend;
- on what assets; and
- when to do it.

Further details on the benefits of LC and VO are documented in Life Cycle Value Realisation (Institute of Asset Management, 2015c).

### Preserving pavement assets

It is important to understand the implications of the two alternative strategies (maintenance strategy and renewal (rehabilitation) strategy) for preserving road pavement assets, which are based on the characteristic lifecycle of roads.

Figure 1-6 shows the effect of these two strategies represented by the blue line (renewal) and the green, broken line (maintenance). Road roughness is used as the measure of the performance of the pavement. Road roughness, or roughness, is the term used to describe the relative degree of comfort or discomfort experienced by a road user when using a road. The International Roughness Index (IRI) is a roughness parameter which is determined from the longitudinal road profile measured in a wheel path. In the IRI calculation, the measured profile is processed using a mathematical transformation which filters and cumulates the wavelengths encountered in the profile. This transformation was developed and calibrated in a manner that ensures that the output, i.e. the IRI, is closely correlated with road user perception of roughness and tyre load dynamics, which impact on vehicle control and safety (Committee of Transport Officials, 2016). Roughness is measured on a regular basis by the Branch. More details on this topic can be found in Chapter 3 – Level of Service.

When a road becomes rough to ride on, users experience a ride that is bumpy and potentially unsafe. Roughness is also an indicator of the condition of the underlying pavement structure layers.

### Maintenance strategy

This strategy assumes adequate funding for routine maintenance, reseal and rehabilitation. Figure 1-6 illustrates the deterioration of roughness with time and shows the required maintenance treatments of:

- routine maintenance;
- resealing at appropriate intervals; and
- rehabilitation once the riding quality (road roughness) and condition of the road has deteriorated to the intervention level.

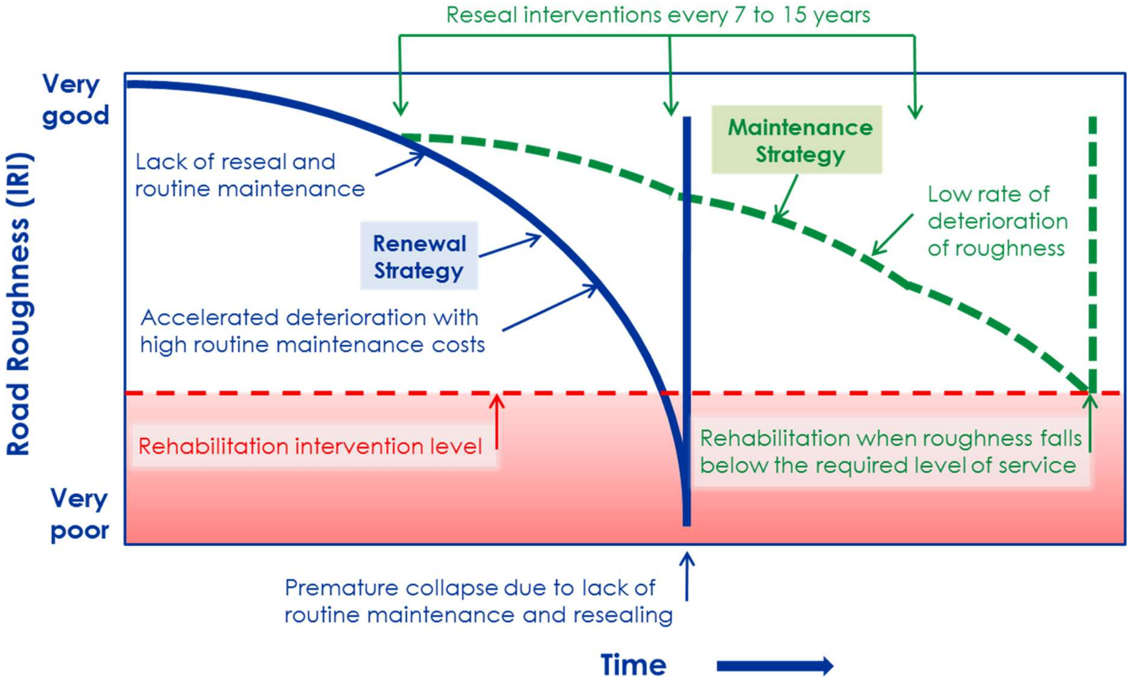



Figure 1-6: Characteristic graph of deteriorating roughness showing the effect of different strategies

The implementation of the maintenance strategy retards the deterioration of the road network by protecting the roads from ingress of water and thereby maximises the useful life of the road until it finally requires rehabilitation. The maintenance strategy results in the lowest costs to the road user and the Branch and the network is preserved in a condition that functions optimally.

**The Branch has adopted the Maintenance Strategy for the Preservation of the provincial Road Network in the Western Cape**

### Renewal strategy

This strategy assumes insufficient funds for routine maintenance and resealing and a fix-worst-first approach is followed for the selection of maintenance options:

- there is a high demand on routine maintenance to prevent the collapse of the road surface, and the consequence is escalating routine maintenance costs;
- severely deteriorated roads require premature rehabilitation due to insufficient preventive maintenance at a cost of at least ten times more than the cost of resealing; and
- the renewal strategy leads to destruction of the road asset, which is very expensive to replace because of the premium paid for rehabilitation or reconstruction. The road user pays excessive costs due to the poor condition of the provincial road network and the Branch pays extra for the intervention.

**The renewal strategy is neither desirable nor sustainable.** Once the network deteriorates beyond the point where the maintenance strategy can no longer be applied because of accelerating deterioration, the renewal strategy takes over and the accelerating destruction of asset is inevitable without an injection of additional funds.

### *Road use management strategies*

The road system cannot accommodate unconstrained use. To address this, road use management strategies (RUMS) provide a framework for the management of road use, particularly for specific road user groups, such as freight vehicles, public transport, port access, and mining-related cartage. Such operational management strategies are complementary to the Road Investment Strategy and the Infrastructure Preservation Strategy.

The RUMS also provides a strategic framework to manage the use of the road system, including vehicle registration, mass and dimension limits, operational requirements, licensing of drivers and operators, traffic management, and road space allocation (Austroads, 2009).

RUMS typically includes:

- Road Access Guideline supported by the Access Management Guidelines;
- Designated routes for heavy or oversize vehicles;
- Abnormal loads;
- Speed management; and
- Priority lanes for public transport vehicle movements.

Travel demand management (TDM) strategies that focus on managing the level of travel demand and influencing modal choice are a sub-set of road use management strategies.

## 1.5 Asset Information Systems

According to the IAM (Institute of Asset Management, 2015a), "Organisations should establish and maintain systems that manage asset information. The systems should be designed to provide enough support and information to meet the organisation's asset management objectives". Furthermore, the IAM goes on to say that "Unless the content of the asset information system is managed appropriately then the business decision making capability will be impaired".

Examples of this impairment are when:

- Maintaining assets;
- Setting investment requirements/ capital expenditure planning;
- Responding to alarms and operational incidents; and
- Managing logistics.

The IAM concludes that "Having an effective asset information management system is a key component of asset management. Such a system ensures that the right information is available to the right users at the right time to support business objectives" (Institute of Asset Management, 2015a).

### 1.5.1 Value of asset information

#### ***Cost efficiencies***

The IAM (Institute of Asset Management, 2015a) quotes studies that have shown that asset information has a very significant effect on the efficiency and performance of asset-intensive businesses. Organisations operating efficient asset information processes have been found to spend around 20% of their total annual budget (OPEX and CAPEX) on asset information. In businesses with poor asset information processes, this can increase to as much as 25%. Therefore, improving the efficiency of how asset information is managed within the business therefore offers a significant opportunity for savings.

#### ***Expenditure effectiveness***

The IAM (Institute of Asset Management, 2015a) advises that an even greater benefit can be realised if asset information is used effectively to inform decision making on business expenditure profiles, such as capital programmes to improve asset serviceability, or best whole-life cost decisions regarding maintenance and renewal choices, i.e., the appropriate use of asset information will **enable the right work to be done in the right place at the right time.**

### 1.5.2 Asset information management system

The IAM (Institute of Asset Management, 2015a) recommends that an Asset Information Management System (AIMS) be established to define and manage the use of asset information as a key component, and in support of, the Asset Management System. AIMS will be a core part of the operation of the Branch, will receive suitable high-level input and support and will be reviewed on a periodic basis to maintain alignment with Branch objectives and the Asset Management System. The AIMS is shown in Figure 1-7 (Institute of Asset Management, 2015a). The word "governance" in this context refers to the disciplines involved in managing and controlling data and information.

As can be seen in Figure 1-7, the AIMS will consider the following:

- Asset Information Strategy;
- Standards, specifications and requirements for asset information;
- Managing information through its lifecycle;
- Monitoring, auditing and benchmarking to review performance;
- Ongoing consideration of governance, people and organisational factors;
- Management of processes and systems; and
- Effective management of change

In this context, the new Chief Directorate Road Programme Management developed within the Transport Infrastructure Branch as from April 2020, will assess how "good practice" approaches may be relevant to the Branch objectives.

## 1.6 Road Asset Management Systems

Asset information is a key enabler for effective asset management (Institute of Asset Management, 2015a). The Branch relies heavily on its Road Asset Management System and supporting processes to enable effective and efficient asset management. In terms of SANS 55001:2015 (International Standards Organization for Standardization, 2015), this includes project identification, optimisation of projects and programmes, programme and project management.

The creation and ongoing development of road information management systems has a long history in the Branch. The historical context of these developments is described below.

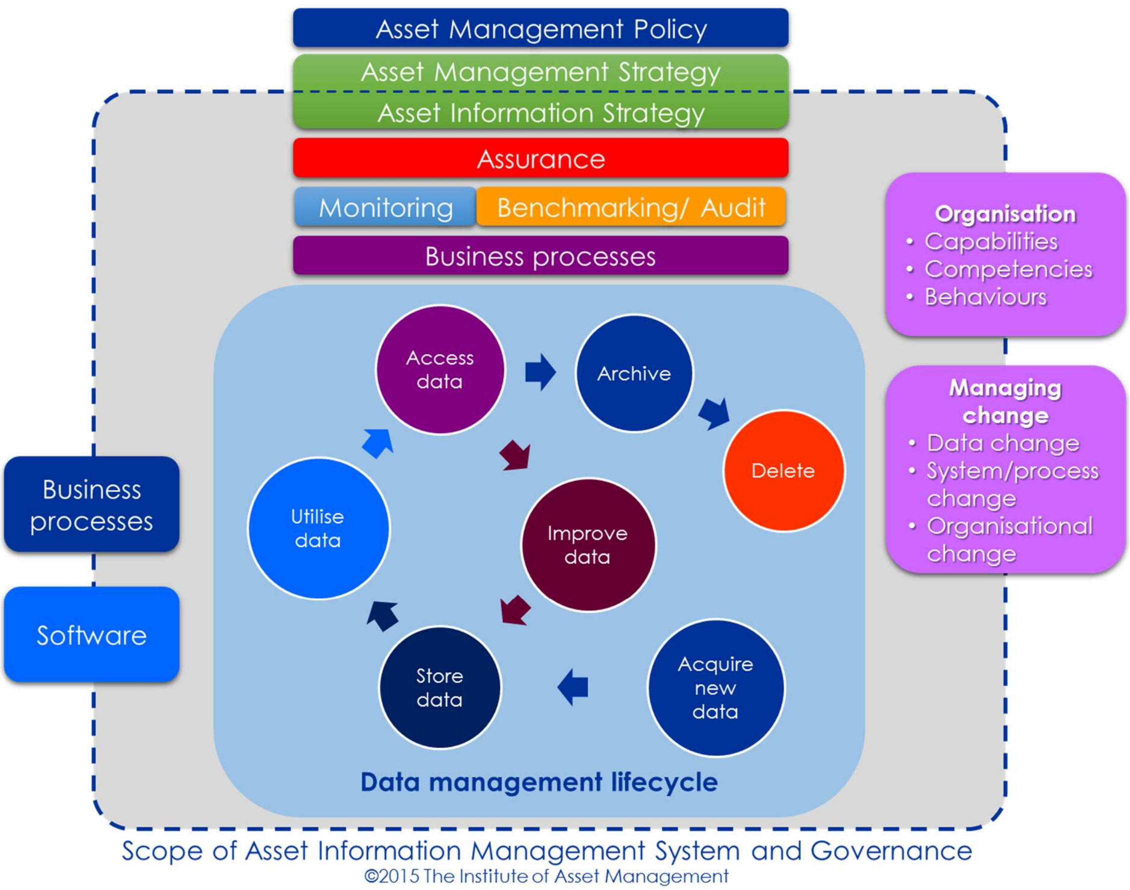



Figure 1-7: The asset information management system

### 1.6.1 Historical development of road management systems

In 1980 what was then the Department of Roads of the Cape Provincial Administration recognised the need to develop formal procedures that use objective data on which to base maintenance strategy and policy, and to identify and prioritise rehabilitation and resealing projects. This strategic approach to asset management has been defined and refined in the preservation strategy of the Branch over more than 30 years.

The Pavement Management System (PMS) was initiated in 1981 with the help of the Council for Scientific and Industrial Research (CSIR) and was developed and enhanced in-house with the assistance of consulting engineers. The PMS supports strategic-level decisions. It provides a repository of as-built pavement structure information. Condition reports can be obtained from the PMS that include both functional and structural condition. The system is used to identify candidate resealing projects and develop a list of resealing priorities.

The Gravel Roads Management System (GRMS) was initiated in 1989 to expand the scope of the PMS to include unpaved (gravel) roads. A panel of consulting engineers was appointed to assist with the implementation and the management of this new system. The GRMS supports strategic- and tactical-level decisions. The GRMS provides a repository of gravel-wearing course information and visual survey and dynamic core penetrometer (DCP) data. Condition reports can be obtained from the GRMS that provide functional condition. The system is used to identify and priorities candidate regravelling projects as well as special maintenance projects, such as spot regravelling.

The latest phase of the development of the PMS and GRMS was being upgraded to web-enabled systems. There are ongoing improvements to the systems and the technology used for data collection.

In 1995, the Branch contracted Aurecon to use the Deighton Total Infrastructure Management System (dTIMS) with the data from the PMS and GRMS databases to provide powerful functionality, enabling lifecycle cost-benefit analysis to be used in the optimisation process for projects under constrained budget conditions.

The priority of rehabilitation and upgrade projects is determined by means of an optimisation process using incremental benefit-cost analysis. The objective function (refer to paragraph 5.1.13, Background to the lifecycle benefit-cost analysis) initially used was to minimise total transport costs (TTC). These costs were calculated from vehicle operating costs and agency costs. This TTC objective function was subsequently modified in 2009 to allow for asset preservation on low-traffic roads by maximising road condition.

The World Bank Highway Development and Management system HDM-4 models are calibrated for the Western Cape using data from 37 monitored sections of road throughout the province captured over the last 15 years. These models predict the future deterioration of the road network and provide information for estimating vehicle operating costs. dTIMS enables the combined analysis of both paved and unpaved roads to produce the optimum distribution of funds, thus guiding the Branch in the most effective allocation of resources.

The following kinds of potential projects are identified by dTIMS:

- Rehabilitation/ reconstruction;
- Light rehabilitation;
- Resealing;
- Regravelling; and
- Upgrading to paved standards.

dTIMS determines the technical budget needs and the optimised MTEF budgets for each project type listed above. This improves the allocation of funding sources to identified areas of need.

The Bridge and Structures Management System, known as STRUMAN, was developed by the CSIR and initiated in 1998. It provides an inventory of bridges and large culverts. Needs are determined from ad hoc visual inspections. Currently, no algorithms are being used to determine maintenance needs.

It is envisaged that in future dTIMS or similar approved industry software will include functionality for determining the maintenance priorities for structures.

The Traffic Counting System (TCS) was developed more than 50 years ago and continues to be refined and upgraded. The system provides reliable traffic counts for the PMS and dTIMS to support the demand analysis.

The first phase of a new system called the Gravel Roads Maintenance Management System (GROMAMAS) was implemented in 2005. GROMAMAS manages all the processes associated with the regravelling and maintenance of unpaved roads. The GROMAMAS supports tactical and operational decisions.

In 2008 the borrow pit module in the Gravel Management System was split off to create the Materials Information Management System (MIMS). This system is currently a repository of information on all borrow pits used for the maintenance of unpaved roads. MIMS will, in future, provide valuable information on the availability and spatial distribution of gravel materials. MIMS is operational and is currently being enhanced.

The major technical systems architecture is shown diagrammatically in Figure 1-8 and places the systems with respect to their support of strategic, tactical and operational levels of decision making. Systems shown in grey are not operational and are envisaged or under development. The acronyms used in Figure 1-8 are described in the list of acronyms at the beginning of the RAMP. The purpose and output of the Strategic Asset Management Systems is listed in Appendix D. Similarly, systems of a tactical and operational nature are listed in Appendix E.

### 1.6.2 Outline of the asset management information available

All surveillance data (listed in Table 3-1, Table 3-2 and Table 3-5) is available from the systems described in Annexure D and E. Comprehensive reports are prepared annually on the state of the paved and unpaved road network that cover the condition of each road.

### 1.6.3 Gap analysis for RAMS

All systems are reviewed periodically, and their functionality updated to meet the information requirements of the Branch. Systems are also redeveloped to keep up with changes in technology. Currently, gaps in systems and processes are identified by system owners and these are attended to depending on priority and funding. The Department has an Information Technology Steering Committee to guide and direct systems developments within the department. In addition, the Branch committee member works towards a gap assessment of information management and processes in terms of best practice contained in SANS 55001:2015 (International Standards Organization for Standardization, 2015), PAS 55 (British Standards Institute, 2008), the IAM publication "Asset Information, Strategy, Standards and Data Management" (Institute of Asset Management, 2015a) and Asset Management – an anatomy (Institute of Asset Management, 2015b).

The following gaps have been identified:

- The lack of an information system to support the management of routine maintenance of the paved road network will be improved by the implementation of a Maintenance Management System.
- The lack of control over how project portfolios to provide oversight for strategic, tactical and operations planning will be improved by the implementation of a Portfolio Management System.

### 1.6.4 Evaluation of information and analysis functions

The American Association of State Highway and Transportation Officials (AASHTO) self-assessment questionnaire (AASHTO, 2002) was used as a tool to evaluate the state of asset management in the Branch as at 10 July 2015, and reported on in the RAMP 2017/18 to 2026/27.

The Branch has initiated an independent evaluation of the efficiency of available systems and processes in September 2018. This exercise will form part of the System Support Services review of key asset management systems and the development of a new efficiency process system.

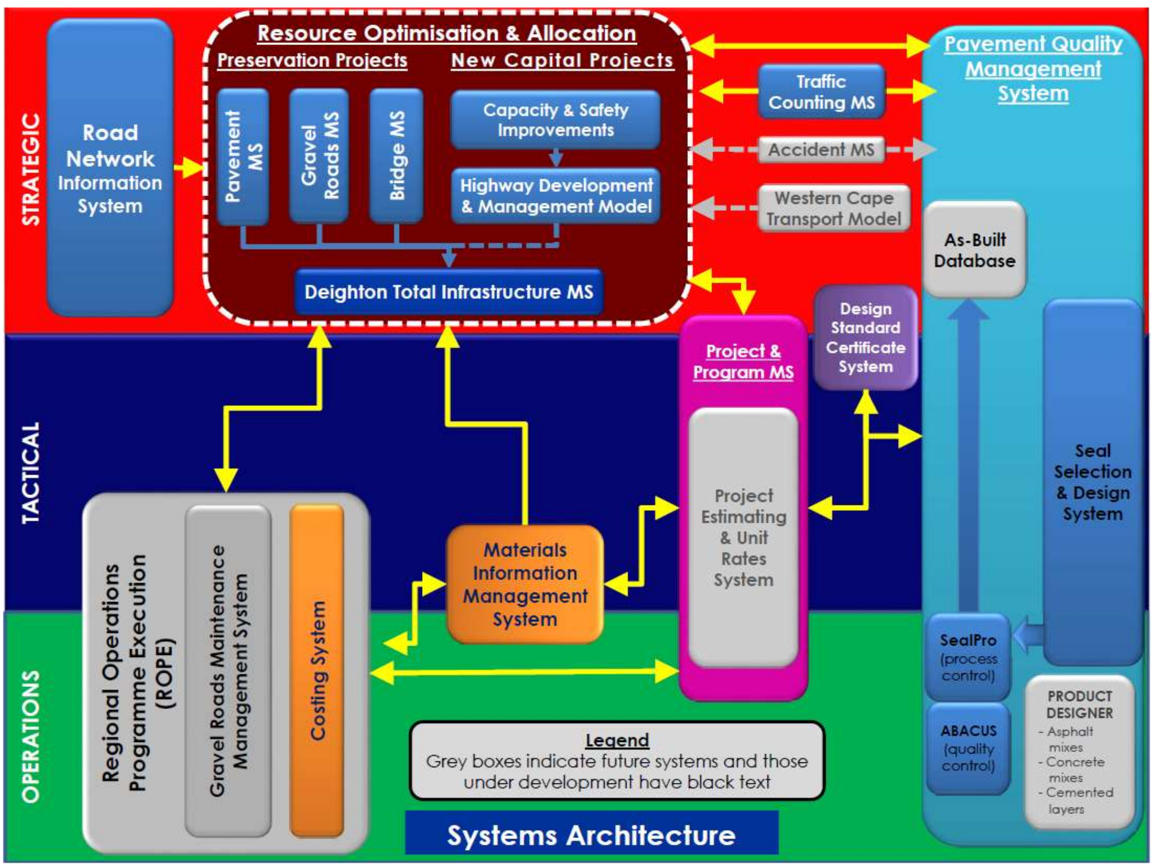



Figure 1-8: Major systems architecture

### 1.6.5 Technology management

Government organizations are not exempt from implementing technology management principles in their business model. The demands of stakeholders and the public have changed. The "on-demand" business models utilizing platforms such as Uber, banking platforms, and specific platforms such as airline apps have changed the customer service landscape dramatically and this has also become clear when the public perceives public service.[2]

It is therefore important for government authorities and agencies to leverage technological advances in order to deliver new value for the public, ensure effective reengineered processes and increase the overall output of the employees. Technology and technology management in the government sector can be used to:

- utilize digital services to improve processes
- offer services with increased efficiency and quality
- breakdown silos and improve participation between the private and public sectors.

In a paper by Mahmood et al. [3], it was found that fundamental changes to the core functions of government cannot be achieved by digitization and introduction of web services alone. Digital services in government has a track record of failing to deliver on its promises as costs, performance and reputation does not improve significantly in the process. Technology transformation should extend its focus beyond the use of websites or the digitization of existing processes. It should aim to fundamentally change the way the organization is working and delivers its services.

This RAMP identifies the need for effective technology management in the workplace and our processes and should formalise its technology management strategy to ensure the achievement of its business goals and objectives.

[2] THE ROLE OF AI TECHNOLOGY AND ADVANCED ANALYTICS IN PUBLIC SECTOR, Intalio, 2020
[3] The role of information and communications technology in the transformation of government trust, Mahmood et al., 2020

## 1.7 Administrative and financial management

In addition to RAMS, other support systems can be classified into the categories of administrative and financial management systems.

### 1.7.1 Administrative and Financial systems

The following is a list of systems in use by the Branch:

- Outlook;
- Integrated loss control system;
- Supplier Invoice Tracking Systems (SITS)
- Basic Accounting System (BAS);
- Personnel and salary administration system (PERSAL);
- Strategic planning monitoring system;
- Integrated Procurement System (IPS); and
- Electronic Content Management document management system (ECM).

### 1.7.2 Financial management services

Financial management services are rendered to the Branch by the Financial Management Branch of the Department. The Financial Management Branch consists of the following divisions:

- Management Accounting;
- Financial Accounting, Financial Control; and
- Supply Chain Management.

The Branch uses the transversal National Treasury financial management systems. In addition to these systems, the Department is using various debtors and management reporting systems to improve financial and budgetary controls.

The financial management of the Branch is structured on a decentralised basis and management in the various components of the Branch is financially accountable. Systems have been developed to complement this decentralised strategy. The Financial Management Branch holds regular meetings with the management of the Branch and key financial staff to ensure effective and efficient control.

The Branch regards compliance with the Public Finance Management Act (PFMA) (Act 1 of 1999) as a high priority. The Branch completes the National Treasury's normative measures report on a quarterly basis and submits the report to Provincial Treasury.

No changes in the financial management services and systems are required by this RAMP.

# CHAPTER 2.THE ROAD NETWORK

## 2.1 Ownership of the road infrastructure

The Constitution of the Republic of South Africa, 1996, lists provincial roads and traffic management as a Schedule 5, Part A function, which is an exclusive provincial legislative competence, but does not give a specific definition of provincial roads. Nor do the Local Government: Municipal Structures Act (Act 32 of 2000) or the Local Government: Municipal Systems Act (Act 117 of 1998) define roads and streets. The division of functions between the provincial and local spheres of government remains unstructured and guided by historic arrangements and informal agreements entered into in the spirit of co-operative governance.

Section 7(1) of the Cape Roads Ordinance requires that the "Administrator" shall undertake the construction and maintenance of every public road, other than a minor road of which the "Administrator" is the road authority. Section 7(2) requires that a "(Divisional) Council' shall, in so far as funds permit, undertake the construction and maintenance of every divisional road of which the Council is the road authority". Section 7(3) states that the road authority "may undertake the construction and maintenance of every minor road and public path of which it is the road authority".

Prior to the establishment of regional services councils during the period 1987 to 1989, the divisional councils were the road authorities for proclaimed main roads, divisional roads, minor roads and public paths in rural areas and in outer municipal areas. Divisional councils were abolished in the late 1980s. During 1992, all assets, liabilities, rights, duties and obligations of the regional services councils in respect of proclaimed main roads, divisional roads, minor roads and public paths were passed to the then Administrator of the Cape of Good Hope. This resulted in the Provincial Government of the Western Cape becoming the road authority for all provincially proclaimed roads in the province. This "road authority" function has been delegated to the Minister responsible for the Department of Infrastructure, with the Provincial Transport Infrastructure Branch of the Department of Infrastructure being the responsible organisation. The district municipalities in the province, being the legal successors to the regional services councils, act as the agents of the provincial government for the maintenance of main roads, divisional roads and minor roads.

The Branch is therefore responsible for the proclaimed provincial road network within the Western Cape, consisting of 7 316.38 km of paved roads, 24 901.89 km of unpaved roads, and eight weighbridges. The road network of the Province is shown in Appendix F – Maps of the road network.

### 2.1.1 Legislative requirements

The achievement of the strategic goals of the Branch is guided primarily by the following constitutional and other legislative mandates:

- Constitution of the Republic of South Africa, (Act 108 of 1996).
- The Constitution of the Western Cape, 1998 (Act 1 of 1998).
- Public Finance Management Act, 1999 (Act 1 of 1999 as amended by Act 29 of 1999) and Regulations.
- Public Service Act, 1994 (Act 103 of 1994) and Regulations, 2001 and 2016.

- Western Cape Land Administration Act, 1998 (Act 6 of 1998). National Land Transport Act, 2009 (Act 5 of 2009) and Regulations.
- National Road Traffic Act, 1996 (Act 93 of 1996).
- Cape Roads Ordinance, 1976 (Ord, 19 of 1976).
- Advertising Along Roads and Ribbon Development Act, 1940 (Act 21 of 1940).
- Road Transportation Act, 1977 (Act 74 of 1977).
- Road Safety Act, 1972 (Act 9 of 1972).
- Road Accident Fund Act, 1972 (Act 9 of 1972)
- Road Traffic Management Corporation Act No 20 of 1999.
- Administrative Adjudication of Road Traffic Offences Act No 46 of 1998.
- Infrastructure Development Act No 23 2014.
- Provincial Infrastructure Delivery Management Framework as approved by the Provincial Executive Council.
- Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended by Acts 181 of 1993 and 66 of 1995 and Regulations.
- National Environmental Management Act, 1998 (Act 107 of 1998) and regulations.
- Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) and regulations.
- Western Cape Road Traffic Act, 1998 (Act 12 of 1998).
- Western Cape Toll Roads Act, 1999 (Act 11 of 1999), and the Policy drawn up in terms of Section 16(1) of the Act.
- Preferential Procurement Policy Framework Act, 2000 (Act 5 of 2000) and its regulations.
- Construction Regulation R1010 of 2003 with specific reference to compliance to occupational health and safety within the construction industry.
- Construction Industry Development Board Act 2000 (Act 38 of 2000) with specific reference to the regulation of the construction industry and its 2004 Regulations with specific reference to the registering of contractors and projects.
- Building Industry Bargaining Council Legislation Act 2003 (Act No 25769 of 2003) with specific reference to the protection of employees in the construction industry.
- Broad-Based Black Economic Empowerment Act, 2003 (Act 53 of 2003).
- Local Government: Municipal Systems Act, 1999 (Act 32 of 1999).
- Local Government: Municipal Structures Act, 1998 (Act 117 of 1998).
- Division of Revenue Act, 2007 (Act 1 of 2007 and subsequent Acts).
- Government Immovable Asset Management Act, 2007 (Act 19 of 2007).
- Expropriation Act, 1975 (Act 63 of 1975).
- Western Cape Transport Infrastructure Act, 2013 (Act 1 of 2013).
- Spatial Land Use Management Act, 2013, (Act 16 of 2013) and regulations.
- The Land-use Planning Ordinance Act, 1985 (No 15 of 1985).
- The Western Cape Land-use Planning Act, 2014.
- The Mine Health and Safety Act, 1996 (No 29 of 1996).

## 2.2 Road network classification

Rural roads in the Western Cape are classified into three main categories:

- National roads, managed by the SA National Roads Agency (SANRAL);
- Western Cape Government provincial roads, managed by the Branch;
- Local municipal roads and streets managed by the different local municipalities.

Provincial roads are those roads proclaimed as such by the WCG and consist of four categories:

- Trunk roads;
- Main roads;
- Divisional roads; and
- Minor roads.

There are also proclaimed municipal main roads that are subsidised by the Western Cape Government. Other road networks within the Western Cape are the SANRAL national road network and municipal networks.

## 2.3 The strategic network

A study into the need for provincial strategic road networks was commissioned by the National Department of Transport during 2016. This initiative required that the Branch identify and submit its PRMG strategic road network for year-on-year performance measures based on key performance indices, measuring the outcomes supporting S'Hamba Sonke Programme.

The rationale used by the Branch for determining the strategic road network was based on the premise that the network would assist in supporting economic growth in the Western Cape. The information contained in the Growth Potential Study (Western Cape Government, 2013) (Western Cape Government, 2014) and the Provincial Spatial Development Framework (Western Cape Government, 2014) assisted with the process of selecting paved roads from the hierarchy of road classes in the Western Cape. Roads with predominantly high volumes that connect areas of economic growth potential were selected. The Strategic Provincial Road Network has a length of 3 236.66 km of paved roads.

## 2.4 Road carriageway length

Table 2-1 lists the extent of the road network in terms of length in the Western Cape as described on the Road Network Information System (RNIS) website https://rnis.westerncape.gov.za.

| Table 2-1: Centreline length of the road network of the Western Cape in 2022 | | | | | |
|---|---|---|---|---|---|
| **Area** | **Trunk Roads** | **Main Roads** | **Divisional Roads** | **Minor Roads** | **Total** |
| **PAVED ROADS** | | | | | |
| Cape Winelands | 385.48 | 732.27 | 525.46 | 121.66 | 1 764.87 |
| Central Karoo | 553.72 | 63.91 | 14.82 | 0.97 | 633.42 |
| Garden Route | 765.52 | 465.72 | 279.50 | 44.47 | 1 555.21 |
| Overberg | 351.71 | 385.41 | 192.54 | 59.47 | 989.13 |
| West Coast | 436.54 | 894.52 | 310.21 | 90.73 | 1 732.00 |
| City of Cape Town | 146.30 | 84.14 | 47.02 | 1.35 | 278.81 |
| Unicity Road Network | 0 | 295.16 | 67.78 | 0 | 362.94 |
| **Provincial total** | **2 639.27** | **2 921.13** | **1 437.33** | **318.65** | **7 316.38** |
| **UNPAVED ROADS** | | | | | |
| Cape Winelands | 0 | 234.41 | 883.54 | 1 755.00 | 2 872.95 |
| Central Karoo | 68.07 | 616.56 | 1 676.54 | 3 781.96 | 6 143.13 |
| Garden Route | 63.17 | 455.09 | 2 456.52 | 2 328.86 | 5 303.64 |
| Overberg | 0 | 115.74 | 1 153.45 | 1 450.95 | 2 720.14 |
| West Coast | 0 | 374.93 | 1 575.53 | 5 880.32 | 7 830.78 |
| City of Cape Town | 0 | 0 | 0 | 14.53 | 14.53 |
| Unicity Road Network | 0 | 0 | 16.72 | 0 | 16.72 |
| **Provincial total** | **131.24** | **1 796.73** | **7762.30** | **15 211.62** | **24901.89** |
| **All ROADS** | | | | | |
| Cape Winelands | 385.48 | 966.68 | 1 409.00 | 1 876.66 | 4 637.82 |
| Central Karoo | 621.79 | 680.47 | 1 691.36 | 3 782.93 | 6 776.55 |
| Garden Route | 828.69 | 920.81 | 2 736.02 | 2 373.33 | 6 858.85 |
| Overberg | 351.71 | 501.15 | 1 345.99 | 1 510.42 | 3 709.27 |
| West Coast | 436.54 | 1 269.45 | 1 885.74 | 5 971.05 | 9 562.78 |
| City of Cape Town | 146.3 | 84.14 | 47.02 | 15.88 | 293.34 |
| Unicity Road Network | 0 | 295.16 | 67.78 | 0 | 362.94 |
| **Provincial total** | **2 770.51** | **4 717.86** | **9 182.91** | **15 530.27** | **32 201.55** |
| **CARRIAGEWAY LENGTH OF MANAGED ROAD NETWORK USED IN THE SITATIONAL ANALYSIS (CHAPTER 4)** | | | | | |
| Paved | 2 641.26 | 2 869.68 | 1 403.74 | 255.23 | 7 169.91 |
| Unpaved | 131.24 | 1 795.65 | 7 735.60 | 681.57 | 10 344.06 |
| **Total managed** | **2 772.50** | **4 665.33** | **9 139.34** | **936.80** | **17 513.97** |
| **CARRIAGEWAY LENGTH OF MANAGED ROAD NETWORK USED IN THE LCCA (CHAPTER 5)** | | | | | |
| Paved | 2 737.11 | 3 057.26 | 1 403.74 | 255.23 | 7 453.34 |
| Unpaved | 131.24 | 1 795.65 | 7 735.60 | 681.57 | 10 344.06 |
| **Total managed** | **2 868.35** | **4 852.91** | **9 139.34** | **936.80** | **17 797.40** |

Note, the variance between the three data sources used for the provincial network and the managed network is due to:

- The RNIS is a system that is dynamically managed, while the PMS and GRMS are static for a twelve-month period.
- The Situational Analysis and the needs analysis of this report is based on the 2022 data.

The UniCity roads form part of the road asset register in this report. These roads were historically maintained by the City of Cape Town (CoCT) and the condition of these roads has deteriorated to such an extent, that CoCT are not able to maintain the road infrastructure to an appropriate level of service. As the road authority, the Branch has collected the condition data for these roads and its analysis forms part of both the situational analysis and LCCA at network level.

Historical information on the condition of the individual roads, the road network and the traffic carried is available from the RNIS at https://rnis.westerncape.gov.za/rnis.

All references to the length of the WCG road network are "carriageway length", thus including the length of dual carriageways in both directions. **Note:** From this point forward, the reference to the WCG network includes only the "managed road network" by the WCG Branch. The road network information has been updated to the format provided by National Department on Transport in September 2019 and this is provided in Appendix P – Road Network Information.

Details of the national road network in the Western Cape are shown in Table 2-2.

Table 2-2: National Road network in the Western Cape

| National Road No. | 1 | 2 | 7 | 300 | Total |
|---|---|---|---|---|---|
| **Length, km** | 542.45 | 517.00 | 384.70 | 16.44 | 1 460.59 |

The proclaimed municipal road network is 283.43 km. The WCG contributes subsidies to the municipalities to maintain these proclaimed main roads. Data on the full extent of the municipal road networks in the Western Cape is not available.

## 2.5 Paved roads versus unpaved roads

According the 2022 asset data, paved roads comprise 41% of the managed road network length investigated, but the traffic data indicates 96% of vehicle-km is travelled on paved roads. It is, therefore, reasonable to say that a focus on the maintenance and rehabilitation of paved roads will influence the maximum number of road users. This policy has historically been followed and, according to the current funding scenario, more than 75% of the maintenance and rehabilitation funds of the Branch has been allocated towards the preservation of the paved road network.

The asset valuation of 2020 indicates that paved roads comprise of 96% of the total network's value, requiring a large input of funding to preserve the paved roads in a functional condition and minimising the road user costs for 96% of the road users. According to the 2022 asset data, the managed road network (including municipal main roads) of the Western Cape Government carries 10.3 billion vehicle-km per annum. **Only 4% of this annual traffic is travelled on unpaved roads.**

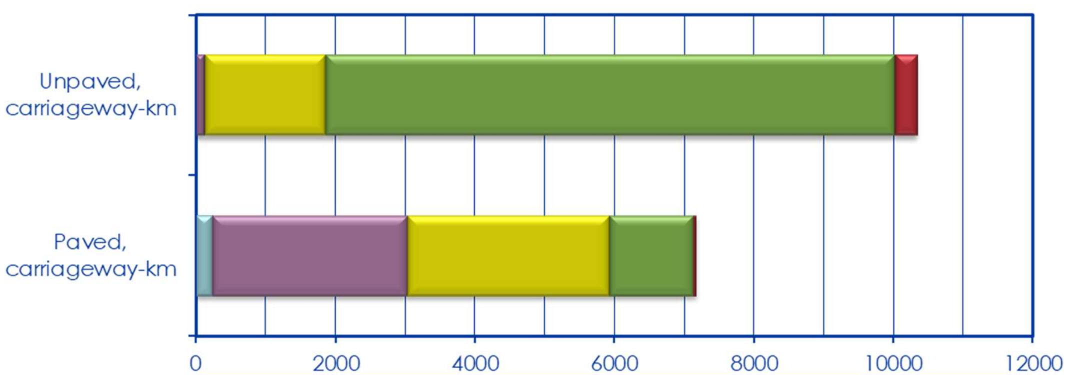
## 2.6 Road classification

Table 2-3 provides details of the six-class rural and urban road classification system used in TRH 26: South African Road Classification and Access Management Manual (Committee of Transport Officials, 2012).

The functional road classification for the WCG-maintained rural road network according to TRH 26 (Committee of Transport Officials, 2012) is shown in Figure 2-1. Figure 2-2 shows the subsidised municipal proclaimed main roads network. Most paved roads are classified as class R2 that provide mobility, and most unpaved roads are classified as class R4 that provide access.

**Table 2-3: Road network classification according to TRH 26 for rural and urban roads**

| Class | Function | Description |
|---|---|---|
| 1 | Mobility | Principal arterial |
| 2 | | Major arterial |
| 3 | | Minor arterial |
| 4 | Access/activity | Collector street |
| 5 | | Local street |
| 6 | | Walkway |




| | Paved, carriageway-km | Unpaved, carriageway-km |
|---|---|---|
| R1 | 235,78 | 0,00 |
| R2 | 2791,98 | 131,24 |
| R3 | 2892,21 | 1722,43 |
| R4 | 1207,52 | 8165,23 |
| R5 | 44,08 | 325,16 |

Figure 2-1: The WCG maintained rural road network classification according to TRH 26 (2022)

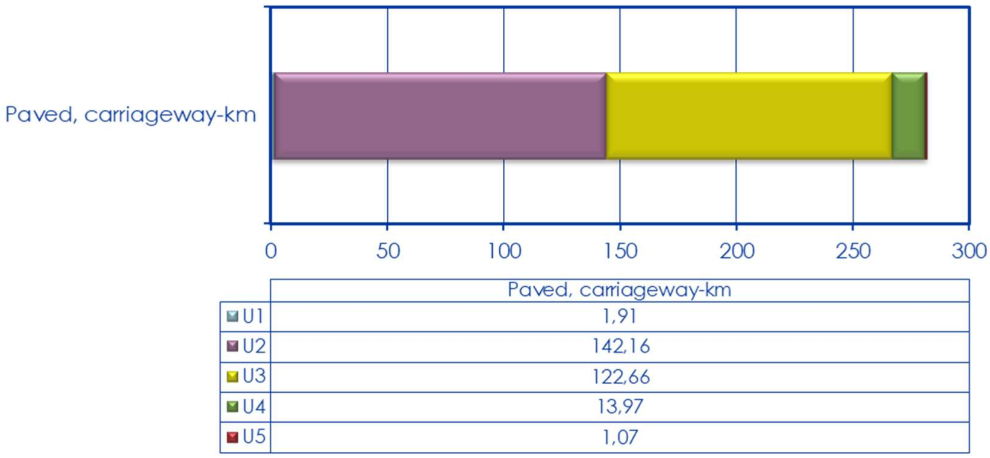



Figure 2-2: The urban WCG proclaimed municipal main road network classification according to TRH 26 (2022)

## 2.7 Overload control

Overloading of road freight vehicles results in excessive road deterioration, which increases the cost of road maintenance. In addition, overloaded vehicles are a safety risk because they are difficult to control and have greater likelihood of getting defects such as brake failure. As a result, overload control is a crucial component of road infrastructure management.

Table 2-4 provides the statistics of the overloaded vehicles on the provincial road network over the last ten years. The percentage of vehicles overloaded on the network has followed an upward trend from 2014/15 to 2022/23.

**Table 2-4: Overload control statistics**

| Year | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 |
|---|---|---|---|---|---|---|---|---|---|
| Vehicles weighed | 673 920 | 651 541 | 592 054 | 618 744 | 632 538 | 599 976 | 424 300 | 553 529 | 423 260 |
| Vehicles legal | 597 127 | 575 041 | 518 832 | 533 814 | 540 902 | 517 602 | 360 907 | 472 718 | 358 022 |
| Vehicles overloaded | 76 793 | 76 500 | 73 222 | 84 930 | 91 636 | 82 374 | 63 393 | 80 811 | 65 238 |
| % Vehicles over-loaded | 11.4 | 11.7 | 12.4 | 13.7 | 14.5 | 13.7 | 14.9 | 14.6 | 15.4 |
| % Overloaded within 5% limit | 9.3 | 9.7 | 10.2 | 11.7 | 12.4 | 11.8 | 13.0 | 12.7 | 13.5 |

It follows from the Table 2-4, that the upward trend is caused by several issues contributing to the overload control challenges including:

- A lack of capacity to extend the operating hours at certain weighbridges. Several weighbridges do not operate around the clock;
- The ease of communication regarding enforcement operations;
- A weak regulatory framework for overload control, limiting the chances of successful prosecution in certain cases; and
- Penalties that are not strong deterrents to offenders.

Figure 2-3 provides an historical view on vehicles weighed, showing the percentage of overloaded vehicles and those within the 5% warning limit.

In addition to the increase in overloading, many overloaded vehicles still escape prosecution by avoiding those sections of road with weighbridges by using and damaging other roads not designed for such heavy loads. Of further interest is the large percentage of vehicles that are overloaded within the 5% warning limit. This indicates that operators may be deliberately overloading within the warning range knowing that they will escape fines if detected. A reduction in the 5% warning limit may have to be considered to address this issue.

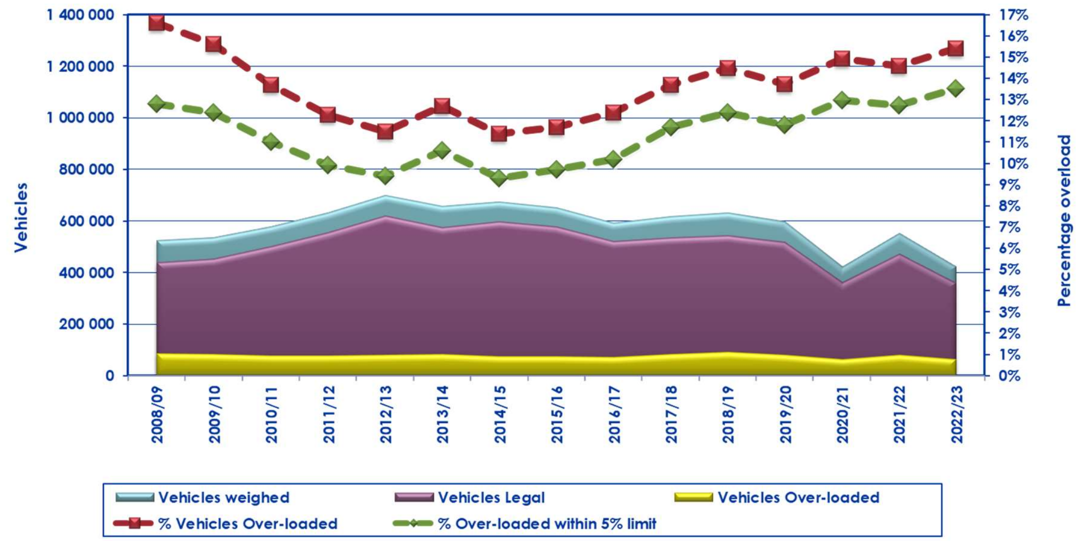



Figure 2-3: Historical trend of vehicles weighed

The introduction of Weigh-In-Motion technology to screen 100% of the traffic stream for possibly overloaded vehicles has been successfully implemented at the Beaufort West Overload Control Centre. This and other advances in technology will be monitored and implemented where applicable to improve the efficiency and effectiveness of overloading control.

To initiate sustainable freight transport delivery in the Western Cape, the provincial Government has developed the Provincial Freight Strategy. The Freight Strategy includes strategic actions to address the key issues in freight transport delivery in the Western Cape, where successful implementation of the Strategy will help in the transition to sustainable freight delivery.

## 2.8 Structure data

Table 2-5 lists the summary of structural assets and road signs per area in terms of number in the Western Cape Province.

| Table 2-5: Summary of structural assets per road type and area as of March 2020 | | | | |
|---|---|---|---|---|
| **Area** | **Bridges** | **Large culverts** | **Gantries** | **Road Signs** |
| **PAVED ROADS** | | | | |
| Cape Winelands | 164 | 374 | 0 | 12 564 |
| Central Karoo | 71 | 203 | 0 | 6 182 |
| Garden Route | 144 | 313 | 0 | 11 101 |
| Overberg | 75 | 173 | 0 | 5 247 |
| West Coast | 102 | 149 | 0 | 8 005 |
| City of Cape Town | 175 | 59 | 74 | 4 317 |
| **Provincial Total** | **731** | **1 271** | **74** | **47 416** |
| **UNPAVED ROADS** | | | | |
| Cape Winelands | 23 | 87 | 0 | 2 639 |
| Central Karoo | 19 | 134 | 0 | 4 111 |
| Garden Route | 31 | 232 | 0 | 4 555 |
| Overberg | 40 | 76 | 0 | 2 381 |
| West Coast | 33 | 0 | 0 | 3 040 |
| City of Cape Town | 0 | 0 | 0 | 1 |
| **Provincial Total** | **146** | **529** | **0** | **16 727** |
| **ALL ROADS** | | | | |
| Cape Winelands | 187 | 461 | 0 | 15 203 |
| Central Karoo | 90 | 337 | 0 | 10 293 |
| Garden Route | 175 | 545 | 0 | 15 656 |
| Overberg | 115 | 249 | 0 | 7 628 |
| West Coast | 135 | 149 | 0 | 11 045 |
| City of Cape Town | 175 | 59 | 74 | 4 318 |
| **Provincial Total** | **877** | **1 800** | **74** | **64 143** |

Additional structure information was collected during the visual assessments on the bridges. This data has been verified and in currently in use. Table 2-5 shows a summary of the structure data collected in the field.

| Table 2-6: Structures included in the visual condition data per district as of March 2020 | | | | | | |
|---|---|---|---|---|---|---|
| Area | Bridge | Bridge - Arch | Bridge Cellular | Culvert Major | Retaining Wall | Sign Gantry |
| Cape Winelands | 199 | 2 | 11 | 434 | 8 | 0 |
| Central Karoo | 84 | 0 | 6 | 341 | 0 | 0 |
| Garden Route | 169 | 6 | 21 | 540 | 60 | 0 |
| Overberg | 100 | 5 | 14 | 214 | 1 | 0 |
| West Coast | 127 | 1 | 7 | 201 | 1 | 0 |
| City of Cape Town | 102 | 2 | 0 | 36 | 9 | 30 |
| **Total** | **781** | **16** | **59** | **1766** | **79** | **30** |

# CHAPTER 3. LEVEL OF SERVICE

## 3.1 Minimum conditions and standards

### 3.1.1 Road network

Through years of international and local research, the needs of the public in respect of road standards, and thus levels of service, have been established. These standards are documented in a great variety of publications, the most important of which are listed in Appendix J – Standards and specifications. Several different surveillance measurements are done at set frequencies to determine the condition of the road network. These are shown in Table 3-1 and Table 3-2. In addition to these measurements, the traffic is counted at selected nodes on all paved and unpaved roads.

**Table 3-1: List of paved network surveillance measurements and levels of service**

| Type of surveillance | Frequency of measurement | Compliance with TMH 22 | Level of Service | | | Usage |
|---|---|---|---|---|---|---|
| | | | Class | TRH 26 | Limit | |
| Visual condition (see note below) VCI (min) | Whole network[1] annually | Yes | DR/OP | 4, 5 | ≥45,0 | Functional and structural condition<br>Seal programme<br>Maintenance programme<br>Condition Report |
| | | | MR | 3 | ≥52,5 | |
| | | | TR | 1, 2 | ≥55,0 | |
| Longitudinal profiles IRI (m/km) (max) | Whole network[1] every 2 years | Yes[2] | DR/OP | 4, 5 | ≤5,6 | Functional condition<br>Rehabilitation programme<br>Condition Report |
| | | | MR | 3 | ≤4,5 | |
| | | | TR | 1, 2 | ≤4,2 | |
| Transverse profiles Rut depth (mm) (max) | Whole network[1] every 2 years | Yes[2] | DR/OP | 4, 5 | ≤20 | Functional and structural condition<br>Seal programme<br>Condition Report |
| | | | MR | 3 | ≤20 | |
| | | | TR | 1, 2 | ≤20 | |
| Surface texture MPD (mm) (min.) | Whole network[1] every 2 years | Yes[2] | DR/OP | 4, 5 | ≥0,4 | Functional condition<br>Seal programme<br>Condition Report |
| | | | MR | 3 | ≥0,4 | |
| | | | TR | 1, 2 | ≥0,4 | |
| Deflection SN | One third of the network[1] every year | Yes | n/a | | | Structural condition<br>Rehabilitation programme<br>Condition Report |

| Table 3-1: List of paved network surveillance measurements and levels of service | | | | | | |
|---|---|---|---|---|---|---|
| Type of surveillance | Frequency of measurement | Compliance with TMH 22 | Level of Service | | | Usage |
| | | | Class | TRH 26 | Limit | |
| Video images | Whole network[1] every 2 years | n/a | n/a | | | Orientation<br>Seal programme<br>Rehabilitation programme<br>Maintenance programme<br>Miscellaneous usage |

Note 1: This does not include the proclaimed municipal main roads

Note 2: The data collection of the mechanical surveillance measurements on the paved road network commenced in the 2022/23 financial year and the planned completion is scheduled to take place in the last quarter of the financial year.

| Table 3-2: List of unpaved network surveillance measurements and levels of service | | | | |
|---|---|---|---|---|
| Type of surveillance | Frequency of measurement | Index and compliance with TMH 22 | Level of Service | Usage |
| Visual condition | Annually on the maintained network | n/a | Not currently available | Functional and structural condition<br>Regravel programme<br>Reshape & rework programme<br>Maintenance programme<br>Upgrade programme<br>Condition Report |
| Gravel thickness millimetres | Annually on the maintained network | n/a | Minimum of 50 mm | Structural condition<br>Regravel programme<br>Reshape & rework programme<br>Maintenance programme<br>Upgrade programme<br>Condition Report |
| Dynamic Cone Penetrometer DN | Ad hoc | n/a | Gravel wearing course:<br>Minimum CBR range: 9 – 15 depending on subgrade and traffic | Structural condition<br>Upgrade programme<br>Maintenance programme |

The preliminary classification of the Levels of Service for unpaved roads is shown in Table 3-3.

| Table 3-3: Preliminary classification of unpaved network levels of service | | | | |
|---|---|---|---|---|
| Level of Service | Mobility Speed (km/h) | Roughness Intervention Level (90th percentile) IRI | Accessibility (capacity of a normal car to negotiate the roads without losing traction) | Safety in terms of dustiness (visual assessment rating based on TRH12) |
| **High** | 80 | 7,5 | 99,5%: In service for ≥ 363 days pa | ≤3 |
| **Medium** | 60 | 10 | 99%: In service for ≥ 361,5 days pa | ≤4 |
| **Low** | 40 | 13 | 99%: In service for ≥ 361,5 days pa | ≤4 |
| **Very low** | 20 | 15 | 99%: In service for ≥ 361,5 days pa | ≤5 |

Table 3-4 provides the preliminary network targets for each Key Performance Indicator and Level of Service.

| Table 3-4: Preliminary network targets | | | | | |
|---|---|---|---|---|---|
| Key Performance Indicators | LOS | | | | |
| | High | Medium | Low | Very low | AM Objectives |
| **Average gravel thickness (mm)** | ≥60 | ≥60 | n/a | n/a | 1 |
| **Target average roughness[1] (IRI)** | ≤4 | ≤5 | ≤6 | ≤6 | 1, 4 |
| **Network Condition Number[2]** | ≥60 | ≥50 | Not set | Not set | 1 |
| **Accessibility (days pa)** | ≥363 | ≥361,5 | ≥361,5 | ≥361,5 | 1 |
| **Average dustiness to TMH 9** | ≤2 | ≤3 | ≤3 | ≤4 | 1 |
| **Average Annual Gravel loss (mm)** | <10 | <7 | n/a | n/a | 2, 4 |
| **Upgrade to paved standard** | As per dTIMS | As per dTIMS | n/a | n/a | 3, 5 |

### 3.1.2 Structures

Table 3-5 shows the surveillance measurements for structures and major culverts. Currently, there are two condition indices calculated on structures, Priority condition index (PCI) and Average condition index (ACI), however levels of service have not yet been determined.

| Table 3-5: Structures and major culverts surveillance measurements and levels of service | | | | |
|---|---|---|---|---|
| Type of surveillance | Frequency of measurement | Index and compli-ance with TMH19 | Level of Service | Usage |
| Visual condition | 5 years | PCI and ACI is calculated | Not available | Functional and structural condition<br>Maintenance programme<br>Condition Report |

### 3.1.3 Overload control

Ideally, the overloading of heavy vehicles on all roads should be eliminated. This is not likely and the Desired Budget for overloading control is based on the following level of service:

- Less than 10% of heavy vehicles should be overloaded; and
- Less than 2% of heavy vehicles should be overloaded to such an extent that they are charged for the transgression.

### 3.1.4 Division of Revenue Act

The Division of Revenue Act has not published any changes to the level of service for the transportation assets.

# CHAPTER 4.SITUATIONAL ANALYSIS

The data used in this chapter is the 2022 visual assessment data unless indicated otherwise. The lengths of roads are shown in Table 2-1.

## 4.1 Inventory Data

Detailed information on the network, the traffic it carries and its condition is available on the RNIS at https://rnis.westerncape.gov.za. This chapter's analysis is based on the 2022 visual assessment data, as well as the latest data for all other measurements. Other asset data is related to the latest available data.

A summary of the road network under jurisdiction of the Branch, per road type and RCAM class is provided in Table 4-1. This network is maintained by the Branch, except for the Main Roads within the City of Cape Town. A summary of the structures is provided in Table 4-2.

A tabular summary of the age of the assets, per asset type, is provided in Table 4-40.

Figure 4-1 presents the distribution of the 17 797 km of Western Cape carriageway length that are being maintained. Included are Trunk Roads, Main Roads and Divisional Roads for both paved and gravel networks. The managed Minor Roads are also included.

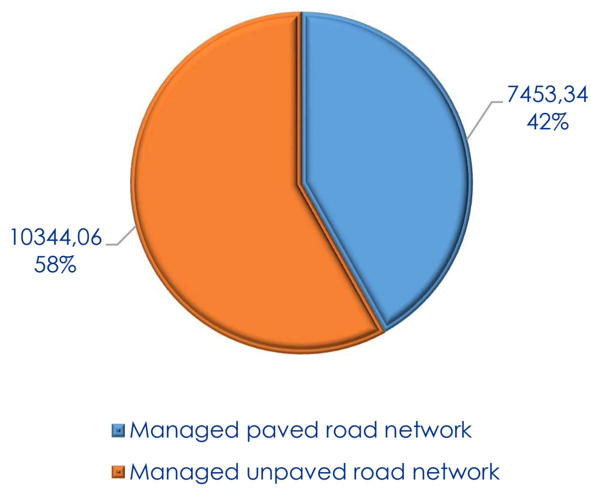



Figure 4-1: Road network distribution of carriageway length as of 2022

| Table 4-1: Summary of the managed road network 2022 | | | | | |
|---|---|---|---|---|---|
| Area | RCAM Class | Paved | Unpaved | Total | % |
| | | km | km | km | |
| Cape Winelands | 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | 691.85 | 0.00 | 2839.63 | 3.89 |
| | 3 | 643.04 | 247.08 | 2825.93 | 5.00 |
| | 4 | 487.71 | 1137.99 | 3094.13 | 9.13 |
| | 5 | 16.00 | 22.65 | 86.65 | 0.22 |
| Central Karoo | 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | 564.88 | 68.07 | 2327.59 | 3.56 |
| | 3 | 64.90 | 410.75 | 670.35 | 2.67 |
| | 4 | 13.67 | 1814.10 | 1868.78 | 10.27 |
| | 5 | 0.00 | 83.83 | 83.83 | 0.47 |
| Garden Route | 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | 770.25 | 63.17 | 3161.99 | 4.68 |
| | 3 | 434.00 | 340.70 | 2076.70 | 4.35 |
| | 4 | 291.44 | 2477.30 | 3644.96 | 15.56 |
| | 5 | 16.22 | 122.62 | 187.50 | 0.78 |
| Overberg | 1 | 1.91 | 0.00 | 5.73 | 0.01 |
| | 2 | 304.94 | 0.00 | 1216.99 | 1.71 |
| | 3 | 461.79 | 190.56 | 2037.72 | 3.67 |
| | 4 | 168.96 | 1137.42 | 1813.26 | 7.34 |
| | 5 | 10.00 | 26.19 | 66.19 | 0.20 |
| West Coast | 1 | 92.49 | 0.00 | 369.96 | 0.52 |
| | 2 | 419.10 | 0.00 | 1705.92 | 2.35 |
| | 3 | 946.49 | 313.88 | 4116.12 | 7.08 |
| | 4 | 276.27 | 1865.95 | 2971.03 | 12.04 |
| | 5 | 0.93 | 21.80 | 25.52 | 0.13 |
| City of Cape Town | 1 | 154.00 | 0.00 | 681.82 | 0.87 |
| | 2 | 118.07 | 0.00 | 480.82 | 0.66 |
| | 3 | 83.92 | 0.00 | 338.22 | 0.47 |
| | 4 | 8.12 | 0.00 | 32.48 | 0.05 |
| | 5 | 0.00 | 0.00 | 0.00 | 0.00 |
| UniCity | 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | 28.16 | 0.00 | 112.64 | 0.16 |
| | 3 | 375.92 | 0.00 | 1503.18 | 2.11 |
| | 4 | 8.31 | 0.00 | 33.24 | 0.05 |
| | 5 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | | **7 453.34** | **10 344.06** | **17 797.40** | **100 %** |
| % | | 41.9 % | 58.1 % | 100 % | - |
| NOTES: Table Includes UniCity Roads | | | | | |

| Table 4-2: Summary of other assets being maintained as at June 2020 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Area | RCAM Class | Paved Roads | | | | Unpaved Roads | | |
| | | Bridges no. | Large culverts no. | Gantries no. | Road Signs no. | Bridges no. | Large culverts no. | Road Signs no. |
| Cape Winelands | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 68 | 208 | 0 | 6 733 | 0 | 0 | 0 |
| | 3 | 53 | 98 | 0 | 2 915 | 6 | 18 | 381 |
| | 4 | 41 | 66 | 0 | 2 850 | 17 | 69 | 2 250 |
| | 5 | 2 | 2 | 0 | 66 | 0 | 0 | 8 |
| Central Karoo | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 68 | 179 | 0 | 5 744 | 2 | 16 | 195 |
| | 3 | 3 | 21 | 0 | 371 | 6 | 27 | 707 |
| | 4 | 0 | 3 | 0 | 67 | 10 | 91 | 3 129 |
| | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 80 |
| Garden Route | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 92 | 225 | 0 | 8 747 | 1 | 11 | 119 |
| | 3 | 31 | 55 | 0 | 998 | 5 | 25 | 745 |
| | 4 | 20 | 31 | 0 | 1 277 | 23 | 185 | 3 505 |
| | 5 | 1 | 2 | 0 | 79 | 2 | 11 | 186 |
| Overberg | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 36 | 59 | 0 | 2 509 | 0 | 0 | 0 |
| | 3 | 26 | 86 | 0 | 1 605 | 12 | 11 | 332 |
| | 4 | 12 | 28 | 0 | 1 115 | 28 | 65 | 2 007 |
| | 5 | 1 | 0 | 0 | 18 | 0 | 0 | 42 |
| West Coast | 1 | 4 | 2 | 0 | 527 | 0 | 0 | 0 |
| | 2 | 37 | 40 | 0 | 3 067 | 0 | 0 | 0 |
| | 3 | 48 | 88 | 0 | 2 956 | 6 | 0 | 555 |
| | 4 | 13 | 19 | 0 | 1 450 | 25 | 0 | 2 430 |
| | 5 | 0 | 0 | 0 | 5 | 2 | 0 | 55 |
| City of Cape Town | 1 | 109 | 22 | 0 | 2 116 | 0 | 0 | 1 |
| | 2 | 60 | 23 | 74 | 1 484 | 0 | 0 | 0 |
| | 3 | 6 | 14 | 0 | 662 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 55 | 0 | 0 | 0 |
| | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | | 633 | 731 | 1 271 | 74 | 47 416 | 146 | 529 |
| % | | 1,0 | 1,1% | 1,9% | 0,1% | 70,9% | 0,2% | 0,8% |

Notes:

- The 'NR' (SANRAL) road structures have been excluded.
- The UniCity and Municipal Main roads have also been excluded (not logged)
- Structures from both carriageways included (previously not)
- Included structures with Structure Numbers ending in 'A', 'B', 'C', 'D', 'E' or 'F'.

In addition to the infrastructure being maintain on the road network, the Branch also maintains plant equipment and the extent of these assets are represented in Table 4-3.

The sub directorate Mechanical Services are responsible for the maintenance of all plant equipment, that supports the delivery of projects, including the in-house team and district municipalities. A summary of the extensive asset base used for this support is shown below.

**Table 4-3: Plant equipment in the Western Cape as of November 2023**

| Equipment Type | Number |
|---|---|
| Van | 280 |
| Caravan | 224 |
| Grader | 133 |
| Platform truck | 114 |
| Small tip truck | 108 |
| Platform trailer | 107 |
| Walk behind Roller | 97 |
| Water trailer | 97 |
| Generator | 87 |
| Breaker | 86 |
| Fuel trailer | 83 |
| Pump | 76 |
| Water truck | 70 |
| Minibus | 70 |
| Big tip truck | 63 |
| Plate Compactor | 60 |
| Roller (Pneumatic, Vibrating Steel and Tandem) | 53 |
| Trailer | 43 |
| TLB | 43 |
| Tractor | 41 |
| Pneumatic loader | 38 |
| Water Tank | 34 |
| Vibrator | 32 |
| Platform crane truck | 29 |
| Drawn Grader | 26 |
| Mower | 21 |
| Grid roller | 20 |
| Spray wagon | 20 |
| Dozer | 18 |
| Road Sweeper | 17 |
| Low bed trailer | 16 |
| Chip Spreader | 9 |
| Excavator | 8 |
| Mechanical horse | 8 |
| Bus | 8 |
| Fuel truck | 6 |
| Hatchback | 5 |

| Table 4-3: Plant equipment in the Western Cape as of November 2023 | |
|---|---|
| **Equipment Type** | **Number** |
| Truck | 5 |
| Forklift | 5 |
| Road Marker | 4 |
| SUV 2X4 | 4 |
| Linear Crusher | 3 |
| Chipper | 2 |
| Hammer mill | 1 |
| Tree mulcher | 1 |
| Malgas Ferry | 1 |

## 4.2 Usage of the Assets

Traffic counts on all managed provincial roads are undertaken on a regular basis to establish the use of, and usage patterns on the road network.

A tabular summary of the usage of the assets, per road type and RCAM class and administrative area, in average daily vehicle-km, calculated for carriageway lengths, is shown in Table 4-4. The total usage for the paved network is 30.6 million vehicle-km per day and for the unpaved network it is 1,05 million vehicle km per day, totalling 31.6 million vehicle-km per day, or 10,3 billion vehicle-km annually.

Table 4-4: Summary of the road usage 2022

| Area | RCAM Class | Average daily vehicle-km for 2022 | |
|---|---|---|---|
| | | Paved roads | Unpaved Roads |
| Cape Winelands | 1 | 0 | 0 |
| | 2 | 4 890 169 | 0 |
| | 3 | 1 153 416 | 25 475 |
| | 4 | 345 436 | 122 227 |
| | 5 | 15 684 | 52 |
| Central Karoo | 1 | 0 | 0 |
| | 2 | 247 675 | 3 091 |
| | 3 | 9 992 | 27 313 |
| | 4 | 1 646 | 59 791 |
| | 5 | 0 | 880 |
| Garden Route | 1 | 0 | 0 |
| | 2 | 1 471 114 | 6 553 |
| | 3 | 425 166 | 47 252 |
| | 4 | 198 286 | 272 949 |
| | 5 | 6 370 | 14 439 |
| Overberg | 1 | 0 | 0 |
| | 2 | 1 186 652 | 0 |
| | 3 | 642 733 | 44 276 |

| Table 4-4: Summary of the road usage 2022 | | | |
|---|---|---|---|
| Area | RCAM Class | Average daily vehicle-km for 2022 | |
| | | Paved roads | Unpaved Roads |
| | 4 | 112 873 | 176 746 |
| | 5 | 3 589 | 2 001 |
| West Coast | 1 | 462 676 | 0 |
| | 2 | 1 398 849 | 0 |
| | 3 | 1 102 757 | 64 461 |
| | 4 | 121 870 | 185 151 |
| | 5 | 235 | 652 |
| City of Cape Town | 1 | 12 254 355 | 0 |
| | 2 | 3 941 065 | 0 |
| | 3 | 569 128 | 0 |
| | 4 | 8 039 | 0 |
| | 5 | 0 | 0 |
| **Total** | | **30 569 775** | **1 053 309** |
| **%** | | **96%** | **4.0%** |

NOTES:
Data excludes UniCity roads

### 4.2.1 Traffic demand

The most relevant indicator of traffic growth is the number of vehicle-km travelled on the network over a given time period. The Branch conducts an ongoing vehicle counting programme and regularly updates the RNIS with the latest link-lengths. The Branch can therefore accurately report on vehicle-km on the managed network.

There was a steady growth of approximately 3,4% in vehicle-km travelled in the last few years from 2016 to 2022 with a notable increase in average daily vehicle-km between 2021 and 2022, as illustrated in Figure 4-2. This is contrary to what may have been predicted during the period when the Covid-19 pandemic was at its peak. The growth provides a reflection of road usage in the Western Cape and may provide an indication of economic activity in the province.


Figure 4-2: Growth in average daily vehicle-km on the WCG network 2002 to 2022

The different traffic categories and their proportion of the paved and unpaved road network, expressed as a percentage, are shown in Table 4-5 and Figure 4-3.

It is evident how most of the network (60,2%) is composed of roads with traffic volumes of less than 300 vehicles per day.

**Table 4-5: Traffic categories for 2022 (including UniCity roads)**

| Traffic category | AADT | Managed network length km | % of managed network |
|---|---|---|---|
| S0 | <100 | 6 845 | 38,5 |
| S1 | 101 – 300 | 3 857 | 21,7 |
| T0 | 301 – 500 | 1 774 | 10,0 |
| T1 | 501 – 1 500 | 2 155 | 12,1 |
| T2 | 1 501 – 4 500 | 1 798 | 10,1 |
| T3 | 4 501 – 13 500 | 678 | 3,8 |
| T4 | 13 501 – 40 000 | 601 | 3,4 |
| T5 | >40 000 | 77 | 0,4 |
| Total | | 17 784 | 100 |

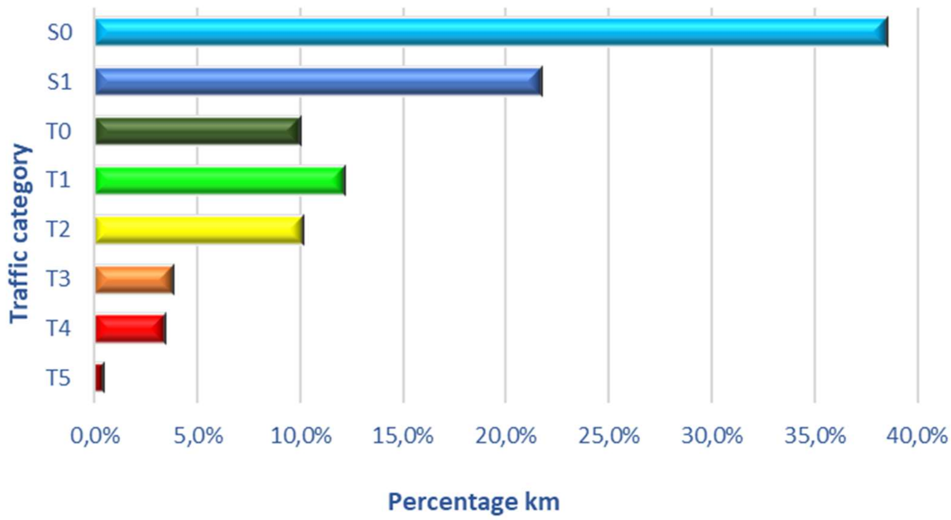
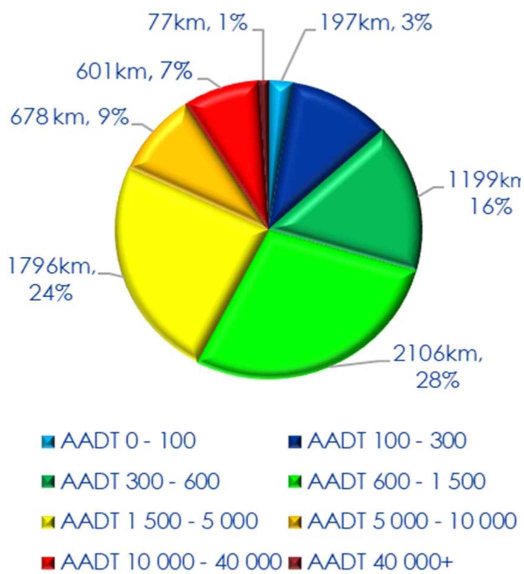


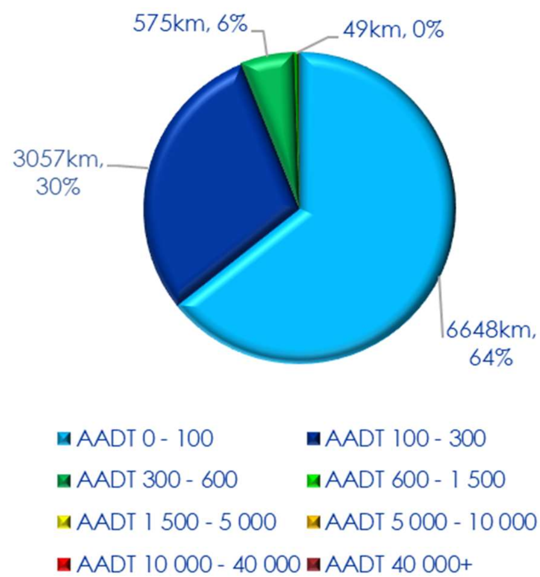

Figure 4-3: Traffic categories and their percentage of km of the network for 2022

(including UniCity roads)

The distribution of traffic on paved and unpaved roads is shown in Figure 4-4. The findings from the distribution of traffic are:

- 38,5% of the road network carries less than 100 vehicles per day.
- 3,8% of the road network carries more than 10 000 vehicles per day.




Paved Roads

Unpaved Roads

Figure 4-4: Traffic distribution on paved and unpaved roads 2022

Figure 4-4 shows that there are 49 km of unpaved roads that carry more than 575 vehicles per day, and another 501 km that carry between 300 and 600 vehicles per day. These unpaved roads may warrant upgrading to paved standards due to the economic benefits that would accrue, as well as the difficulty of maintaining these roads as a result of very high gravel loss that triggers the need for frequent regravelling.

# 4.3 Engineering Condition of the Assets

## 4.3.1 Background

The condition of the paved road network is surveyed by means of visual evaluations and instrument surveys at frequencies that are in accordance with draft TMH 22: Road Asset Management Manual (Committee of Transport Officials, 2013), unless otherwise indicated.

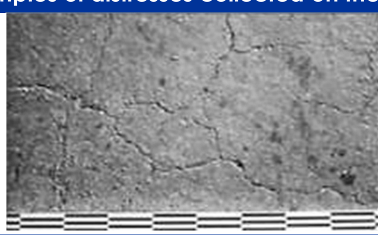
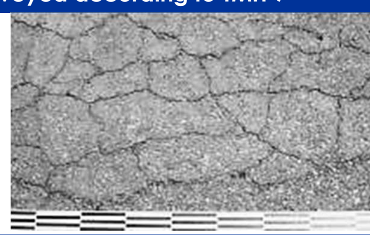
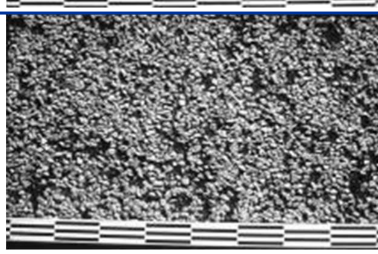
## 4.3.2 Visual condition of the paved road network

Visual assessment surveys are arranged annually (Table 3-1) to collect and record condition information on the paved managed road network of the WCG using TMH 9: Pavement Management Systems: Standard Visual Assessment Manual for Flexible Pavements (Committee of State Road Authorities, 1992). The surveys are completed on all surfaced roads.

Surveys are done on the roads in both directions for dual carriageways because the condition and pavement information are different.

Table 4-6 presents examples of some of the types of distress collected during the visual assessment surveys. The distresses shown here are those typically modelled in the lifecycle cost analysis to predict future pavement performance.

**Table 4-6: Examples of distresses collected on the paved road network surveyed according to TMH 9**

| | | | |
|---|---|---|---|
| <u>Surfacing cracks</u><br>Example of degree 3 rating (distinct cracks). |  | <u>Crocodile cracks</u><br>Example of degree 3 rating (distinct cracks with slight deformation of cracked areas). |  |
| <u>Stone loss</u><br>Example of degree 3 rating (distinct loss in small areas). |  | <u>Rutting</u><br>Example of degree 5 rating (severe, dangerous, >30 mm). |  |
| <u>Pothole</u><br>Example of degree 3 rating (>200 mm diameter and significant depth). |  | | |

The Visual Condition Index (VCI) is based on a composite rating of all the distresses that are surveyed annually. The visual condition index is categorised as very poor (0-30%), poor (30-50%), fair (50-70%), good (70-85%), and very good (85-100%) as shown in Table 4-7.

**Table 4-7: Categories of visual condition**

| VCI range (%) | Description | Colour used in charts & graphs |
|---|---|---|
| 0 – 29 | very poor | |
| 30 – 49 | poor | |
| 50 – 69 | fair | |
| 70 – 84 | good | |
| 85 – 100 | very good | |

Table 4-8 shows examples of road visual conditions.

**Table 4-8: Examples of visual condition Indices on paved roads in the Western Cape Province**

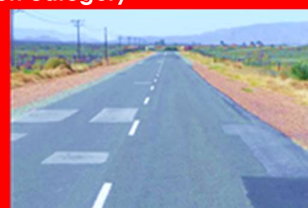
**Very Poor condition category**

TR01608 (Murraysburg)

DR01111 (Kalbaskraal)

**Poor condition category**

MR00536 (Eendekuil)



TR03303 (Oudtshoorn)

**Fair condition category**

TR00101 (Outeniqua Pass)

TR08301 (Garcia Pass)

**Good condition category**

TR03402 (Prince Albert)

DR02181 (Marcuskraal)

**Very Good condition category**

MR00174 (Stellenbosch)

MR00526 (Porterville)

The following figures, showing selected aspects of the infrastructure conditions, were prepared from the information in the Road Network Information System.

The condition distribution of the paved road network, which is managed by the Pavement Management System by length and vehicle-km is shown in Figure 4-5 (2022 figures). This condition distribution includes the UniCity roads but excludes proclaimed municipal main roads.

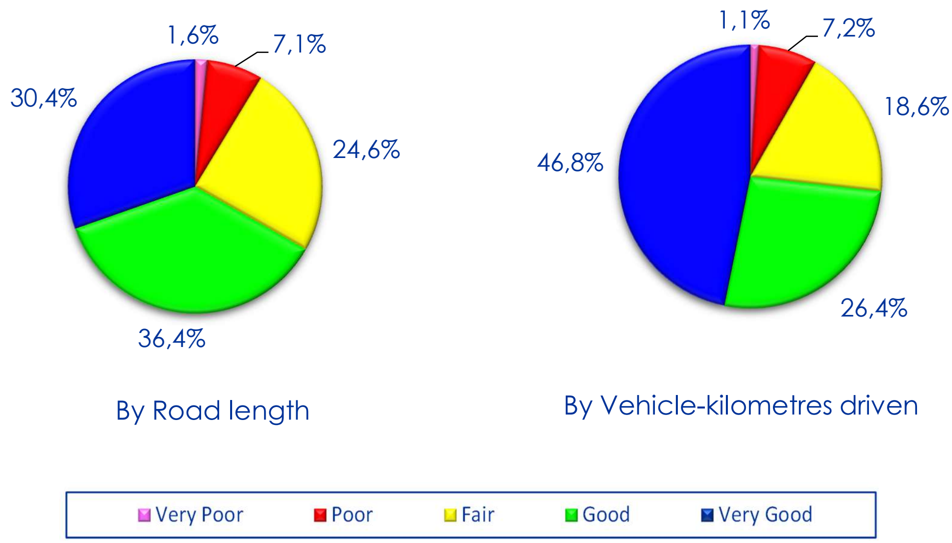



Figure 4-5: Distribution of the VCI of paved roads by road length and vehicle-km including UniCity roads (2022)

Figure 4-6 presents the visual condition distribution of paved roads based on the 2022 assessment data. The comparison shows that an effective economic maintenance policy is being followed by the Branch because the condition distribution per vehicle-kilometre driven is superior to the condition distribution per road length. The objective of maximising the road condition for the maximum number of road users is therefore achieved.

It is noticeable that 46.8 % of vehicles-kilometres and 43.6% of passengers-kilometres are driven on the 30.4% of roads that are in "very good" condition. The usage of the 8.7% of roads in "poor to very poor" condition affects 8.3% of road users. According to the recommendations of the Road Infrastructure Strategic Framework for South Africa (Department of Transport, 2006), it is desirable that not more than 10% of the length of a road network is in a poor to very poor condition. However, this recommendation does not take account of the distribution of traffic volumes on the network. Taking only length of paved road into account, about 8.7% of the paved road network is in a poor to very poor condition including the UniCity roads. Taking the traffic distribution into account, 8,3% of the road users (vehicles) are affected by the poor to very poor roads including UniCity roads. The addition of the UniCity roads added to the road network continuous to have an impact on the sound principles followed previously by the Branch.

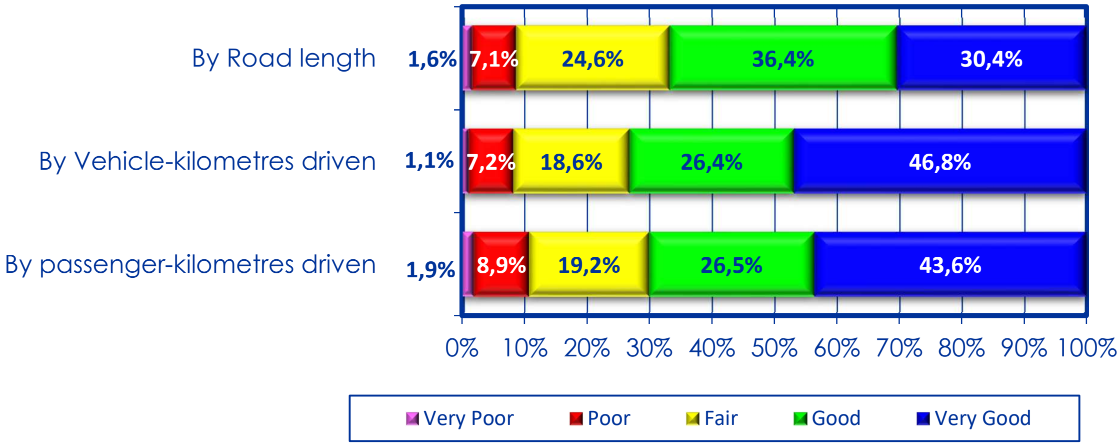



Figure 4-6: Paved roads condition distribution including UniCity roads (2022)

The following observations can be deduced from Figure 4-6:

- By road length, 66.8% of paved roads are in the good to very good condition category.
- In terms of vehicle usage, 73.2% of vehicle-km are travelled on roads in the good to very good condition category.
- In terms of passenger usage, 70.1% of passenger-km are travelled on roads in the good to very good condition category.

Since 2012, the overall visual condition distribution by road length has improved (refer to paragraph 4.9, Visual condition trends), however with the inclusion of the UniCity roads a slight deteriorating is noticed.

Although the visual condition gives clues to the structural condition of the road network and its ability to carry traffic loading, the effect of sealing a road can mask its structural condition and present an optimistic picture of the network's load carrying capacity, which degrades continually due to the effects of traffic loading and the environment. The visual condition therefore cannot be relied upon as the definitive measure of the condition of the road network.

A detailed map showing the condition of provincial roads may be viewed on the RNIS internet site at http://rnis.westerncape.gov.za/rnis/kml_jobs_display.draw_map?p_job_id=3. Photographic and other detail can be accessed for each road segment by clicking on the map.

### 4.3.3 Visual condition of paved roads per district municipality

Table 4-9 and Figure 4-7 illustrates the paved road visual condition distribution according to the 2022 visual assessment data, per DM, including the UniCity roads. The UniCity roads have the highest percentage of roads in poor and very poor condition, followed by the Central Karoo DM and Cape Winelands DM. These roads require expensive measures for rehabilitation.

| Table 4-9: Condition distribution per DM for paved roads in the Western Cape (2022) | | | | | |
|---|---|---|---|---|---|
| DM | Length (km) | | | | |
| | Very Poor | Poor | Fair | Good | Very Good |
| City of Cape Town | - | 3 | 5 | 40 | 162 |
| Cape Winelands | 14 | 81 | 347 | 580 | 384 |
| Garden Route | 6 | 81 | 338 | 593 | 545 |
| Overberg | 6 | 75 | 254 | 351 | 411 |
| Central Karoo | 19 | 55 | 261 | 208 | 115 |
| West Coast | 55 | 129 | 468 | 824 | 562 |
| UniCity | 17 | 105 | 157 | 118 | 85 |
| Western Cape Province | **118** | **528** | **1 830** | **2 713** | **2 264** |

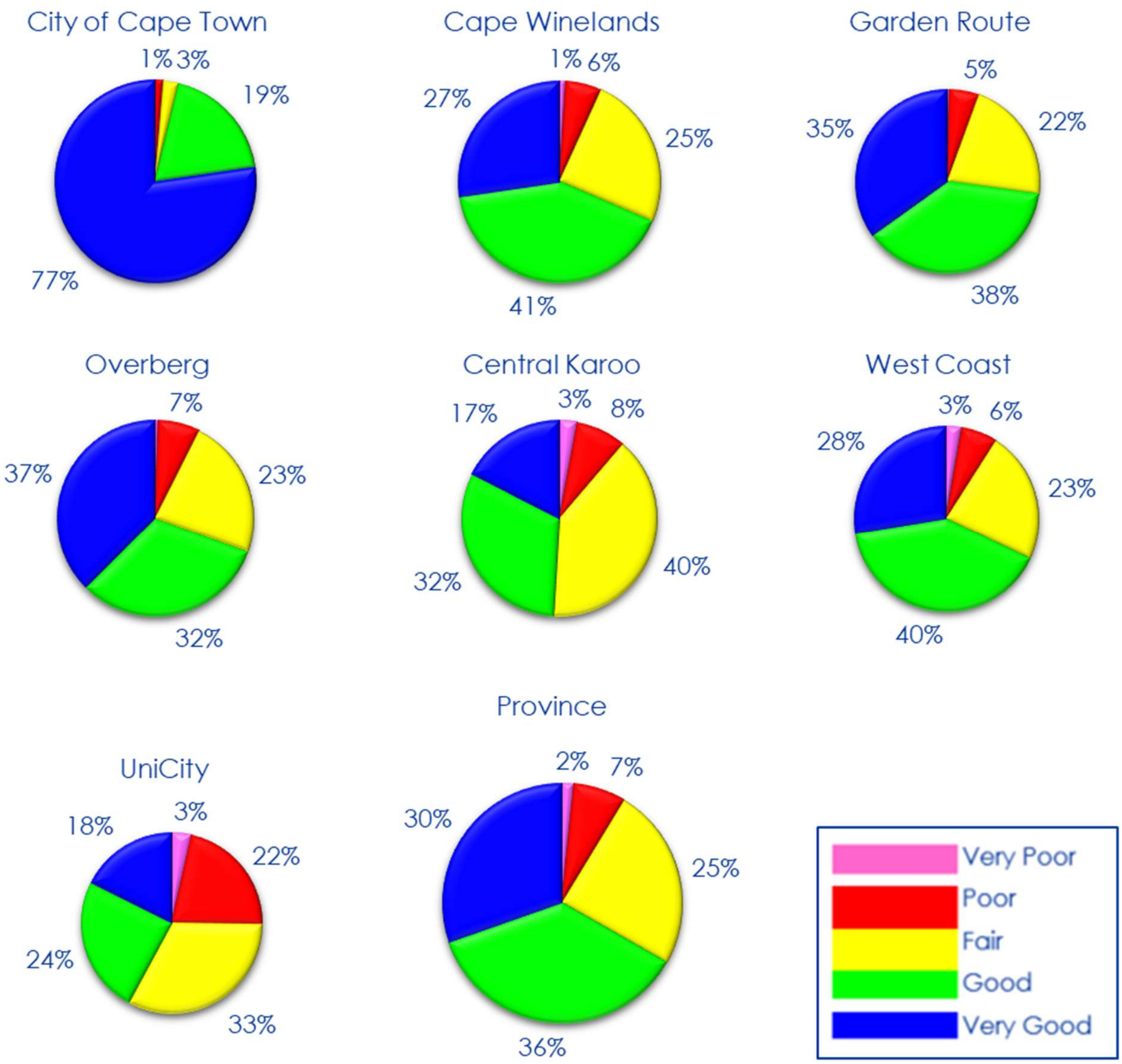



Figure 4-7: Condition distribution per kilometre by DM area for paved roads including UniCity roads (2022)

### 4.3.4 Visual condition of paved roads per RCAM Class

Table 4-10 and Figure 4-8 illustrates the paved road visual condition distribution according to the 2022 visual assessment data, per RCAM class. Comparing paved roads in the different RCAM classes, it is clear that the higher class roads are maintained to a higher level of service as per the documented desired level of service in Chapter 3.

**Table 4-10: Condition distribution per RCAM class for paved roads in the Western Cape (2022)**

| RCAM Class | Length (km) | | | | |
|---|---|---|---|---|---|
| | Very Poor | Poor | Fair | Good | Very Good |
| 1 | 0 | 0 | 14 | 67.04 | 156.65 |
| 2 | 25.24 | 154.64 | 665.79 | 936.16 | 1152.31 |
| 3 | 61.87 | 265.89 | 769.05 | 1133.26 | 784.8 |
| 4 | 28.63 | 104.49 | 371.11 | 547.76 | 169.5 |
| 5 | 2 | 3.42 | 9.98 | 28.94 | 0.81 |

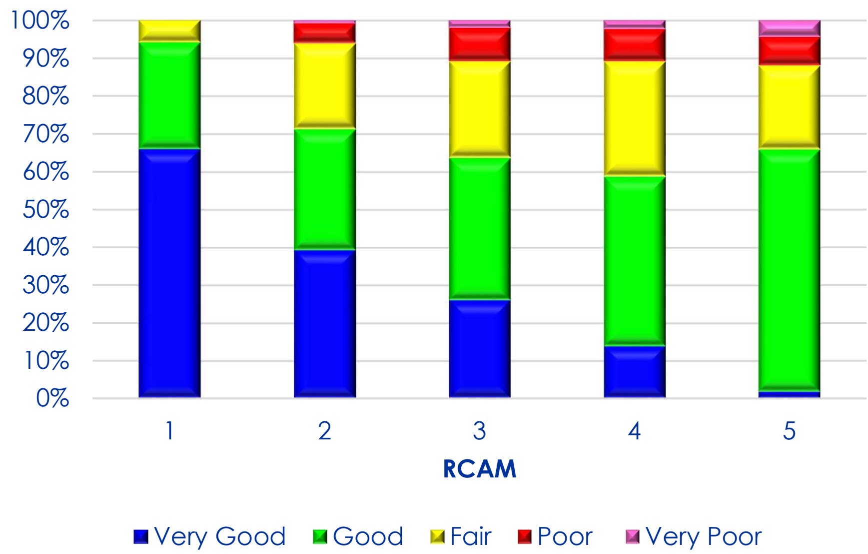



Figure 4-8: Condition distribution per kilometre by RCAM Class for paved roads including UniCity roads (2022)

### 4.3.5 Instrument survey condition data

Measurements are collected by a high-speed instrument survey and are used for modelling future pavement performance in the lifecycle benefit-cost analysis. These measurements include longitudinal and transverse profiles that are converted to roughness measurements, rut depths, surface texture measurements and deflection measurements. A summary of these measurements is provided in Table 3-1and the results for the paved network are shown for the following:

- Longitudinal profile roughness – Table 4-11;
- Transverse profile rut – Table 4-12;
- Surface texture depth – Table 4-13; and
- Falling weight deflection measurements – Table 4-14.

According to draft TMH 22 (Committee of Transport Officials, 2013), the service level is determined at the 90th percentile level, which represents a considerable change from the 50th percentile used previously. Table 4-11 shows the categories of road in the Western Cape and the service level previously used that was based on TRH 4 categories A, B and C. The use of the 90th percentile level for all categories or RCAM classes does not differentiate between their different requirements for roughness. Therefore, the use of percentiles according to road category and RCAM class is proposed and shown in Table 4-11. A similar approach has been shown in Table 4-12 for transverse profile and in Table 4-13 for surface texture.

### *Evaluation of measurements*

- In terms of roughness (longitudinal profile), all RCAM Class roads do not meet service level requirements. This is a reflection of the age of the current network and the low rate of rehabilitation, please refer to paragraph 4.8.1.

- In terms of rutting from transverse profile measurements, all categories and classes meet service level requirements.

- In terms of surface texture measurements, all categories and classes meet service level requirements.

- In terms of falling weight deflectometer (FWD) measurements, there are no current service levels with which to compare the measurements.

- The condition of the road links, in terms of the various condition indices, per road link is not currently available on the RNIS.

- The condition of the structure assets (bridges, major culverts, etc.), in terms of the various condition indices, per asset type is not currently available.

- The condition of the ancillary components, in terms of the various condition indices, per component is not currently available.

**Table 4-11: Longitudinal profiling measurements as at March 2022**

| Category or RCAM class | Level of service IRI | Actual condition (IRI m/km) | | | |
|---|---|---|---|---|---|
| | | Average | Median | %<4,2 m/km | Percentile |
| 1 | p97,5<4,20 | 1.7 | 1.6 | 98.4 | p97,5 = 3.8 |
| 2 | p95<4,20 | 2.7 | 2.4 | 90.3 | p95 = 4.9 |
| 3 | p90<4,20 | 3.0 | 2.6 | 85.5 | p90 = 4.7 |
| 4 | p80<4,20 | 3.7 | 3.1 | 73.5 | p80 = 4.6 |
| 5 | p80<4,20 | 3.7 | 3.2 | 71.7 | p80 = 4.7 |

| Table 4-12: Transverse profiling rut measurements as at March 2022 | | | | | |
|---|---|---|---|---|---|
| Category or RCAM class | Level of service (average $\bar{x}$) mm | Actual condition (mm) | | | |
| | | Average $\bar{x}$ | Median | %<20 mm | Percentile |
| 1 | $\bar{x}$ ≤20 | 3.9 | 3 | 100.0 | p97,5 = 10 |
| 2 | $\bar{x}$ ≤20 | 5.1 | 4 | 99.7 | p95 = 11 |
| 3 | $\bar{x}$ ≤20 | 5.3 | 4 | 99.4 | p90 = 9 |
| 4 | $\bar{x}$ ≤20 | 5.6 | 5 | 98.8 | p80 = 8 |
| 5 | $\bar{x}$ ≤20 | 5.7 | 5 | 98.4 | p80 = 7 |

| Table 4-13: Surface texture measurements as at March 2022 | | | | | |
|---|---|---|---|---|---|
| Category or RCAM class | Level of service (average $\bar{x}$) mm | Actual condition (mm) | | | |
| | | Average $\bar{x}$ | Median | %<0,4 mm | Percentile |
| 1 | $\bar{x}$ ≥0,4 | 1.1 | 1.1 | 5.4 | p95 = 1,8 |
| 2 | $\bar{x}$ ≥0,4 | 1.3 | 1.4 | 8.4 | p90 = 2,2 |
| 3 | $\bar{x}$ ≥0,4 | 1.2 | 1.1 | 5.7 | p80 = 1,8 |
| 4 | $\bar{x}$ ≥0,4 | 1.3 | 1.3 | 1.7 | p80 = 1,9 |
| 5 | $\bar{x}$ ≥0,4 | 1.4 | 1.4 | 0.1 | p80 = 1,8 |

| Table 4-14: FWD deflection measurements as at March 2022 | | | | | |
|---|---|---|---|---|---|
| Category or RCAM class | Level of service µmm | Actual condition (µmm) | | | |
| | | Average | Median | %<600 µmm | Percentile |
| 1 | Not provided | 266 | 252 | 98.0 | p97,5 = 566 |
| 2 | Not provided | 475 | 440 | 74.0 | p95 = 894 |
| 3 | Not provided | 474 | 436 | 74.5 | p90 = 777 |
| 4 | Not provided | 562 | 516 | 62.9 | p80 = 746 |
| 5 | Not provided | 493 | 455 | 72.7 | p80 = 648 |

The data collection of the mechanical surveillance measurements on the paved road network commenced in the financial year 2022/23 and currently in full use. The procurement of the data collection services will ensure that the Department complies with the TMH 22 and the PRMG Framework.

### 4.3.6 The visual condition of the unpaved road network

Visual assessment surveys are conducted annually to collect and record condition information on the unpaved road network. The surveys are completed on all maintained[4] unpaved roads. The VCI is based on the visual assessment ratings of all the unpaved road characteristics that are surveyed annually.

Table 4-15 presents examples of some of the characteristics collected during the visual assessment surveys according to draft TMH 9: Manual for Visual Assessment of Road Pavements, Part E: Unpaved Roads (Committee of Transport Officials, 2015). The distresses shown here are those typically modelled in the lifecycle benefit-cost analysis to predict future performance.

**Table 4-15: Examples of some results from on the unpaved network surveyed according to draft TMH 9**

| | |
|---|---|
| Gravel quantity<br><br>Example of degree 3 rating (Isolated subgrade exposures, 50 – 100 mm). |  |
| Riding quality (roughness)<br><br>Example of degree 5 rating (estimated comfortable/safe speed < 40 km/h). |  |
| Drainage on the road<br><br>Example of degree 1 rating<br><br>(edges of road are at least 300 mm above natural ground level). |  |

4 Most of the minor road network is not managed, i.e., they are not maintained using provincial funds.

Table 4-16 shows examples of unpaved road visual conditions.

| Table 4-16: Examples of visual condition indices of unpaved roads | |
|---|---|
| Very Poor condition category | Poor condition category |
|  |  |
| MR00552 (Holrivier) | DR02171 (Aurora - Saamstaan) |

The current condition of the 10 350 km of unpaved, maintained roads in the province is shown in Figure 4-9.

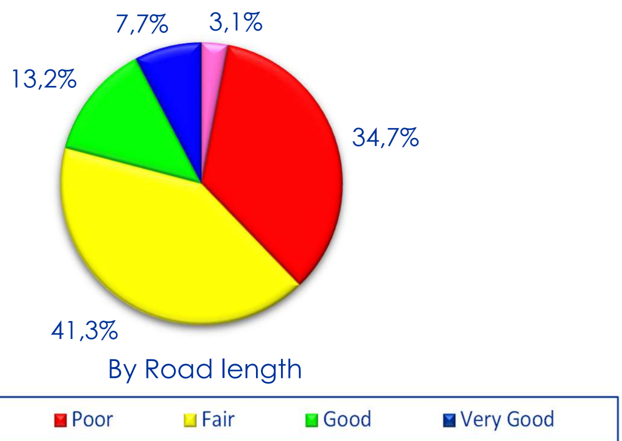



Figure 4-9: The condition of the unpaved road network (2022)

The condition distribution of maintained unpaved roads in 2022 is shown in Figure 4-10. The comparison shows consideration is given to the maintenance of unpaved roads carrying the most passengers. By comparison, 33.0% of all passengers travel on the 37.8% of poor to very poor roads and 16.0% passengers travel on the 20.9% good to very good roads.

The comparison in Figure 4-10 show that the condition distribution per vehicle-kilometre driven is superior to the condition distribution per road length. Further the condition impacting the roads users represented in passenger-kilometres driven shows a further improvement on the condition road users experience.

A detailed map showing the condition of provincial roads may be viewed at http://rnis.westerncape.gov.za/rnis/kml_jobs_display.draw_map?p_job_id=5 . Photographic and other detail can be accessed for each road segment by clicking on the map.

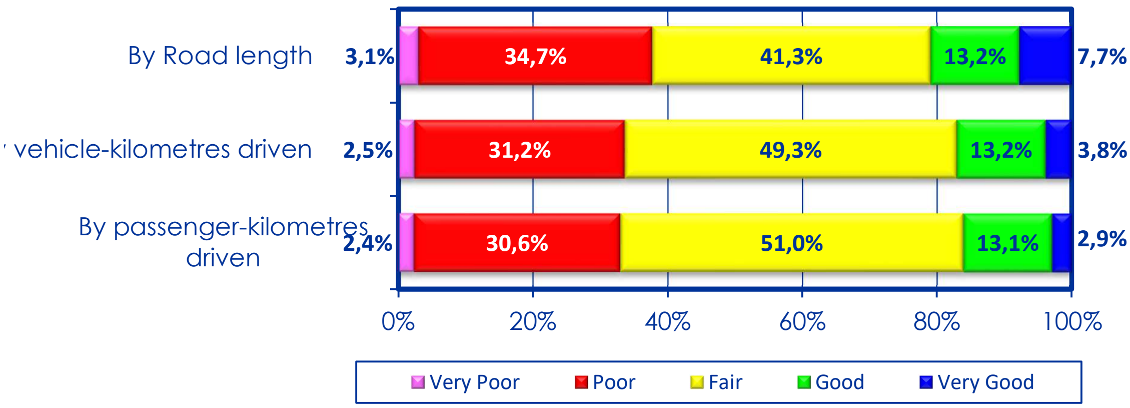



Figure 4-10: Unpaved roads condition distribution by length versus vehicle and passenger-kilometres in 2022

### 4.3.7 Visual condition of unpaved roads per district municipality

Table 4-17 provides the unpaved road visual condition distribution according to the 2022 visual assessment data, per DM. Most of all unpaved roads, irrespective of DM, are in fair to poor condition, as shown in Figure 4-11.

**Table 4-17: Condition distribution per DM for unpaved roads in 2022**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Very Poor | Poor | Fair | Good | Very Good |
| City of Cape Town | - | - | - | - | - |
| Cape Winelands | 24 | 615 | 493 | 91 | 6 |
| Garden Route | 221 | 1 365 | 1 204 | 261 | 19 |
| Overberg | 5 | 252 | 774 | 261 | 15 |
| Central Karoo | 36 | 314 | 764 | 625 | 735 |
| West Coast | 29 | 1 042 | 1 040 | 129 | 23 |
| UniCity | - | - | - | - | - |
| Western Cape Province | 316 | 3 588 | 4 275 | 1 366 | 798 |

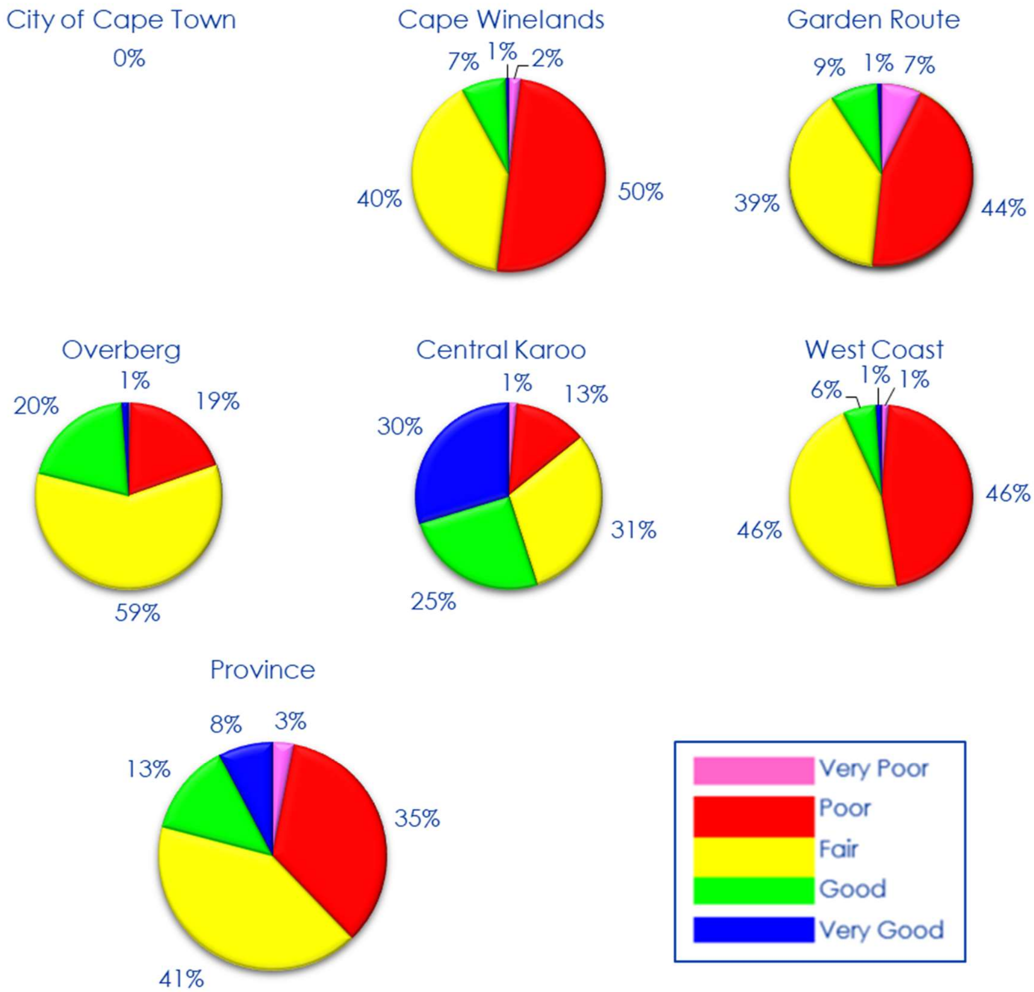



Figure 4-11: Condition distribution per kilometre by DM area for unpaved roads (2022)

### 4.3.8 Visual condition of unpaved roads per RCAM

Table 4-18 provides and Figure 4-12 illustrates the unpaved road visual condition distribution according to the 2022 visual assessment data, per RCAM Class.

**Table 4-18: Condition distribution per RCAM class for unpaved roads in the Western Cape (2022)**

| RCAM Class | Length (km) | | | | |
|---|---|---|---|---|---|
| | Very Poor | Poor | Fair | Good | Very Good |
| 1 | 0 | 0 | 0 | 0 | 0 |
| 2 | 10 | 48.17 | 5 | 17.32 | 50.75 |
| 3 | 14.88 | 474.53 | 771.03 | 323.67 | 138.32 |
| 4 | 269.13 | 2935.24 | 3391.55 | 995.46 | 573.85 |
| 5 | 22.08 | 130.34 | 107.75 | 29.96 | 35.03 |

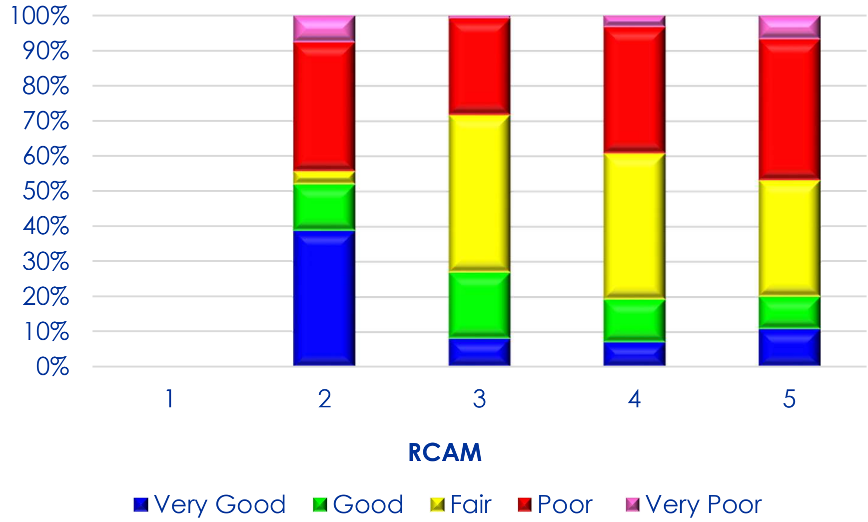


Figure 4-12: Condition distribution per kilometre by RCAM class for unpaved roads (2022)

### 4.3.9 Visual condition indices of Road Structures

The total number of structures that has been inspected by March 2020 are represented in Table 4-19 by type and district.

Table 4-19: Structures included in the visual condition data per District (March 2020)

| DM | Bridge | Bridge - Arch | Bridge Cellular | Culvert Major | Retaining Wall | Sign Gantry |
|---|---|---|---|---|---|---|
| West Coast | 127 | 1 | 7 | 201 | 1 | 0 |
| Cape Winelands | 199 | 2 | 11 | 434 | 8 | 0 |
| Garden Route (Eden) | 169 | 6 | 21 | 540 | 60 | 0 |
| City of Cape Town (DMC) | 102 | 2 | 0 | 36 | 9 | 30 |
| Central Karoo | 84 | 0 | 6 | 341 | 0 | 0 |
| Overberg | 100 | 5 | 14 | 214 | 1 | 0 |
| Total | 781 | 16 | 59 | 1766 | 79 | 30 |

For these structures, the branch calculated an Average Condition Index (ACI) and a Priority Condition Index (PCI). The ACI will be used as a comparative index over time to monitor the overall condition of the bridges. The PCI which is a de-duct-based calculation will be used to identify structures with serious or critical defects that require immediate attention.

Both the ACI and PCI is categorised as very poor (0-30%), poor (30-50%), fair (50-70%), good (70-85%), and very good (85-100%) as shown in Table 4-20.

Table 4-20: Categories of PCI and ACI

| VCI range (%) | Description | Colour used in charts & graphs |
|---|---|---|
| 0 – 29 | critical | |
| 30 – 49 | poor | |
| 50 – 69 | fair | |
| 70 – 84 | good | |
| 85 – 100 | very good | |

The average condition Index per structure type was calculated and the distribution per structure type is shown in Figure 4-13. When using the ACI calculation method the overall ratings of the structures are between fair and very good, however one sign gantry is in poor condition. None of the structures has an overall critical rating when the ACI method of calculation is used.

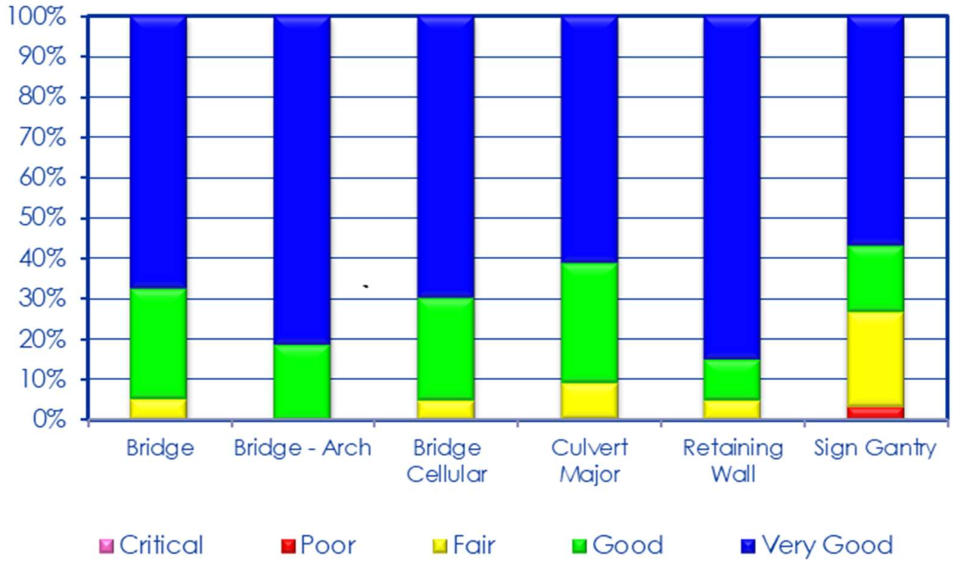



Figure 4-13: ACI for all structures per structure type

Priority Condition Index per structure type was calculated and the distribution per structure type is shown in Figure 4-14. When using the PCI calculation there are 22 bridges, 1 arch bridge, 1 cellular bridge, 46 major culverts and 1 retaining wall with an immediate urgent need for attention.

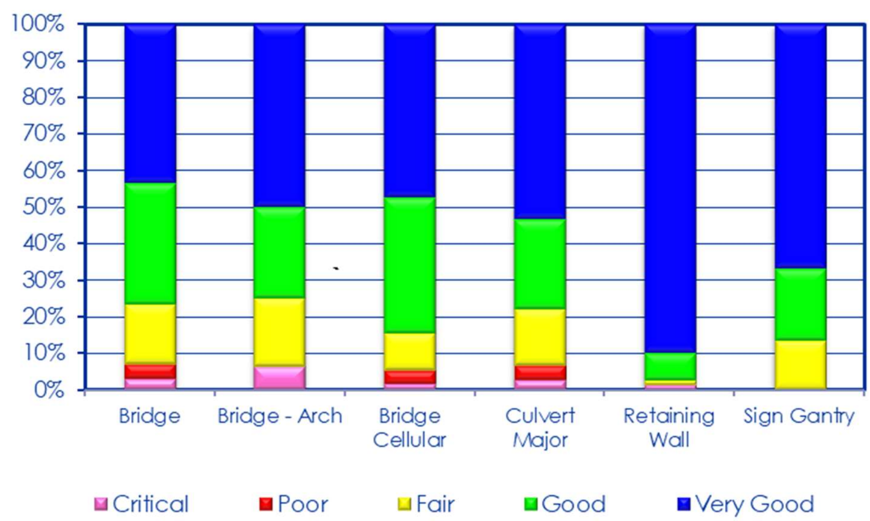



Figure 4-14: PCI for all structures per structure type

## 4.3.10 Average condition index of Road Structures per district

### *Bridges*

Table 4-21 provides the bridges average condition distribution according to the latest structure data collection (March 2020), per DM. All bridges, irrespective of DM, are in fair to very good condition, as shown in Figure 4-15.

**Table 4-21: Average condition distribution per DM for bridges (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 10 | 36 | 56 |
| Cape Winelands | 0 | 0 | 12 | 59 | 128 |
| Garden Route (Eden) | 0 | 0 | 3 | 44 | 122 |
| Overberg | 0 | 0 | 9 | 20 | 71 |
| Central Karoo | 0 | 0 | 5 | 31 | 48 |
| West Coast | 0 | 0 | 2 | 25 | 100 |
| Western Cape Province | 0 | 0 | 41 | 215 | 525 |

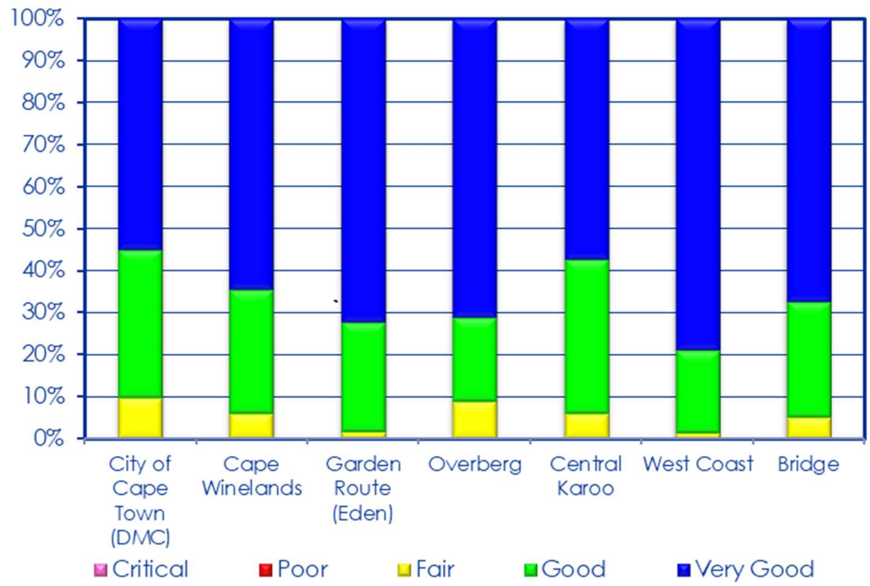



Figure 4-15: ACI for bridges per DM (March 2020)

## *Arch Bridges*

Table 4-22 provides the arch bridges average condition distribution according to the latest structure data collection (March 2020), per DM. All the arch bridges, irrespective of DM, are in fair to very good condition, as shown in Figure 4-16.

| Table 4-22: Average condition distribution per DM for arch bridges (March 2020) | | | | | |
|---|---|---|---|---|---|
| DM | Length (km) | | | | |
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 0 | 0 | 2 |
| Cape Winelands | 0 | 0 | 0 | 2 | 0 |
| Garden Route (Eden) | 0 | 0 | 0 | 0 | 6 |
| Overberg | 0 | 0 | 0 | 1 | 4 |
| Central Karoo | 0 | 0 | 0 | 0 | 0 |
| West Coast | 0 | 0 | 0 | 0 | 1 |
| Western Cape Province | 0 | 0 | 0 | 3 | 13 |

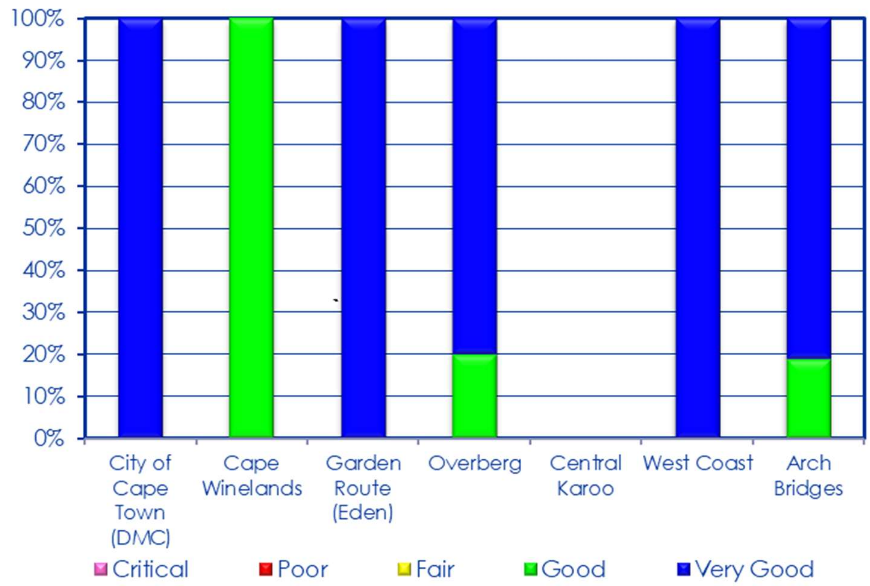



Figure 4-16: ACI for arch bridges per DM (March 2020)

### *Cellular Bridges*

Table 4-23 provides the cellular bridges average condition distribution according to the latest structure data collection (March 2020), per DM. All the cellular bridges, irrespective of DM, are in fair to very good condition, as shown in Figure 4-17.

**Table 4-23: Average condition distribution per DM for cellular bridges (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 0 | 0 | 0 |
| Cape Winelands | 0 | 0 | 2 | 2 | 7 |
| Garden Route (Eden) | 0 | 0 | 1 | 2 | 18 |
| Overberg | 0 | 0 | 0 | 4 | 10 |
| Central Karoo | 0 | 0 | 0 | 4 | 2 |
| West Coast | 0 | 0 | 0 | 3 | 4 |
| Western Cape Province | 0 | 0 | 3 | 15 | 41 |

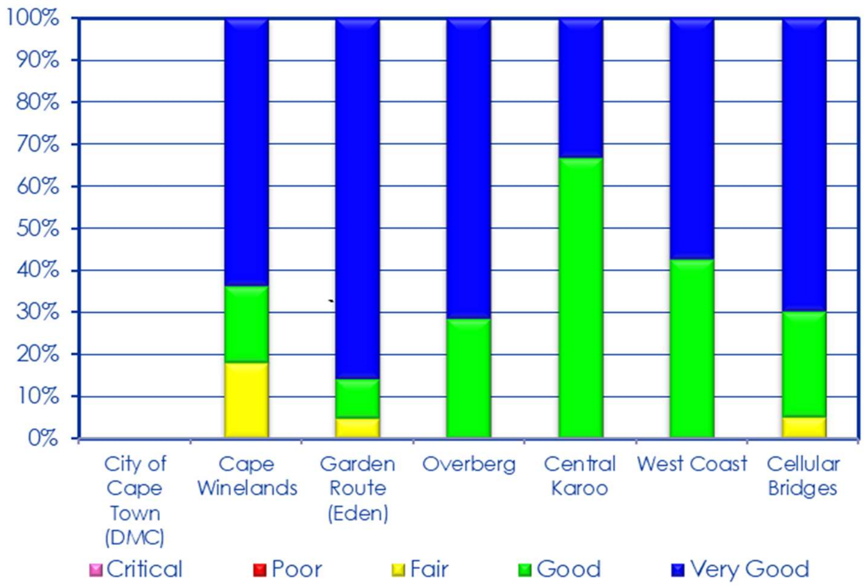



Figure 4-17: ACI for cellular bridges per DM (March 2020)

### *Major Culverts*

Table 4-24 provides the major culverts average condition distribution according to the latest structure data collection (March 2020), per DM. Most of the major culverts, irrespective of DM, are in fair to very good condition, as shown in Figure 4-18. There are six major culverts in poor condition.

**Table 4-24: Average condition distribution per DM for major culverts (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 1 | 2 | 33 |
| Cape Winelands | 0 | 0 | 40 | 127 | 267 |
| Garden Route (Eden) | 0 | 2 | 51 | 167 | 320 |
| Overberg | 0 | 2 | 15 | 77 | 120 |
| Central Karoo | 0 | 0 | 33 | 113 | 195 |
| West Coast | 0 | 2 | 20 | 38 | 141 |
| Western Cape Province | 0 | 6 | 160 | 524 | 1076 |

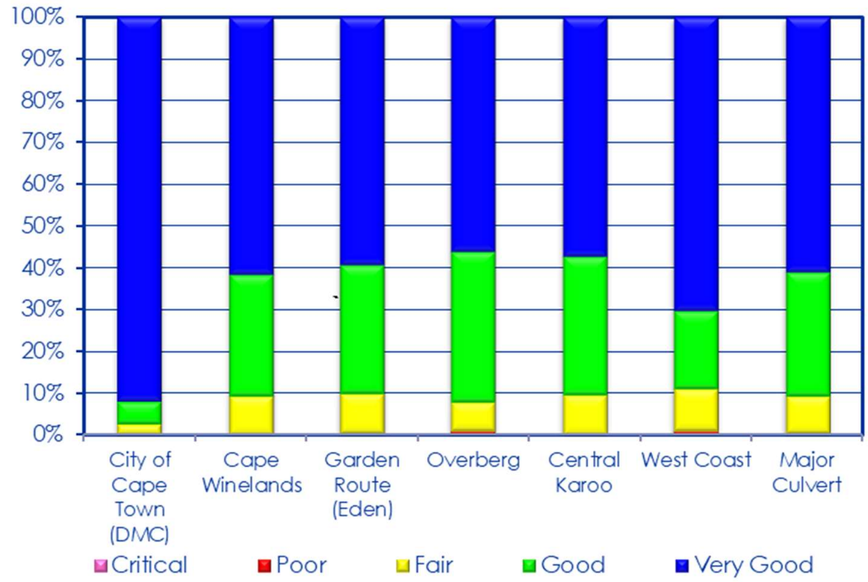



Figure 4-18: ACI for major culverts per DM (March 2020)

### *Retaining Walls*

Table 4-25 provides the retaining walls average condition distribution according to the latest structure data collection (March 2020), per DM. All the retaining walls, irrespective of DM, are in fair to very good condition, as shown in Figure 4-19.

**Table 4-25: Average condition distribution per DM for retaining walls (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 1 | 0 | 8 |
| Cape Winelands | 0 | 0 | 0 | 1 | 7 |
| Garden Route (Eden) | 0 | 0 | 3 | 6 | 51 |
| Overberg | 0 | 0 | 0 | 1 | 0 |
| Central Karoo | 0 | 0 | 0 | 0 | 0 |
| West Coast | 0 | 0 | 0 | 0 | 1 |
| Western Cape Province | 0 | 0 | 4 | 8 | 67 |

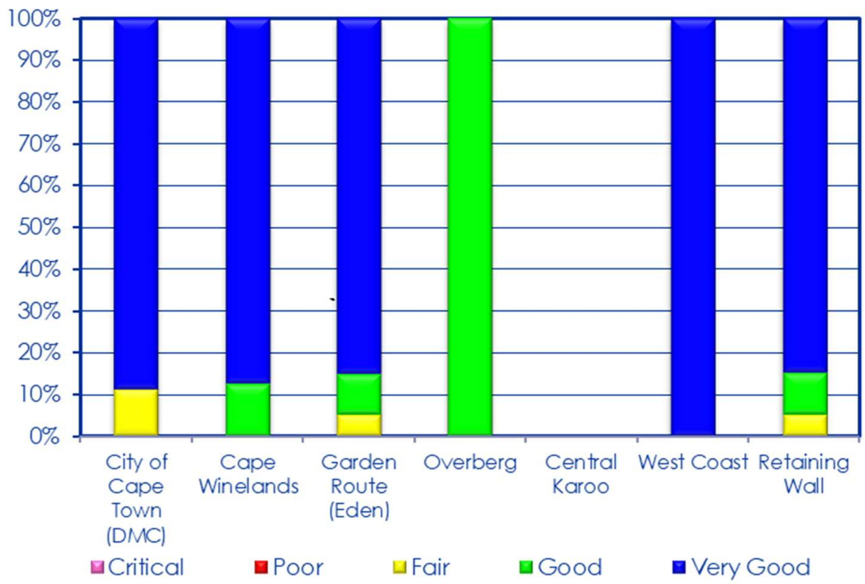



Figure 4-19: ACI for retaining walls per DM (March 2020)

### *Sign Gantries*

Table 4-26 provides the sign gantries average condition distribution according to the latest structure data collection (March 2020), per DM. The only DM that has condition data for the sign gantries is City of Cape Town. One of the sign gantries are in poor condition and the others are in fair to very good condition, as shown in Figure 4-20.

**Table 4-26: Average condition distribution per DM for sign gantries (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 1 | 7 | 5 | 17 |
| Cape Winelands | 0 | 0 | 0 | 0 | 0 |
| Garden Route (Eden) | 0 | 0 | 0 | 0 | 0 |
| Overberg | 0 | 0 | 0 | 0 | 0 |
| Central Karoo | 0 | 0 | 0 | 0 | 0 |
| West Coast | 0 | 0 | 0 | 0 | 0 |
| Western Cape Province | 0 | 1 | 7 | 5 | 17 |


Figure 4-20: ACI for sign gantries per DM (March 2020)

### 4.3.11 Priority condition index of Road Structures per district

#### *Bridges*

Table 4-27 provides the bridges priority condition distribution according to the latest structure data collection (March 2020), per DM. The only DM that does not have a bridge in critical condition is the West Coast, all other DM's have bridges with an immediate treatment need, as shown in Figure 4-21.

Table 4-27: Priority condition distribution per DM for bridges (March 2020)

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 6 | 9 | 22 | 34 | 31 |
| Cape Winelands | 8 | 10 | 46 | 59 | 76 |
| Garden Route (Eden) | 1 | 4 | 13 | 50 | 101 |
| Overberg | 5 | 4 | 17 | 32 | 42 |
| Central Karoo | 2 | 1 | 15 | 34 | 32 |
| West Coast | 0 | 3 | 16 | 51 | 57 |
| Western Cape Province | 22 | 31 | 129 | 260 | 339 |

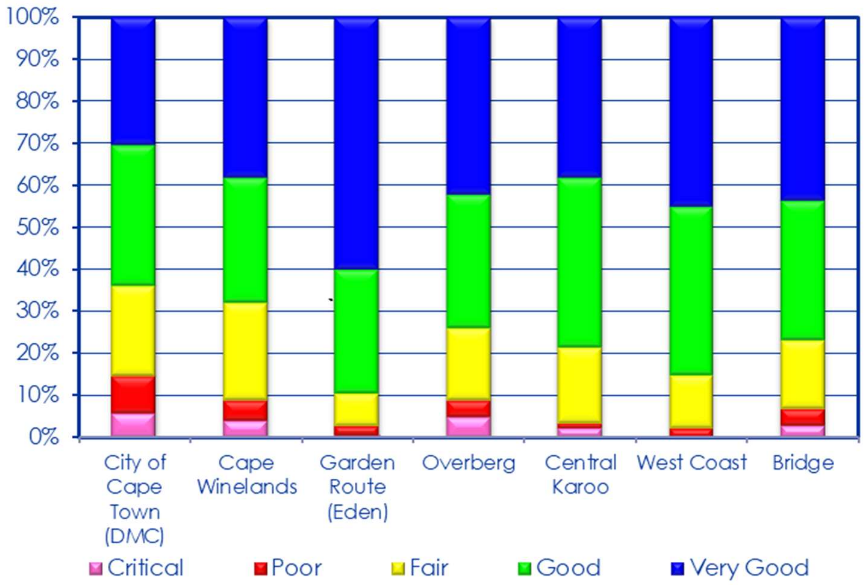



Figure 4-21: PCI for bridges per DM (March 2020)

## *Arch Bridges*

Table 4-28 provides the arch bridges priority condition distribution according to the latest structure data collection (March 2020), per DM. The West Coast DM has an arch bridge with an urgent maintenance need. All the other arch bridges, irrespective of DM, are in fair to very good condition, as shown in Figure 4-22.

**Table 4-28: Priority condition distribution per DM for arch bridges (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 0 | 1 | 1 |
| Cape Winelands | 0 | 0 | 1 | 1 | 0 |
| Garden Route (Eden) | 0 | 0 | 1 | 0 | 5 |
| Overberg | 0 | 0 | 1 | 2 | 2 |
| Central Karoo | 0 | 0 | 0 | 0 | 0 |
| West Coast | 1 | 0 | 0 | 0 | 0 |
| Western Cape Province | 1 | 0 | 3 | 4 | 8 |

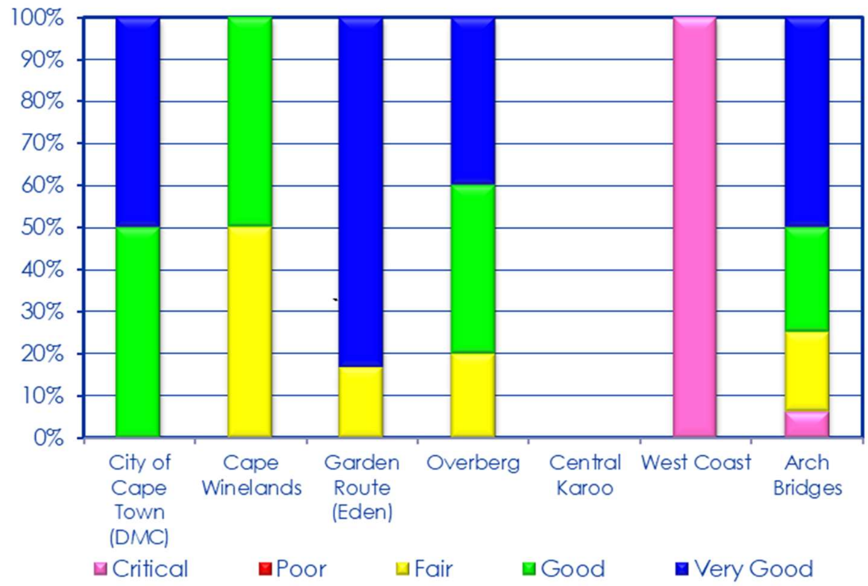



Figure 4-22: PCI for arch bridges per DM (March 2020)

### *Cellular Bridges*

Table 4-29 provides the cellular bridges priority condition distribution according to the latest structure data collection (March 2020), per DM. The Overberg DM has a cellular bridge with an urgent maintenance need, Cape Winelands and the Garden Route DM's each has a bridge with a poor priority index indicating a maintenance need. All the other cellular bridges, irrespective of DM, are in fair to very good condition, as shown in Figure 4-23.

**Table 4-29: Priority condition distribution per DM for cellular bridges (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 0 | 0 | 0 |
| Cape Winelands | 0 | 1 | 2 | 4 | 4 |
| Garden Route (Eden) | 0 | 1 | 2 | 4 | 14 |
| Overberg | 1 | 0 | 1 | 5 | 7 |
| Central Karoo | 0 | 0 | 0 | 5 | 1 |
| West Coast | 0 | 0 | 1 | 4 | 2 |
| Western Cape Province | 1 | 2 | 6 | 22 | 28 |

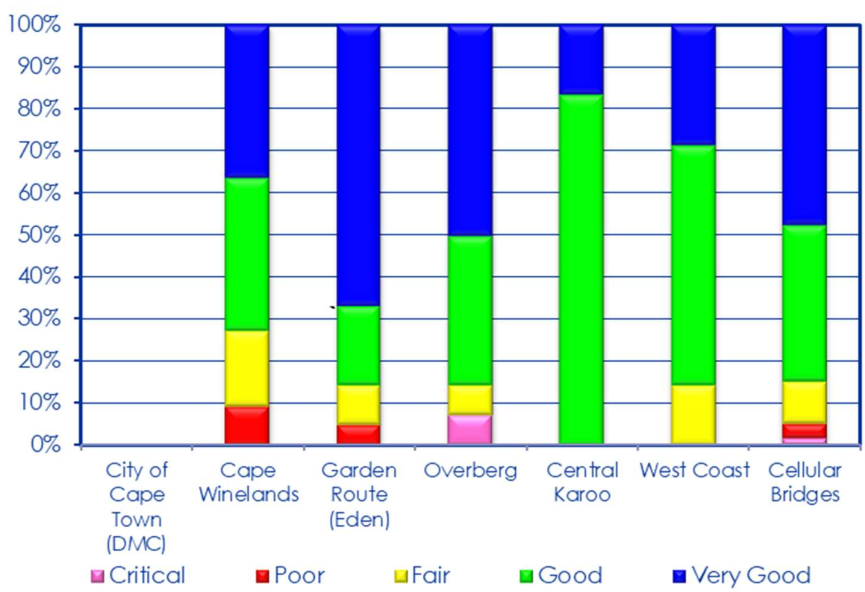



Figure 4-23: PCI for cellular bridges per DM (March 2020)

### *Major Culverts*

Table 4-30 provides the major culverts priority condition distribution according to the latest structure data collection (March 2020), per DM. Most of DM major culverts in critical and poor condition, which requires maintenance of some kind, as shown in Figure 4-24.

**Table 4-30: Priority condition distribution per DM for major culverts (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 1 | 0 | 4 | 6 | 25 |
| Cape Winelands | 10 | 21 | 58 | 119 | 226 |
| Garden Route (Eden) | 12 | 22 | 79 | 142 | 285 |
| Overberg | 8 | 7 | 30 | 55 | 114 |
| Central Karoo | 11 | 16 | 76 | 65 | 173 |
| West Coast | 4 | 3 | 28 | 46 | 120 |
| Western Cape Province | 46 | 69 | 275 | 433 | 943 |

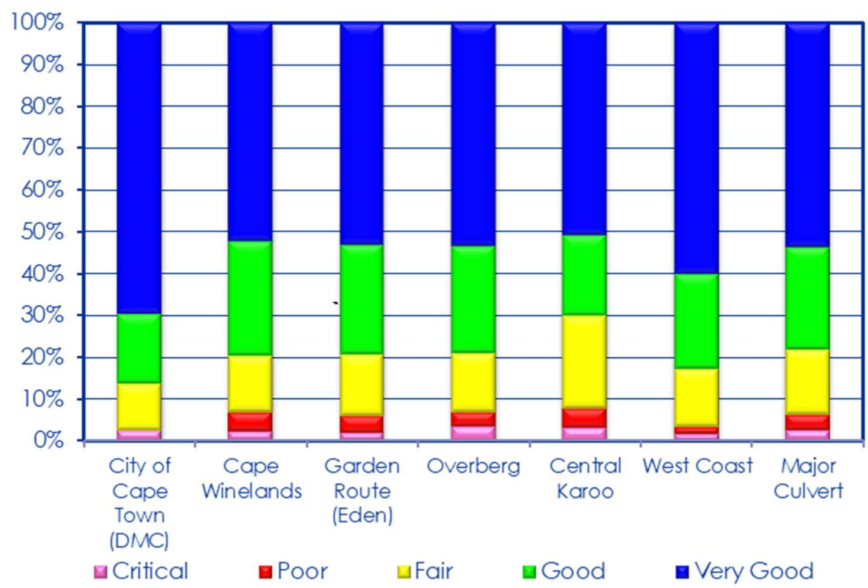



Figure 4-24: PCI for major culverts per DM (March 2020)

### *Retaining Walls*

Table 4-31 provides the retaining walls priority condition distribution according to the latest structure data collection (March 2020), per DM. In the Cape Winelands DM there is one retaining wall in critical condition, requiring urgent maintenance, all other retaining wall, irrespective of DM, are in fair to very good condition, as shown in Figure 4-25.

**Table 4-31: Priority condition distribution per DM for retaining walls (March 2020)**

| DM | Length (km) | | | | |
|---|---|---|---|---|---|
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 0 | 1 | 8 |
| Cape Winelands | 1 | 0 | 0 | 0 | 7 |
| Garden Route (Eden) | 0 | 0 | 1 | 4 | 55 |
| Overberg | 0 | 0 | 0 | 1 | 0 |
| Central Karoo | 0 | 0 | 0 | 0 | 0 |
| West Coast | 0 | 0 | 0 | 0 | 1 |
| Western Cape Province | 1 | 0 | 1 | 6 | 71 |

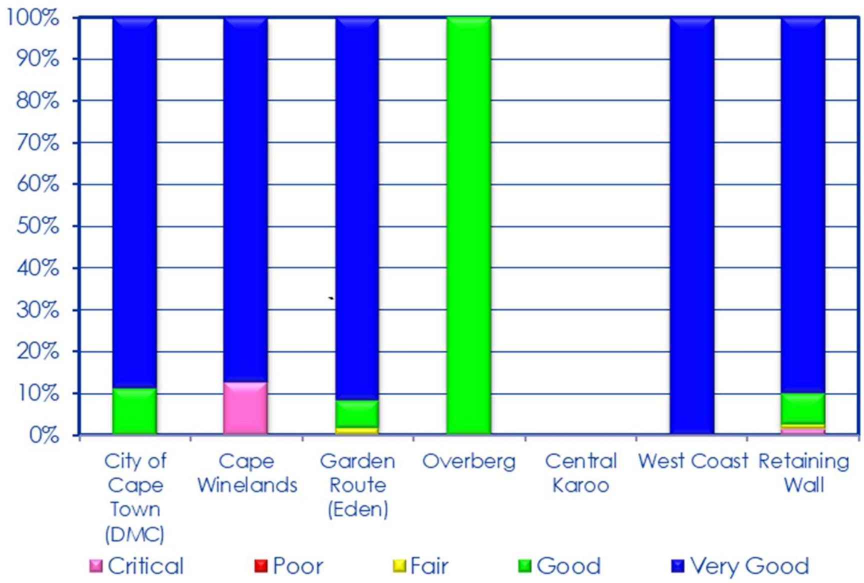



Figure 4-25: PCI for retaining walls per DM (March 2020)

### *Sign Gantries*

Table 4-32 provides the sign gantries priority condition distribution according to the latest structure data collection (March 2020), per DM. The only DM that has condition data for the sign gantries is City of Cape Town. All the sign gantries are in fair to very good condition, as shown in Figure 4-26.

| Table 4-32: Priority condition distribution per DM for retaining walls (March 2020) | | | | | |
|---|---|---|---|---|---|
| DM | Length (km) | | | | |
| | Critical | Poor | Fair | Good | Very Good |
| City of Cape Town (DMC) | 0 | 0 | 4 | 6 | 20 |
| Cape Winelands | 0 | 0 | 0 | 0 | 0 |
| Garden Route (Eden) | 0 | 0 | 0 | 0 | 0 |
| Overberg | 0 | 0 | 0 | 0 | 0 |
| Central Karoo | 0 | 0 | 0 | 0 | 0 |
| West Coast | 0 | 0 | 0 | 0 | 0 |
| Western Cape Province | 0 | 0 | 4 | 6 | 20 |

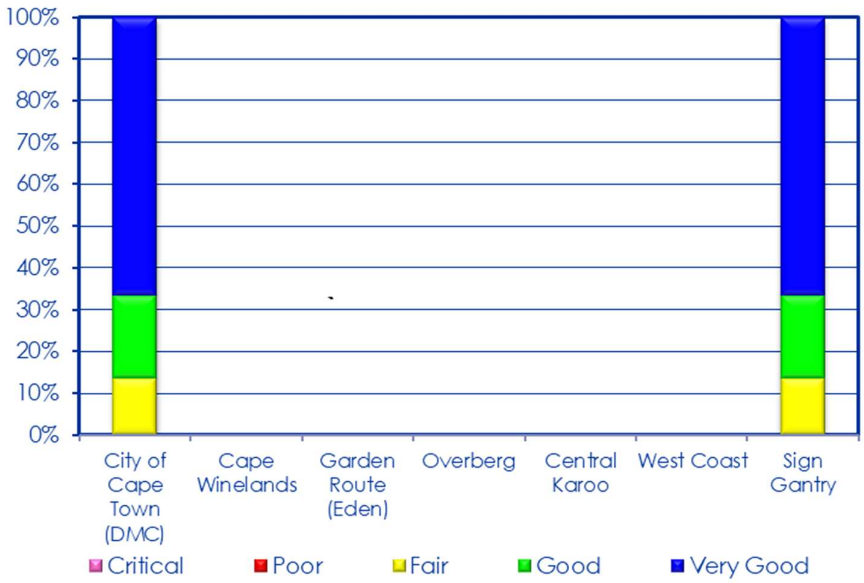



Figure 4-26: PCI for retaining walls per DM (March 2020)

### 4.3.12 Condition of road markings

The condition of road markings is shown in Table 4-33 and Figure 4-27, which highlights the poor and very poor conditions that are found mostly on class 3 and 4 roads.

**Table 4-33: Condition of road markings according to RCAM class June 2022**

| Condition | RCAM class | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| | Km | % | Km | % | Km | % | Km | % | Km | % |
| Very Good | 94.82 | 1.3% | 738.13 | 9.9% | 509.94 | 6.8% | 129.95 | 1.7% | 8.30 | 0.1% |
| Good | 40.63 | 0.5% | 1747.48 | 23.5% | 1382.00 | 18.6% | 500.47 | 6.7% | 10.60 | 0.1% |
| Fair | 71.50 | 1.0% | 376.40 | 5.1% | 895.79 | 12.0% | 279.15 | 3.7% | 15.87 | 0.2% |
| Poor | 14.74 | 0.2% | 55.84 | 0.7% | 170.00 | 2.3% | 116.57 | 1.6% | 4.64 | 0.1% |
| Very Poor | 16.00 | 0.2% | 0.00 | 0.0% | 26.94 | 0.4% | 21.27 | 0.3% | 0.71 | 0.0% |
| None | 0.00 | 0.0% | 16.29 | 0.2% | 30.20 | 0.4% | 167.74 | 2.3% | 5.03 | 0.1% |

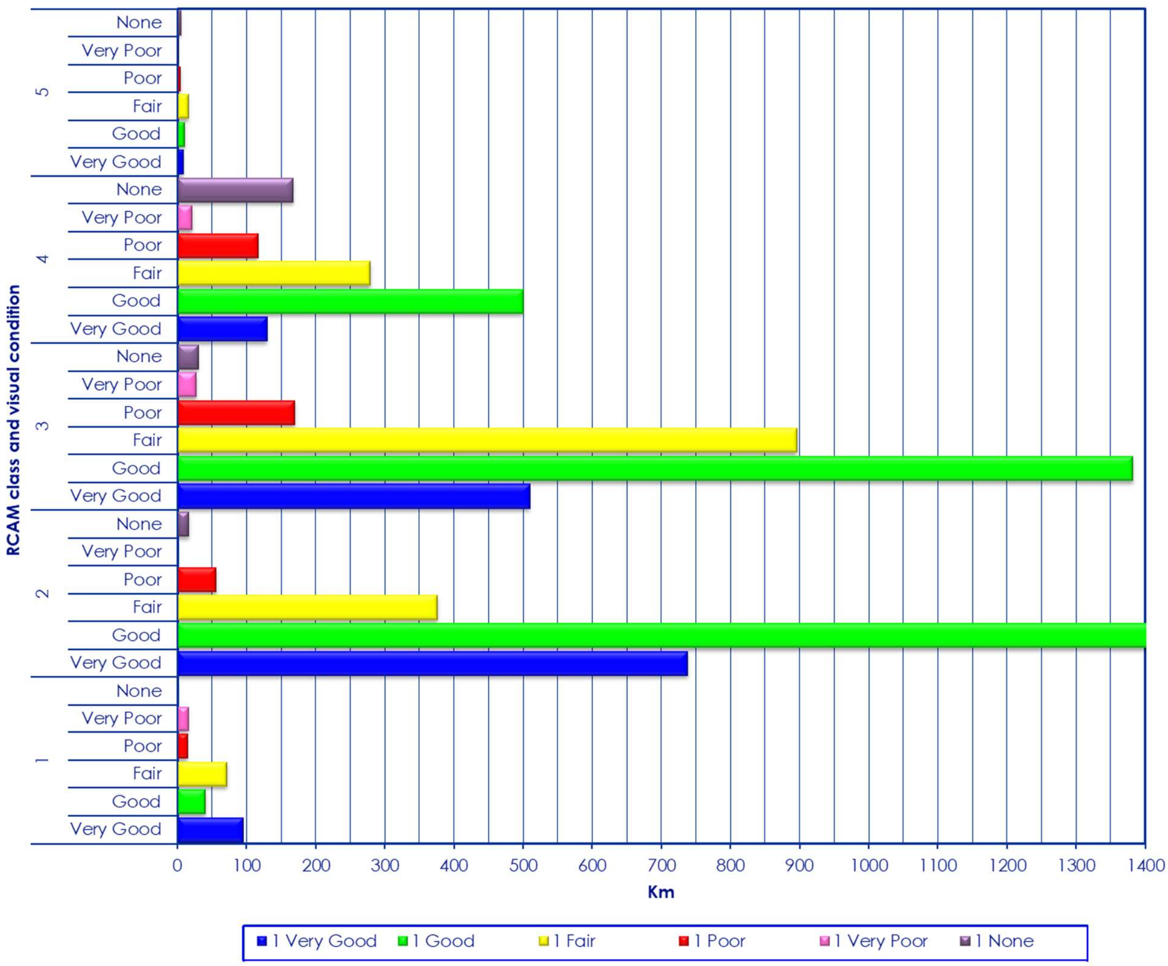



Figure 4-27: Condition of road markings according to RCAM class (2022)

## 4.3.13 Condition of Plant equipment

In Figure 4-28 the current condition distribution of the different plant equipment is shown, some of the equipment's condition is unknown. Most equipment is in good to excellent condition. For the equipment in poor condition a replacement/maintenance strategy will be implement or be removed from the asset register if the equipment is not used.

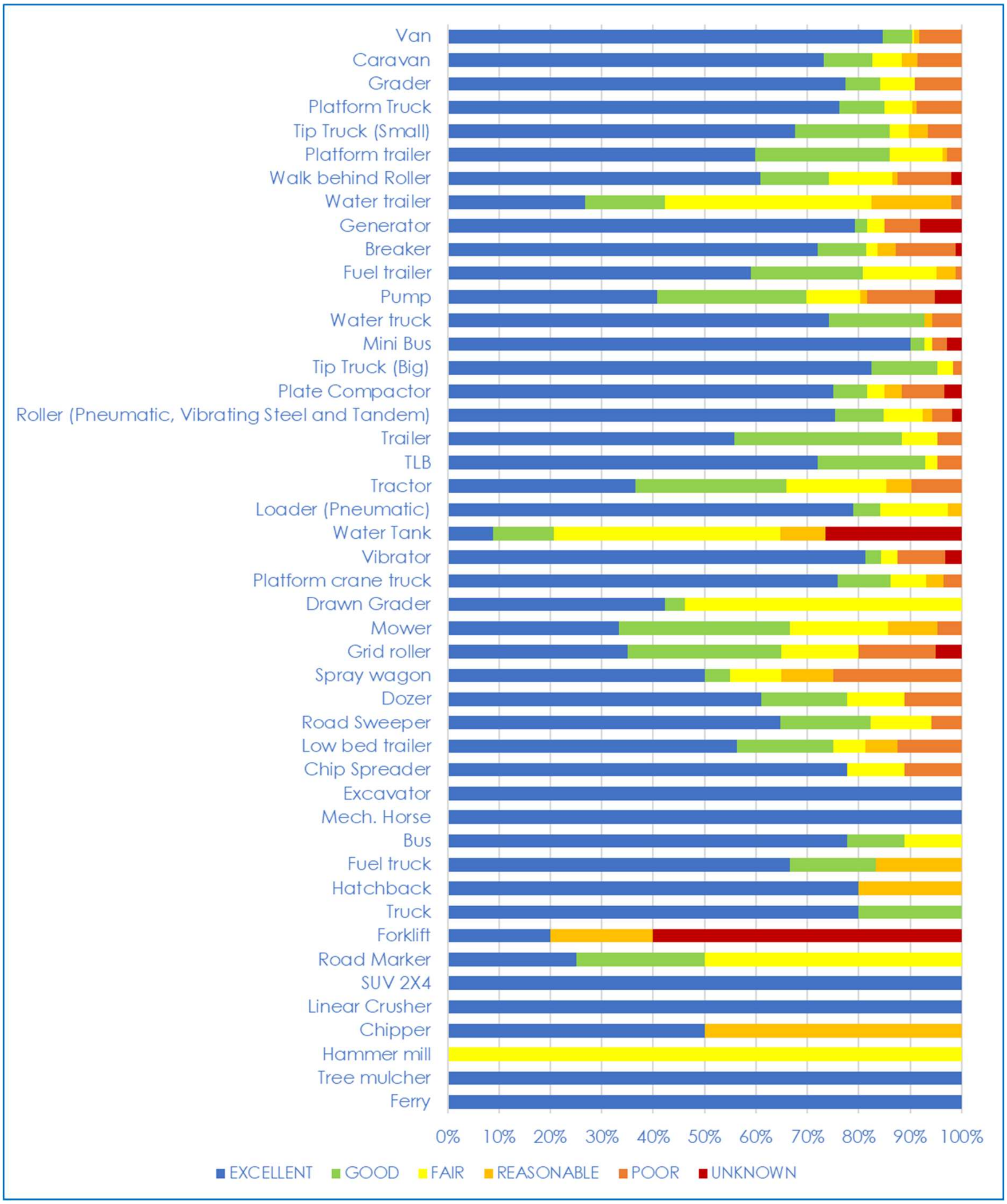



Figure 4-28: Condition distribution of the plant equipment

# 4.4 Functional condition of the assets

## 4.4.1 General

According to the THM 22 document, there are four functional indices related to road asset management systems. The four functional indices are:

- Capacity
- Riding Quality
- Road Safety
- Availability

In the compliance statement as provided in Appendix B, the Branch states that it will first aim to complete the work required for a Level II RAMS, on all asset under the management of the Branch. For a Level II RAMS, the only functional indices required is capacity and riding quality FI calculations.

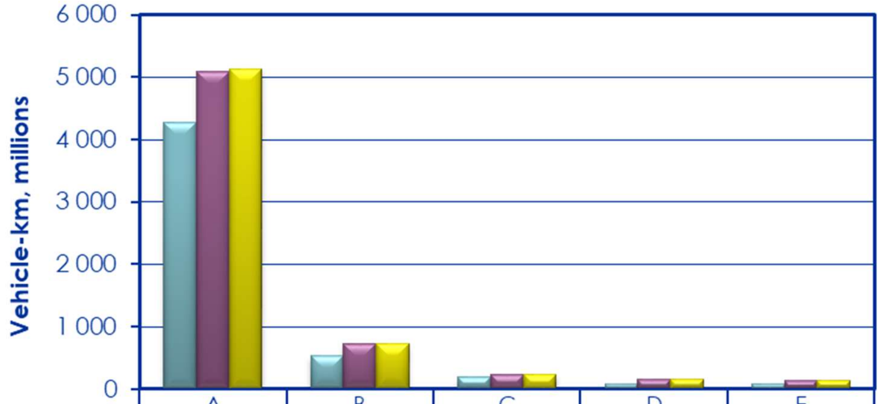
In addition to these indices, the branch has evaluated the following functional condition assessments:

- Riding quality and Smooth Travel Exposure
- Skid resistance
- Macro texture (MPD) and High Texture Exposure
- Low Rut Exposure.

## 4.4.2 Volume capacity

### *Level of service*

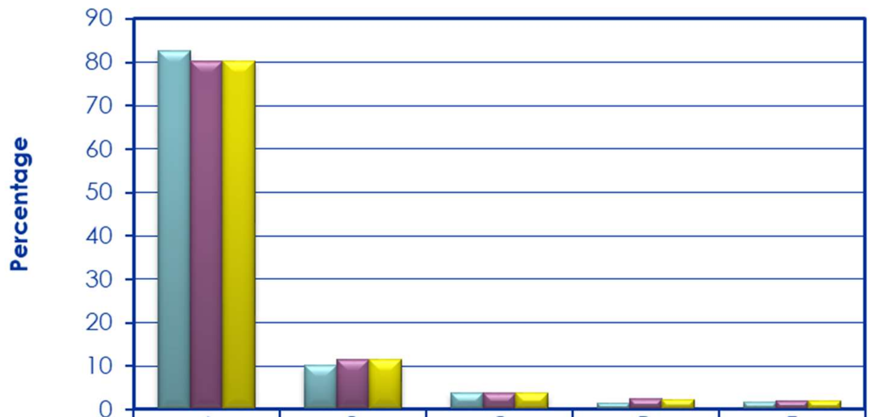
The quality of traffic flow is measured in terms of level of service (LOS). On provincial paved roads, the LOS varies from LOS A, indicating free flow conditions, to LOS E, indicating full capacity conditions with queuing being experienced. Normally the Branch strives to provide at least LOS B on rural roads and LOS D on urban roads. Figure 4-29 shows the distribution of vehicle-km travelled annually on roads under the control of the Branch experiencing LOS C, D or E. Figure 4-30 shows the distribution of vehicle-km as a percentage of the total in terms of LOS. Although the total of vehicle-km has grown in the last decade, the distribution remains almost constant. Only about 8% of the vehicle-km experience a LOS of C or lower.




| | A | B | C | D | E |
|---|---|---|---|---|---|
| 2005 | 4271,88 | 530,28 | 201,32 | 80,46 | 90,69 |
| 2017 | 5082,46 | 730,35 | 237,94 | 153,73 | 133,56 |
| 2019 | 5131,08 | 729,93 | 239,24 | 151,53 | 132,98 |



Figure 4-29: Vehicle-km travelled annually for each level of service category in 2005, 2017 and 2019 (excludes UniCity roads)




| | A | B | C | D | E |
|---|---|---|---|---|---|
| 2005 | 82,55 | 10,25 | 3,89 | 1,55 | 1,75 |
| 2017 | 80,19 | 11,52 | 3,75 | 2,43 | 2,11 |
| 2019 | 80,36 | 11,43 | 3,75 | 2,37 | 2,08 |



Figure 4-30: Percentage vehicle-km travelled for each level of service category in 2005, 2017 and 2019 (excludes UniCity roads)

It must, however, be stressed that LOS in terms of volume capacity is only relevant when LOS D or E is reached on a road. Roads constructed to the correct geometric design class will provide LOS A or B for many years.

Apart from paved road upgrading projects, capacity is not normally a reason for improving a road unless it can be economically justified. Unpaved roads are upgraded to paved roads mainly due to traffic volumes that are too high for economic maintenance, and/or to improve road user costs and riding quality. Except for the 8% of vehicle-km mentioned above, the network performs well and provides LOS B or better.

### *Volume capacity ratio*

Volume-to-capacity ratio (v/c) is the primary performance measure for the highway-based critical segments. V/C is a conventional level-of-service measure for roadways, comparing roadway demand (vehicle volumes) with roadway supply (carrying capacity). This measure can alert the branch to areas where traffic mitigation measures should be considered. The capacity volume ratio's (V/C) is shown per pavement type and RCAM class in Figure 4-31 and Figure 4-32.

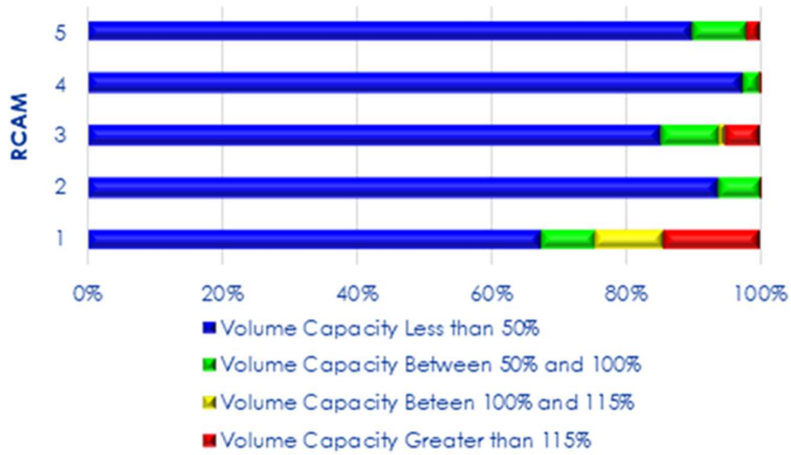



Figure 4-31: Volume capacity ratio for paved roads

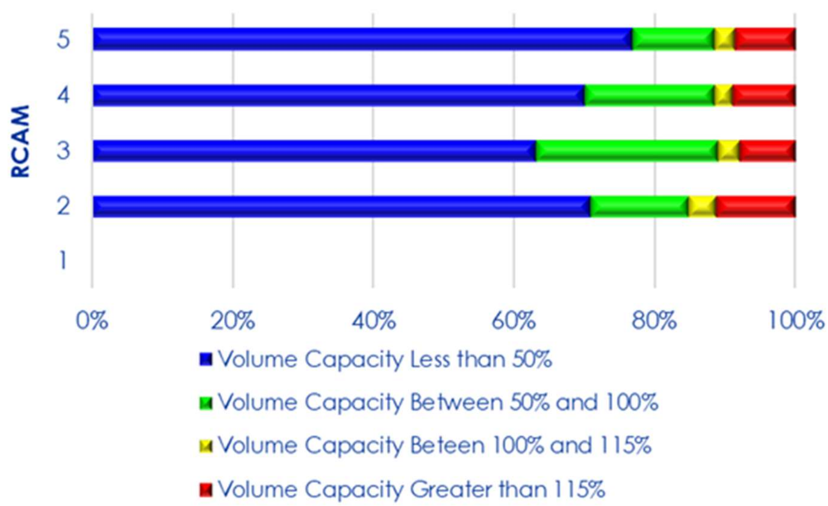



Figure 4-32: Volume capacity ratio for unpaved roads

### *Function Index based on Volume Capacity Ratio*

The V/C is translated to a Functional Index for V/C (FIV/C) using the formula provided in TMH 22, shown in Figure 4-33. The branch currently has a volume capacity problem on 8% of the overall road network.

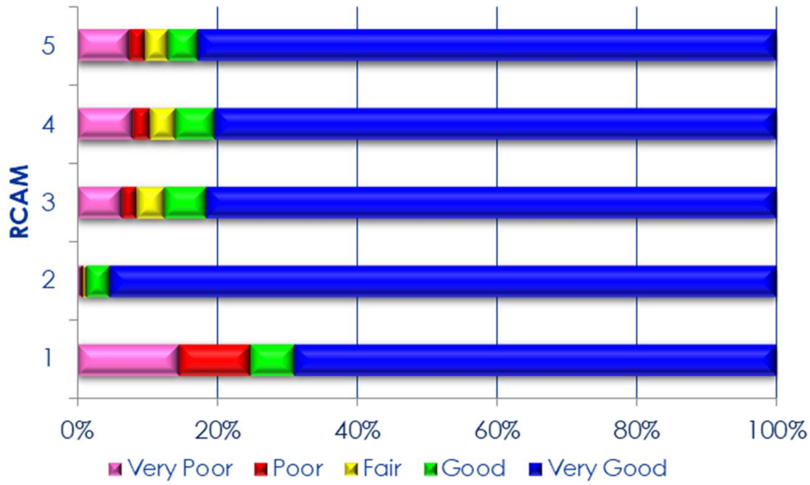



Figure 4-33: FIV/C for all roads

### *Capacity delay cost*

Cost of capacity delays are calculated on all roads related to the impact of the V/C of the roads and time lost related to speed reduction because of congestion caused by the capacity delays. The total capacity delay cost for the road users on the network is R 425 million per annum. Table 4-34 shows the cost of the different pavement types and RCAM class per annum.

**Table 4-34: Cost of capacity delays on roads per RCAM class and pavement type (R Million)**

| Description | RCAM Class | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Paved | 140,7 | 29,2 | 189,5 | 2,1 | 0,4 |
| Unpaved | - | 0,8 | 15,9 | 45,4 | 1,5 |

## 4.4.3 Riding Quality Functional Index

Table 4-35 provides the functional index for roughness per RCAM class. Currently suitable levels of service have not been determined for the functional index for roughness.

**Table 4-35: Functional index for roughness 2022**

| Description | RCAM Class | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Average Functional Index | 91.8 | 82.2 | 78.2 | 69.2 | 68.3 |
| Level of service | - | - | - | - | - |

The distribution graphs of the functional index related to IRI is shown in Figure 4-34.

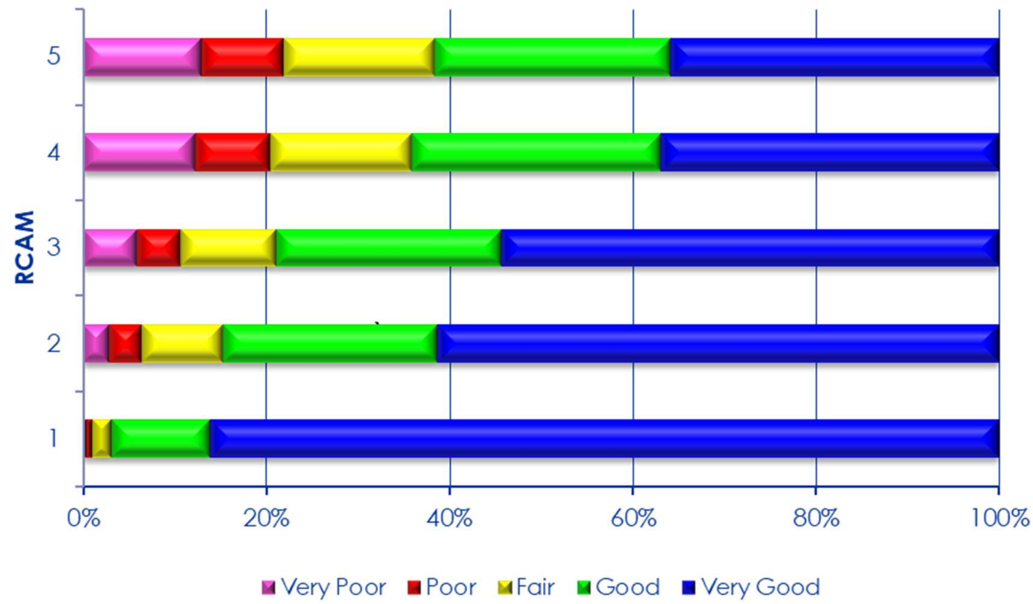



Figure 4-34: FIIRI for paved roads (2022)

### 4.4.4 Smooth Travel Exposure

Smooth travel exposure (STE) measures the technical efficiency of road system performance. It is the proportion of travel undertaken each year on roads with conditions above the targeted conditions for those roads. The target condition is IRI ≤ 4,2 (South African Road Agency SOC Ltd, 2016). The purpose is to monitor whether roads are providing acceptable travel conditions. STE is calculated as follows:

STE = Vkt x 100/Vk

Where:

Vkt = daily travel measured in vehicle-km on roads classified as above targeted conditions.

Vk = daily travel measured in vehicle-km

The smooth travel exposure statistics per RCAM class are shown in Table 4-36 and Figure 4-35.

**Table 4-36: Smooth travel exposure per RCAM class for 2022**

| Description | RCAM Class | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Smooth travel exposure (%) | 99.5 | 93.1 | 85.8 | 77.9 | 71.1 |
| Level of service (minimum, %) (preliminary) | 97,5 | 95,0 | 90,0 | 80,0 | 80,0 |

Examining the results in Table 4-36, RCAM classes 2 to 3 indicate less than satisfactory travel conditions with respect to smoothness. This reflects the age of the current network and the low rate of rehabilitation of these old roads. Several projects have been implemented on the RCAM Class 1 network which is evident when evaluating the STE for these roads.

The preliminary LOS may have been set too high for RCAM classes 2 to 5 considering the resources available and many roads that fall into RCAM classes 3, 4 and 5 may not be economically viable to rehabilitate. Further investigation into the preliminary LOS target values is therefore required.

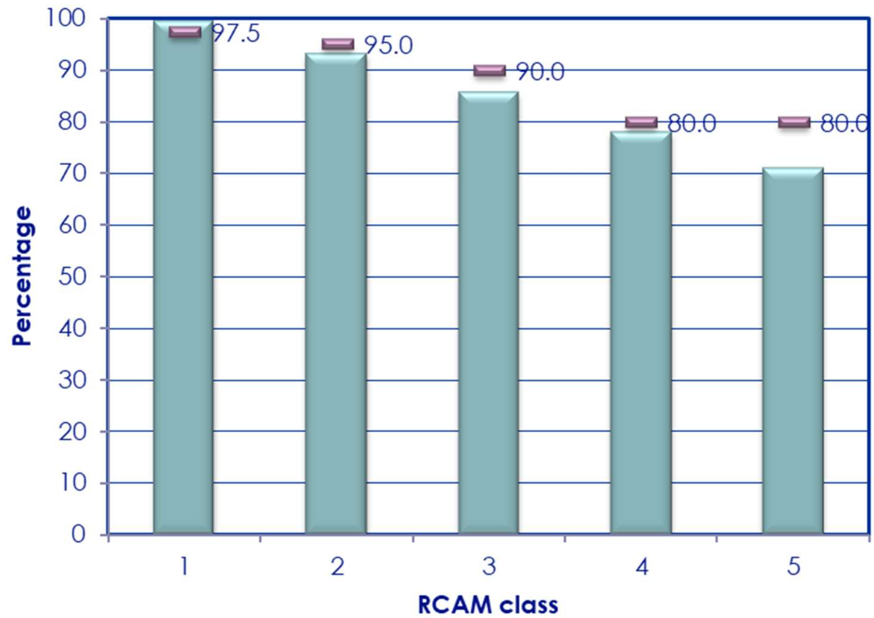



Figure 4-35: Smooth travel exposure per RCAM class compared with preliminary LOS targets for 2022

### 4.4.5 Low rut exposure

Low rut exposure (LRE) measures the safety efficiency of road system performance. It is the proportion of travel undertaken each year on roads with conditions above the targeted conditions for those roads. The target condition is rut depth ≤ 20 mm (Committee of Transport Officials, 2013). The purpose is to monitor whether roads are providing acceptable safety conditions. LRE is calculated as follows:

LRE = Vkt x 100/Vk

Where:

Vkt = daily travel measured in vehicle-km on roads classified as above targeted conditions.

Vk = daily travel measured in vehicle-km

The low rut exposure statistics per RCAM class are shown in Table 4-37 and Figure 4-36.

| Table 4-37: Low rut exposure per RCAM class for 2022 | | | | | |
|---|---|---|---|---|---|
| Description | RCAM Class | | | | |
| | 1 | 2 | 3 | 4 | 5 |
| Low Rut Exposure (%) | 100.0 | 99.8 | 99.5 | 99.2 | 98.8 |
| Level of service (minimum, %) (preliminary) | 97,5 | 95,0 | 90,0 | 80,0 | 80,0 |

The results in Table 4-37 indicates acceptable safety conditions for all RCAM classes with respect to pooling of water in ruts that could lead to aquaplaning of light vehicles. The preliminary LOS may be too low for RCAM classes 4 and 5 and further investigation into the preliminary LOS standards needs to be concluded.

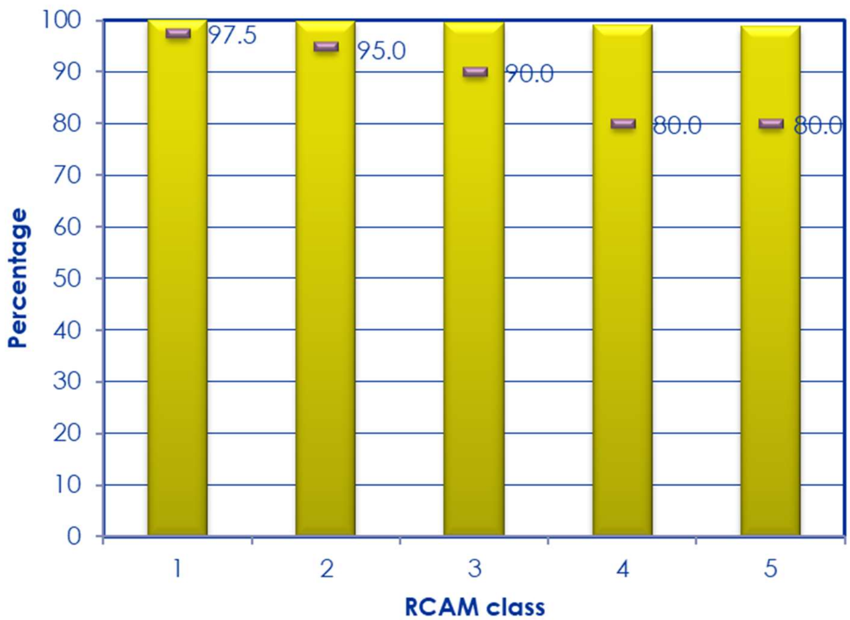



Figure 4-36: Low rut exposure per RCAM class compared with preliminary LOS targets for 2022

### 4.4.6 High texture exposure

High texture exposure (HTE) measures the safety efficiency of road system performance. It is the proportion of travel undertaken each year on roads with conditions above the targeted conditions for those roads. The target condition is texture depth ≥0,4 mm (Committee of Transport Officials, 2013). The purpose is to monitor whether roads are providing acceptable safety conditions. HTE is calculated as follows:

HTE = Vkt x 100/Vk

Where:

Vkt = daily travel measured in vehicle-km on roads classified as above targeted conditions.

Vk = daily travel measured in vehicle-km

The high texture exposure statistics per RCAM class are shown in Table 4-38 and Figure 4-37.

| Table 4-38: High texture exposure per RCAM class for 2022 | | | | | |
|---|---|---|---|---|---|
| Description | RCAM Class | | | | |
| | 1 | 2 | 3 | 4 | 5 |
| High texture exposure (%) | 96.3 | 78.6 | 83.9 | 95.5 | 99.9 |
| Level of service (minimum, %) (preliminary) | 97,5 | 95,0 | 90,0 | 80,0 | 80,0 |

Examining the results in Table 4-38 indicates a less than satisfactory high texture exposure for RCAM classes 1, 2 and 3. This is a reflection of the age of the seals on these roads and that some of the RCAM class 1 and 2 roads are surfaced with asphalt. To date, the target macro texture condition of 0,4 mm has not been used as a reason to reseal these roads. Further investigation into the preliminary LOS standards needs to be done to validate their appropriateness.

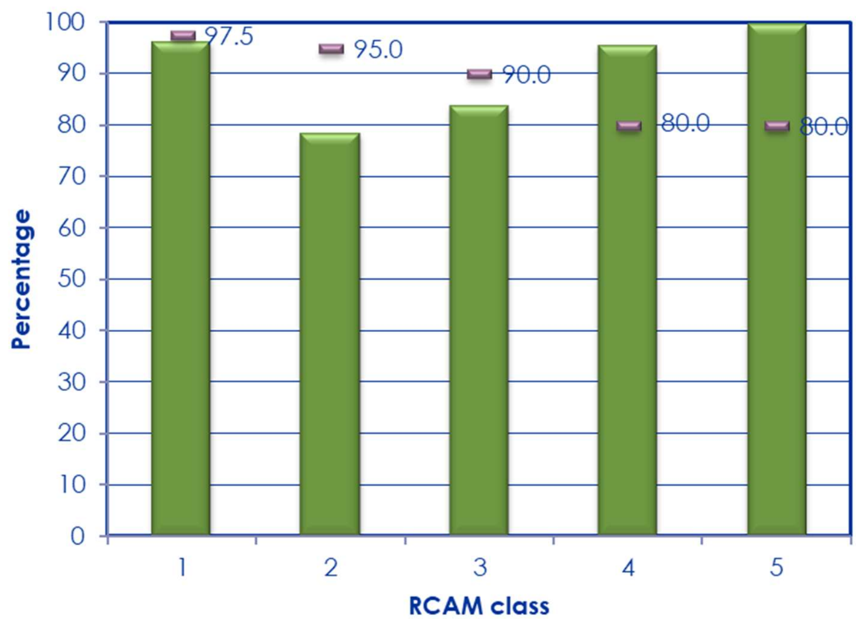



Figure 4-37: High texture exposure per RCAM class compared with preliminary LOS targets in 2022

## 4.5 Comparative conditions

Figure 4-38 provides a graphical view on the defects on the paved road network. Binder condition, rutting and transverse cracks is the predominant defects followed by crocodile cracks and potholes. These defects are the major contributors to visual condition of the network.

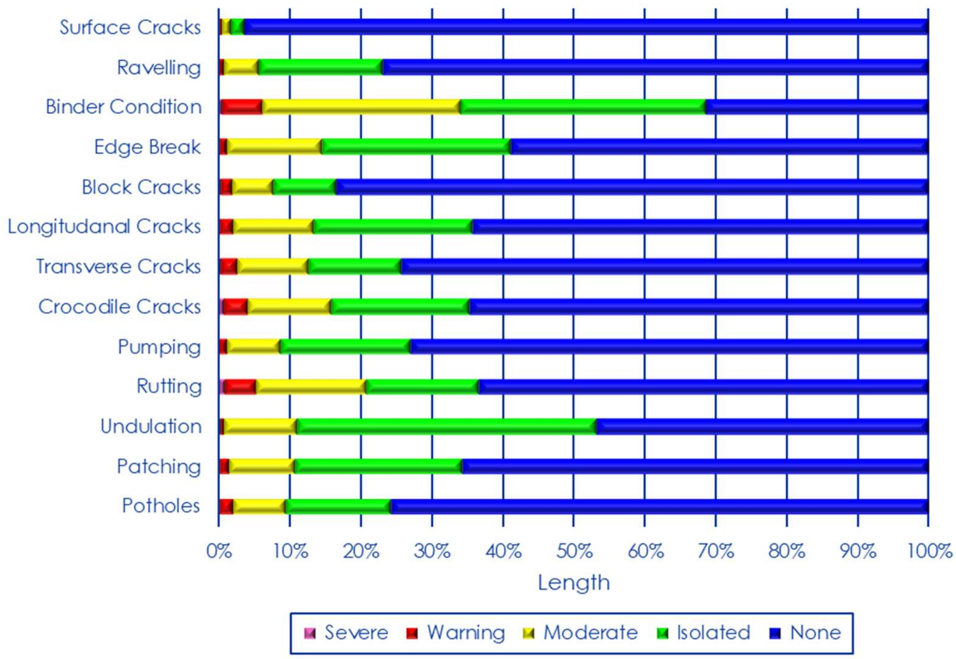



Figure 4-38: Condition distribution per distress for paved roads (2022)

Figure 4-39 provides a graphical view on the distresses on the unpaved network. Gravel Thickness is the major cause for concern on the unpaved road network, as more than 70% of the network is functioning in the Severe condition rating. Material availability and approval of borrow pits are the main reasons for the lack of gravel material on the network. Additional to the gravel thickness, fixed stoniness is the predominant distresses followed by dust and potholes. These three defects are the major contributors to roughness on the network.

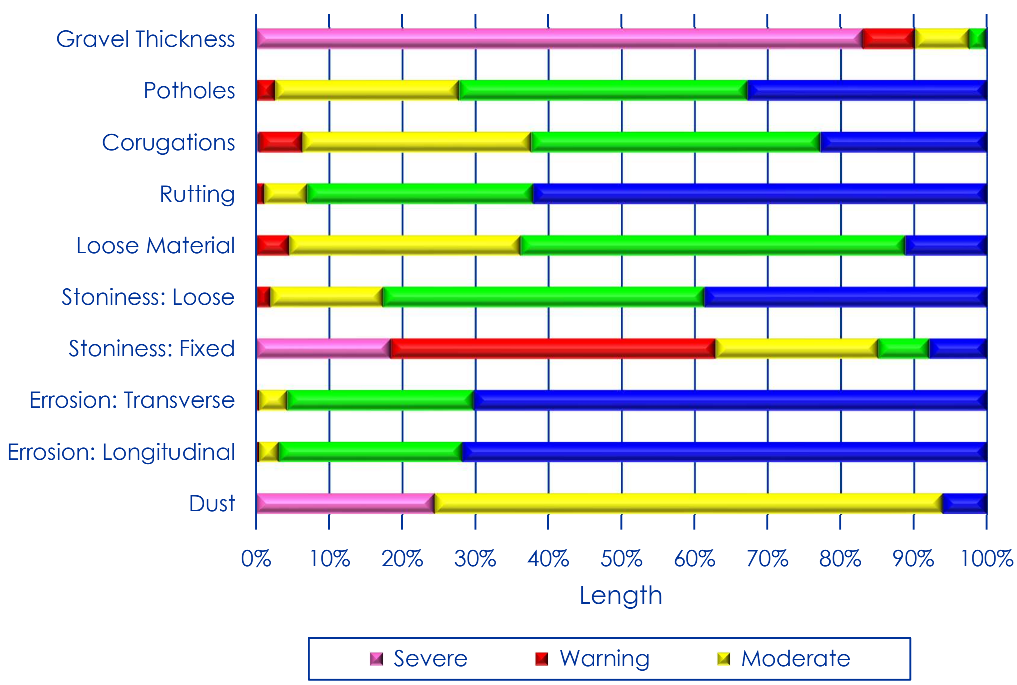



Figure 4-39: Condition distribution of the distresses on the unpaved road network (2022)

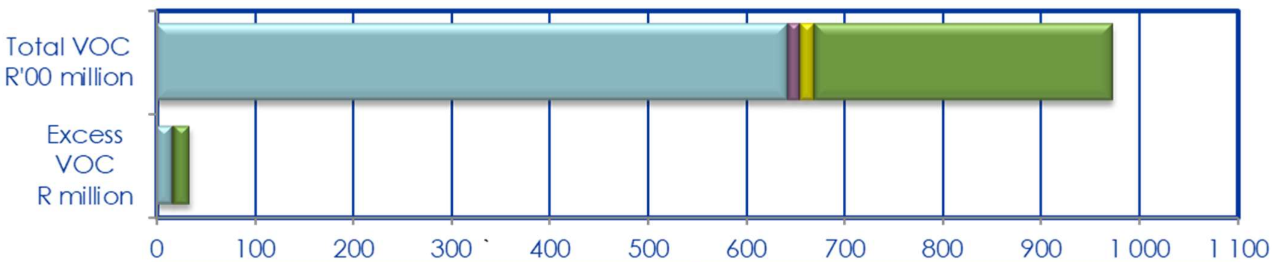
## 4.6 Vehicle operating costs and excess user costs

Vehicle operating costs are calculated in the Vehicle Operating Cost System (VOCS). The Branch maintains VOCS to update the vehicle operating costs and is accessed at https://rnis.westerncape.gov.za under General Reports: VOC Report. This RAMP reports on the 2022 VOC data. Excess (unnecessary) user costs are defined as the extra vehicle operating costs (VOC) incurred by vehicles travelling on roads rougher than an IRI of 3,1 (International Roughness Index).

Total and excess VOC are shown for the paved network in Table 4-39 and Figure 4-40.

Table 4-39: Calculated vehicle operating cost for the paved road network for 2022

| Vehicle operating cost | Length km | Cost per year (Rand, million) | | | | |
|---|---|---|---|---|---|---|
| | | Light | Taxis | Buses | Heavy | Total |
| VOC for Class 1 | 237.69 | 16 515 | 5 027 | 252 | 266 | 22 059 |
| Excess for Class 1 | 2.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 |
| VOC for Class 2 | 2934.14 | 26 848 | 16 032 | 490 | 517 | 43 887 |
| Excess for Class 2 | 707.43 | 4.33 | 5.49 | 0.23 | 0.10 | 10.15 |
| VOC for Class 3 | 3014.87 | 18 698 | 7 995 | 627 | 408 | 27 729 |
| Excess for Class 3 | 1066.20 | 10.44 | 7.01 | 0.74 | 0.18 | 18.37 |
| VOC for Class 4 | 1221.49 | 2 064 | 1 378 | 73 | 50 | 3 564 |
| Excess for Class 4 | 761.49 | 2.39 | 3.00 | 0.23 | 0.06 | 5.67 |
| VOC for Class 5 | 45.15 | 82 | 36 | 3 | 8 | 129 |
| Excess for Class 5 | 38.22 | 0.13 | 0.11 | 0.01 | 0.01 | 0.26 |
| **Total** | **7 453.34** | **64 207** | **30 467** | **1 446** | **1 249** | **97 369** |
| **Excess** | **2 575.34** | **17.29** | **15.62** | **1.20** | **0.36** | **34.47** |
| **Excess as a % of** | | | **0.03** | **0.05** | **0.08** | **0.03** |




| | Excess VOC R million | Total VOC R'00 million |
|---|---|---|
| Light | 17 | 642 |
| Taxis | 0 | 12 |
| Buses | 1 | 14 |
| Heavy | 16 | 305 |

Figure 4-40: Total and excess vehicle operating costs on paved roads for 2022

# 4.7 Asset valuation

## 4.7.1 Current and depreciated costs of assets

The rate of change in asset value is a measure of how well the network is being preserved. The value of a new road is made up of:

- The cost of the ground preparation work; and
- The cost of the road structure (i.e., pavement layers, etc.).

The cost of acquiring land can be excluded because it is typically transferred from one owner to the next and therefore does not influence the asset value.

Figure 4-41 shows the components of the asset value of a road. Asset value is calculated as the total value of a road (foundations, preparation works and structural layers), minus the depreciation of the structural layers. The depreciation of the structural layers of a road is calculated in proportion to its remaining life and total life expectancy. This concept is like the generally accepted accounting practice of calculating an asset's "book value" which equates to cost minus accumulated depreciation.

Using the method for asset value calculation, the current replacement cost (maximum theoretical asset value) is calculated assuming all the unpaved roads have optimal gravel material thicknesses and all paved roads are newly built.

The asset values for 2022, excluding bridges and other structures, are shown below:

- The current replacement cost is approximately R 119 386 million;
- The depreciated replacement cost is R 94 249 million;
- The depreciated replacement cost is 79% of the current replacement cost, indicating total asset value consumption of 21%; and
- The depreciated replacement cost of the Paved roads is 85% of the current replacement cost, indication total asset value consumption of 15%.

By comparison, the depreciated replacement cost of the provincial road network, as assessed in 2014, was R75 700 million.

### *Limitation*

The asset values for bridges and other structures have not been determined due to a lack of data.

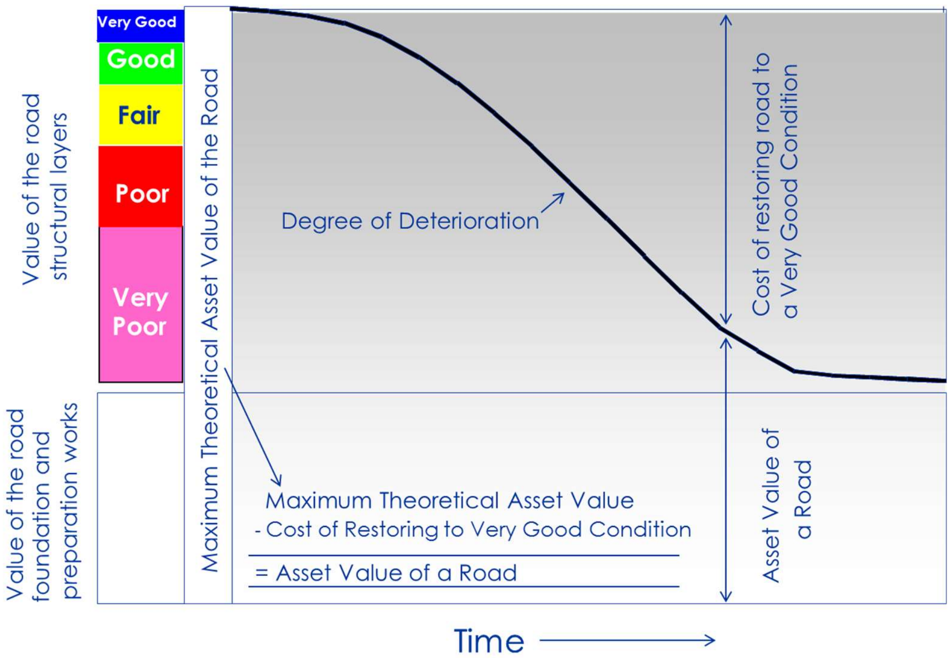



Figure 4-41: Components of the asset value of a road

The current replacement and depreciated replacement costs of the paved and unpaved road network are illustrated in Figure 4-42.

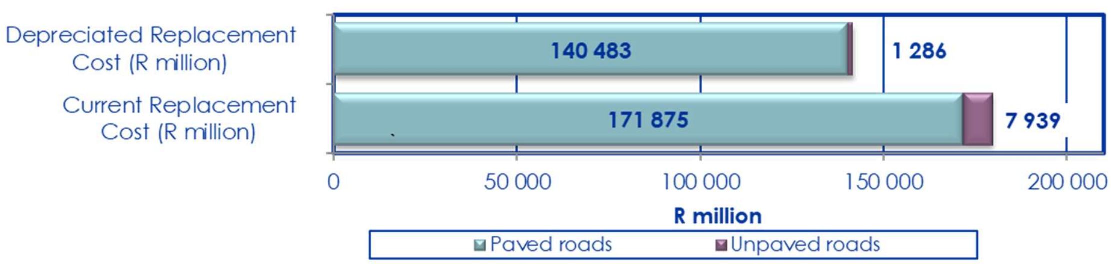



Figure 4-42: Current replacement and depreciated replacement costs of the road network in 2022

The branch envisions that the current data collected on the bridges will later be used to calculate the asset values on bridges as already done for the paved and unpaved roads.

# 4.8 Remaining useful life of assets

The branch has made the decision to use the methodology to calculate the asset values as shown in Chapter 4.7. However, the age of these assets is still used in the need's analysis conducted for the roads. The branch also keeps a close eye on the age of assets related to the design life of these assets.

## 4.8.1 Pavement ages

Figure 4-43 shows the distribution of pavement ages for the paved road network of the WCG. A very large proportion (76%, 5 632,56 km) of paved roads is older than the standard design life of 25 years. As many roads have already reached the end of their design life, a rising trend of paved roads exceeding roughness standards is expected. This will result in a much greater demand for funds for rehabilitation, particularly for Trunk roads, than the current level of funding would be able to accommodate.

Figure 4-44 presents the age distribution of paved roads.

***Limitation:*** Age data is unavailable for 20% of paved roads (1 629,5 km of the network). It is generally accepted that most of these pavements are at least 25 years old and therefore the average network age distribution was adopted for these roads.

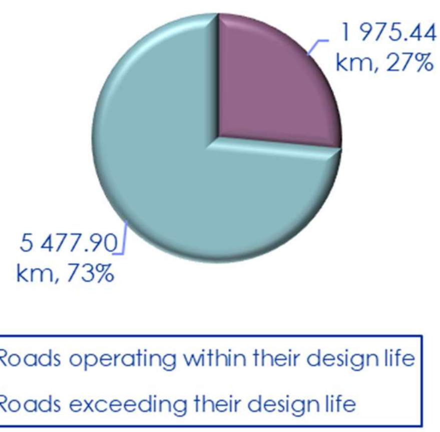



Figure 4-43: Pavement ages versus design life in 2022

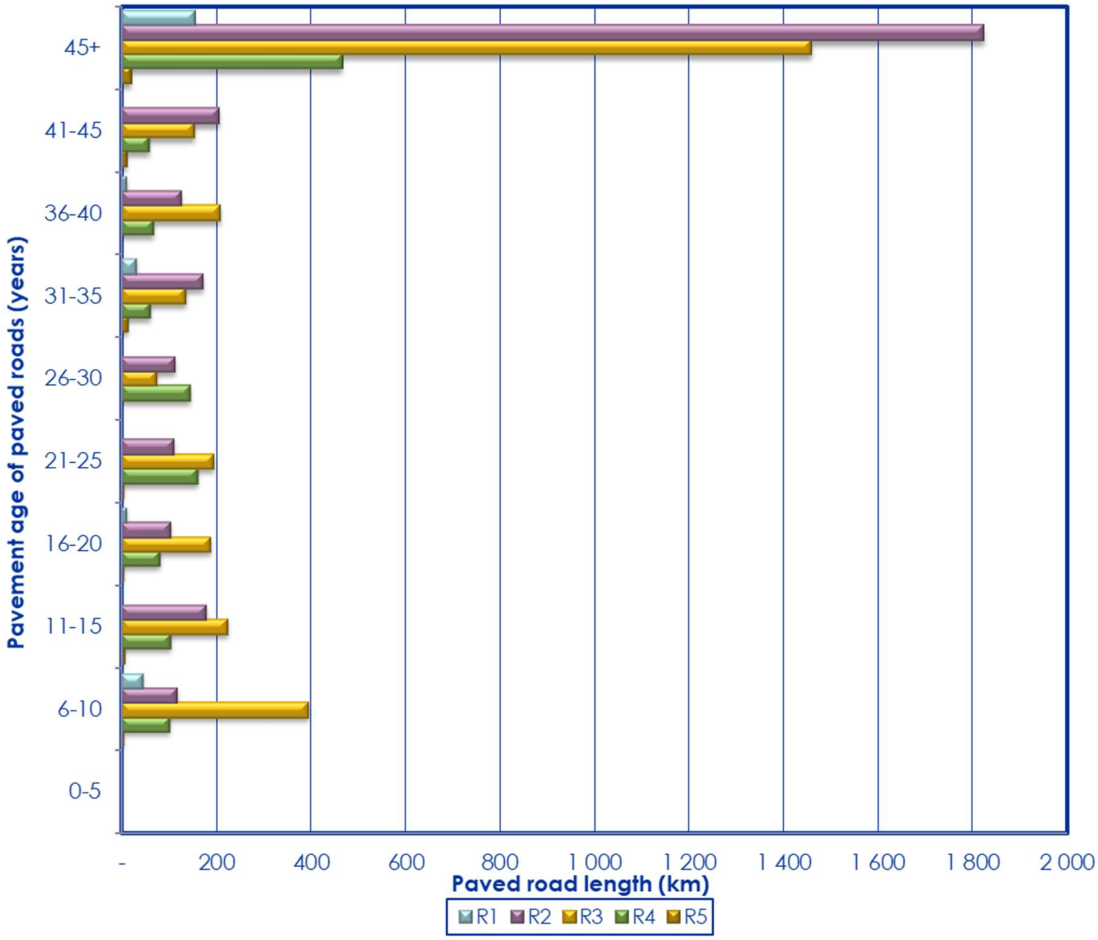



Figure 4-44: Distribution of pavement ages for paved roads 2022

For any road network, a reasonably uniform distribution of pavement ages is desirable to ensure a steady demand for future funding for reconstruction and rehabilitation. Using the available and adapted data on pavement ages, the following can be inferred:

- The vast majority (73%, 5 477.90 km) of pavement ages are older than 25 years, and thus only 27% of the pavements are still operating within their design life.
- Figure 4-44 shows that the R2 class roads has many roads within the 45 years and older category.
- The RNIS data shows the overall rate of reconstruction and rehabilitation since 1984 is generally below 100 km per year (Figure 4-45). Investigating the data, the years 2004, 2007, 2012, 2013, 2015, 2017, 2020 and are exceptions when 116 km, 143 km, 121 km, 103 km, 191 km, 118km, 111 km and 115 km of road were rehabilitated respectively.
- The trend line shows the dip in rehabilitation in the mid-90s and the higher rate in the period 2005 to 2020. Extra funding may have contributed to the higher rate of rehabilitation in the years 2010 to 2020.
- 2022 saw a significant decrease in rehabilitation.

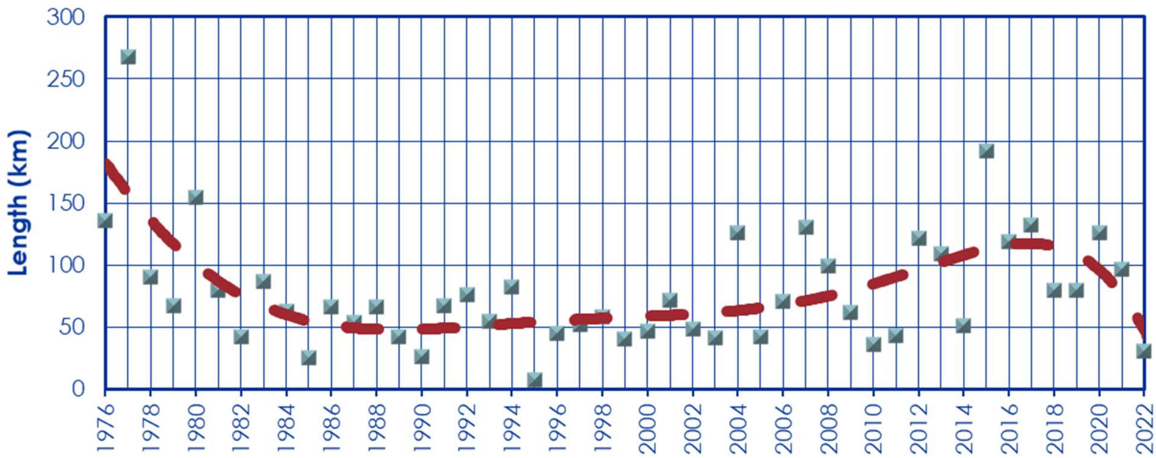



Figure 4-45: Rate of rehabilitation for paved roads 1975 to 2022

Applying cost-effective preventive maintenance actions, such as resealing, can prevent premature failure and extends the life of the road, but in the long-term, rehabilitation of the structural layers is necessary to maintain the roughness levels of service and minimise road user costs.

### 4.8.2 Structure ages

The ages of the Structures that are currently known in the branch is shown in Table 4-40.

Table 4-40: Summary of the age of the assets per asset types as at June 2020

| Area | Asset Type | Average Age, yr. |
|---|---|---|
| Cape Winelands | Roads | 34 |
| | Bridges | 50 |
| | Large culverts | 27 |
| | Gantries | 0 |
| | All Signs | 19 |
| Central Karoo | Roads | 34 |
| | Bridges | 52 |
| | Large culverts | 29 |
| | Gantries | 0 |
| | All Signs | 22 |
| Garden Route | Roads | 34 |
| | Bridges | 49 |
| | Large culverts | 20 |
| | Gantries | 0 |
| | All Signs | 21 |
| Overberg | Roads | 34 |
| | Bridges | 51 |
| | Large culverts | 28 |
| | Gantries | 0 |
| | All Signs | 19 |
| West Coast | Roads | 34 |
| | Bridges | 50 |
| | Large culverts | 28 |
| | Gantries | 0 |
| | All Signs | 20 |
| City of Cape Town | Roads | 35 |
| | Bridges | 47 |
| | Large culverts | 25 |
| | Gantries | 0 |
| | All Signs | 19 |

## 4.8.3 Plant equipment ages

In Figure 4-46 the age distribution of the plant equipment is shown. More than 80% of the equipment are less than 20 years old, the equipment older than 10 years should be inspected and a maintenance/replacement schedule should be created for this equipment.

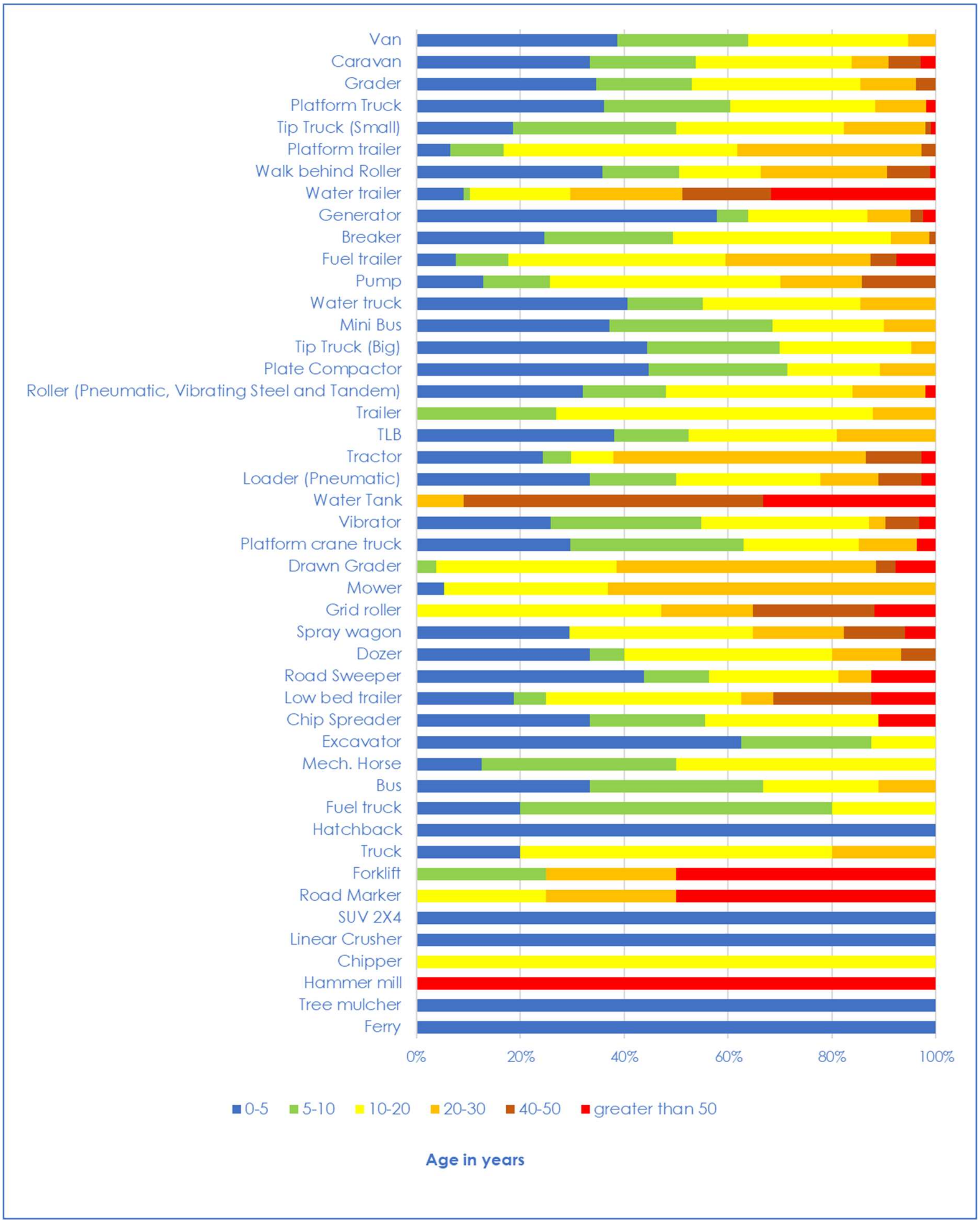



Figure 4-46: Age distribution of plant equipment (2023)

## 4.9 Trend analysis

### 4.9.1 Visual condition trends

The historic condition distribution of the carriageway-kilometres of the managed paved road network, per year, by road length and vehicle-km travelled, is shown in Figure 4-47 and Figure 4-48 respectively. The trend of the visual condition by road length, followed an upward trend in the last couple of years with a significant increase in poor and very poor roads in 2019. This increase is related to the UniCity roads being added in 2019.

The trend of visual condition distribution in terms of vehicle-km has remained fairly constant from 2011 to 2021, except for 2019 with inclusion of UniCity roads. The maintenance focus of these roads was clearly not aligned with the current maintenance focus of the Branch. In 2022 the assessments indicate an increase in the percentage of vehicle-kilometres falling in the very good category.

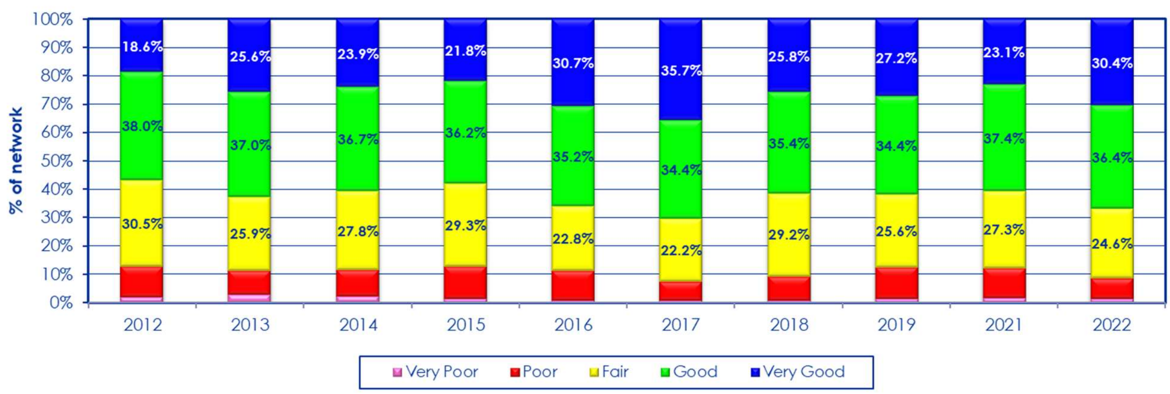



Figure 4-47: Change in the VCI by road length of the paved road network from 2011 to 2022

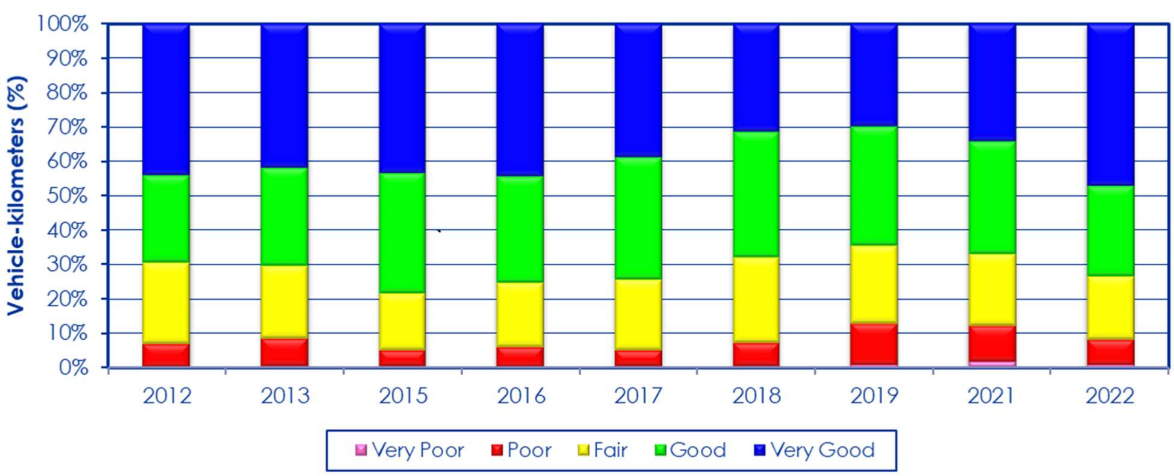



Figure 4-48: Distribution of the VCI of paved roads by annual vehicle-km travelled from 2011 to 2022

The trend of poor and very poor visual condition is shown in Figure 4-49. The roads in poor condition and weighted by length show a cyclic trend between about 8 and 12 %. There is also a cyclical trend between 4 and 8% for roads in poor condition that are weighted by vehicle-km. Comparing these trends reveals that the condition of roads weighted by vehicle-km is up to 4% percent lower than the condition weighted by length. However, in 2017 both these trends decreased and the difference between these two trends reduced by 2%, which is attributed to the amount of reseals conducted by the Branch in recent years. Therefore, the traffic experiences fewer roads in poor condition compared with the distribution of poor roads in the network, implying that the roads carrying more traffic are in better condition. The inclusion of the UniCity roads in 2019 has increased both the values quite drastically, however appropriate asset management maintenance strategies applied to these roads has shown a slight decrease for roads in poor condition weighted by length and vehicle-km.

Those roads that are in very poor condition, both weighted by length and by vehicle-km, show a flat to declining trend up until 2016, thereafter increasing slowly from 2017 and 2021. Comparing the very poor trends reveals that the condition of roads weighted by vehicle-km is between 1 and 2% percent lower than the condition weighted by length. Therefore, over the last decade, the traffic experienced fewer roads in very poor condition compared with the distribution of very poor roads in the network. Over the last 3 years there has been a small difference between the condition weighted by length and by vehicle-km, indicating that traffic experiences almost the same length of road in very poor condition as occurs on the network. There has not been such a drastic change to the very poor roads added from the UniCity roads.

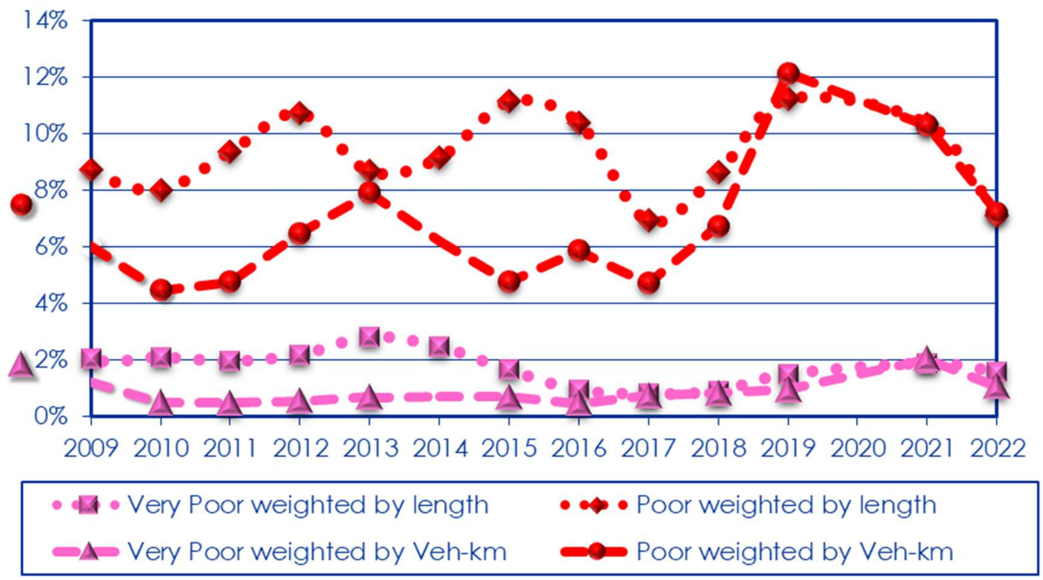



Figure 4-49: The percentage length of paved roads in a poor and very poor visual condition weighted by length and by vehicle-kilometres from 2009 to 2022

The VCI of each road section is weighted for condition and length / vehicle-km to calculate the network condition number (NCN), representing the condition of the paved road network in a single number (Committee of State Road Authorities, 1994). The NCN is used to compare overall visual condition of two or more networks and to monitor the change in condition of a network over time.

Figure 4-50 shows the historic trend in the overall condition of paved roads, as measured by the Network Condition Number (NCN) weighted by length and by vehicle-km. The trend in NCN weighted by length has been relatively flat for the period 2009 to 2015, when the NCN increased from 64 in 2015 to 70 in 2017. This can be ascribed to the increase in reseal between 2015 and 2017. From 2018 to 2021, there has been a rapid decrease in the average condition value, and the NCN is below the desired benchmark value of 70 based when weighted by length. Between 2020 and 2022 this has stabilised again. Refer to Appendix H – Benchmarking, for the basis of determining the benchmark.

The trend in NCN weighted by vehicle-km has fluctuated above and below the benchmark of 70 and was relatively flat to declining over the period 2007 to 2015. The NCN kicked up to 73,3 in 2016, and gradually decreased over the past five years to 66,6 in 2021. It has shown improvement and reached 70+ in 2022 for NCN weighted by vehicle-km. The NCN weighted by vehicle-km has been between 10 and 15% better than the NCN weighted by length over the period 2007 to 2015, however over the past five years, this difference decreased to an average of 1,3%. This reduction is a measure of how effectively the Branch maintains the network for the benefit of the users, i.e. the objective to provide a greater benefit experienced by the users. It also the reflects the works that was completed on our freeway network and other highly trafficked roads that positively benefits a large portion of road users.

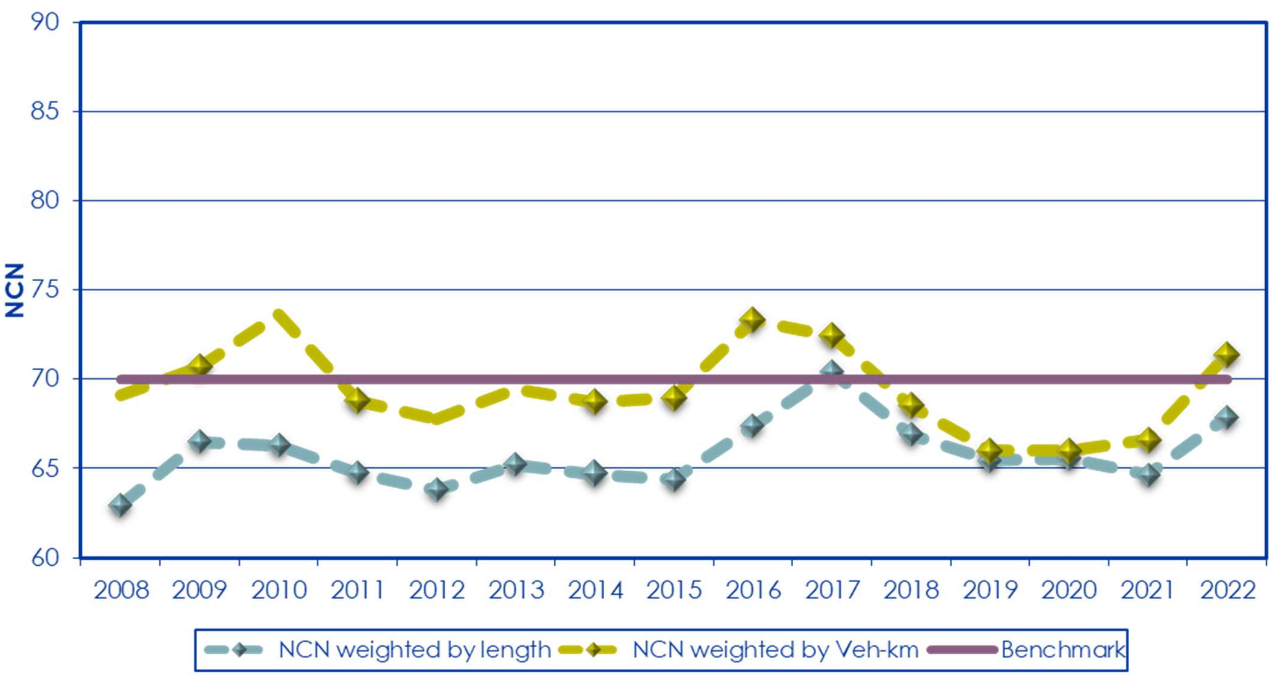



Figure 4-50: The historic trend in the overall network condition of the paved road network 2008 to 2022

The historic condition of the maintained unpaved road network by road length and vehicle-km over the last decade is shown in Figure 4-51 and Figure 4-52 respectively. The trend of visual condition by road length, followed an upward trend in the last couple of years with a significant increase in very poor roads in 2016.  However, since 2017 the very poor condition has decreased and remained constant from 2018 to 2021. 2022 also sees a significant increase in very good roads.

The trend of visual condition in terms of vehicle-km decreased from 2012 to 2015 but reversed in 2016 with a large increase in very poor and poor roads. In 2021 the percentage of roads in poor and very poor condition weighted both by length and vehicle-km has shown a slight decrease. 2022 sees more roads entering the fair condition as well as an increase in very good condition.

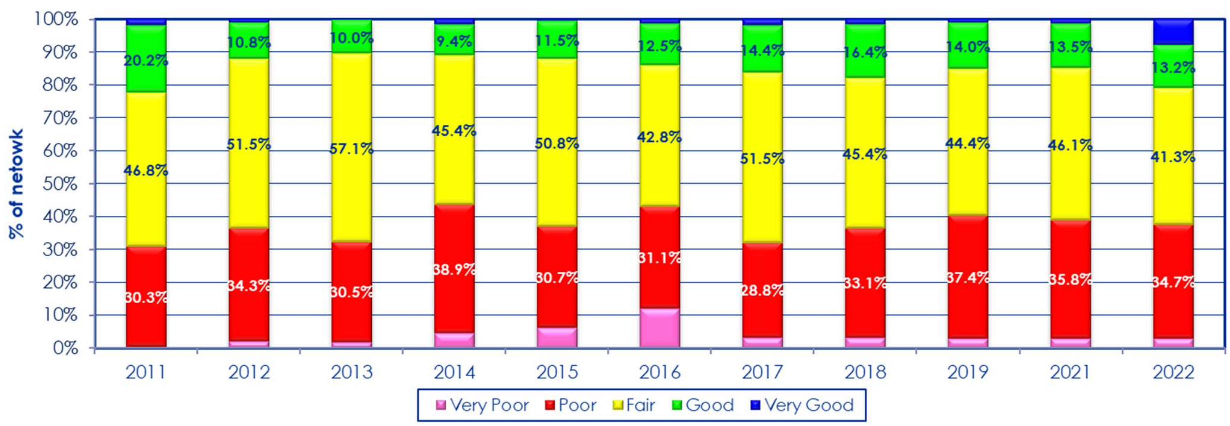



Figure 4-51: Change in the visual condition by road length of maintained unpaved road network from 2011 to 2022

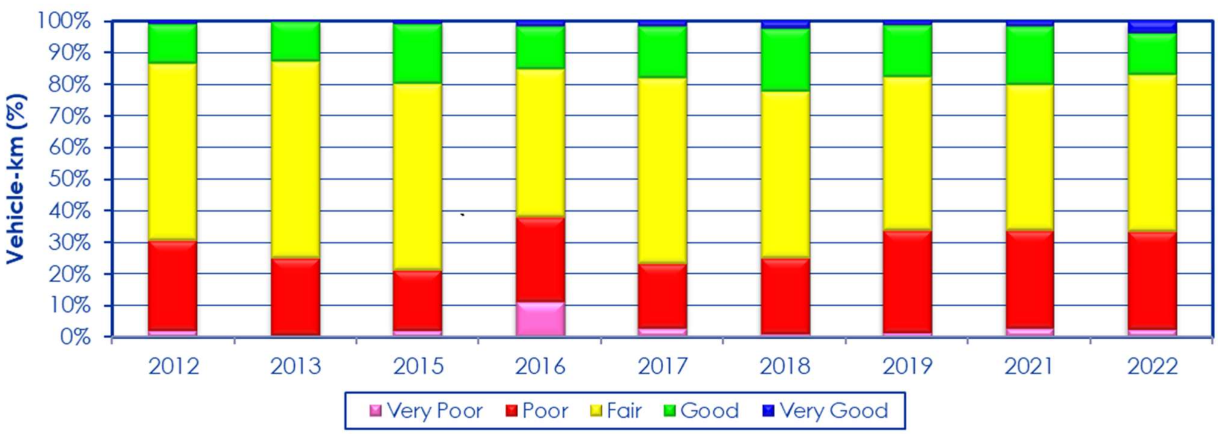



Figure 4-52: Distribution of the VCI of maintained unpaved roads by annual vehicle-km travelled from 2012 to 2022

Figure 4-53 shows the historic trend in the overall condition of unpaved roads, as measured by the NCN weighted by length and by vehicle-km. Network performance is compared to the desired benchmark NCN of 60. Refer to Appendix H – Benchmarking, for the basis of determining the benchmark.

The NCN weighted by length has been in the range of 46 to 55 per cent over the past ten years. There has been a steady incline from 46,0 in 2016 to 52,0 in 2017, however in the past five years the NCN of the unpaved roads had a steady decline. The NCN remains below the desired value of 60. The NCN weighted by vehicle-km has had a flat trend with an NCN of approximately 54 from 2008 to 2013, after which it declined to 47,0 in 2016. Since 2017, the value has steadily improved to just below the desired NCN of 60 in 2018 (56). However, since 2019 there has been a steady decline in this value.

The difference between NCN weighted by length and by vehicle-km is positive with an average difference of 2,05% over the past ten years. This difference indicates that majority of road users experienced better roads than the average network condition. This further illustrates that the roads with the most traffic are in better condition than the lower trafficked roads.

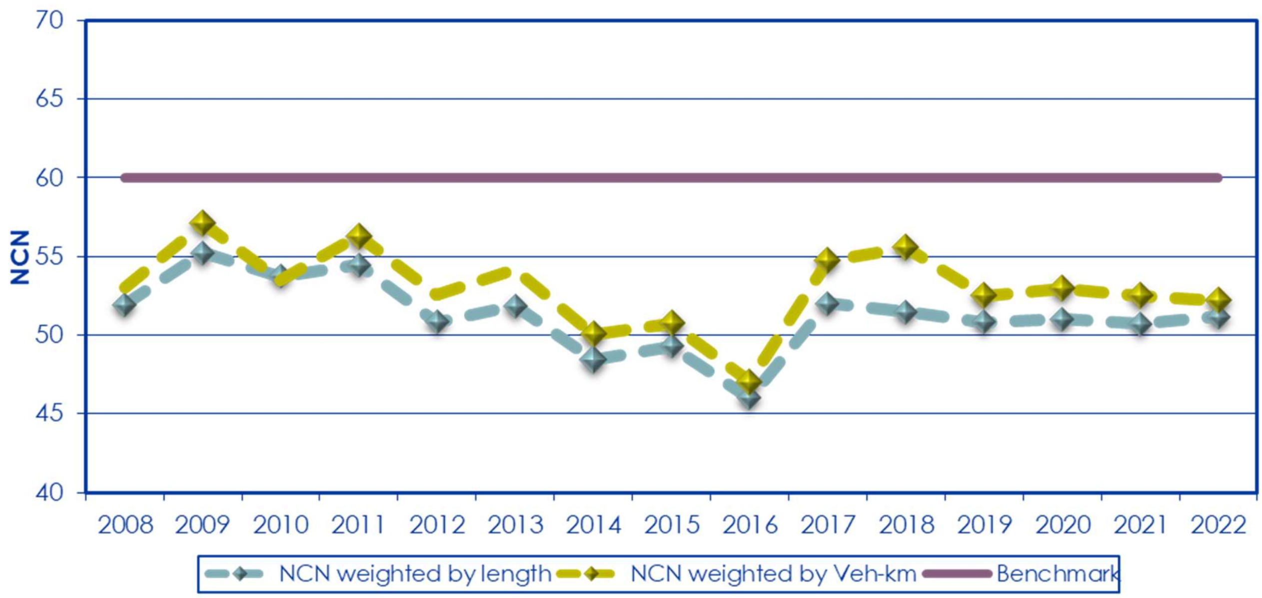



Figure 4-53: The historic trend in the overall network condition of maintained unpaved roads from 2008 to 2022

### 4.9.2 Gravel thickness trend

The change over time in the average gravel thickness on the maintained unpaved road network is shown in Figure 4-54. Over the last ten years, due to underfunding, the difficulty in obtaining environmental approvals to excavate suitable regravelling material, as well as insufficient capacity for regravelling, there has been a steady decline in average gravel thickness on the provincial unpaved roads, from about 25 mm in 2011 to about 27 mm in 2016, and 13 mm in 2022. There is practically no gravel left on most roads. The average gravel thickness should ideally be above 75 mm, while the minimum average thickness should not drop below 60 mm to facilitate blading maintenance.

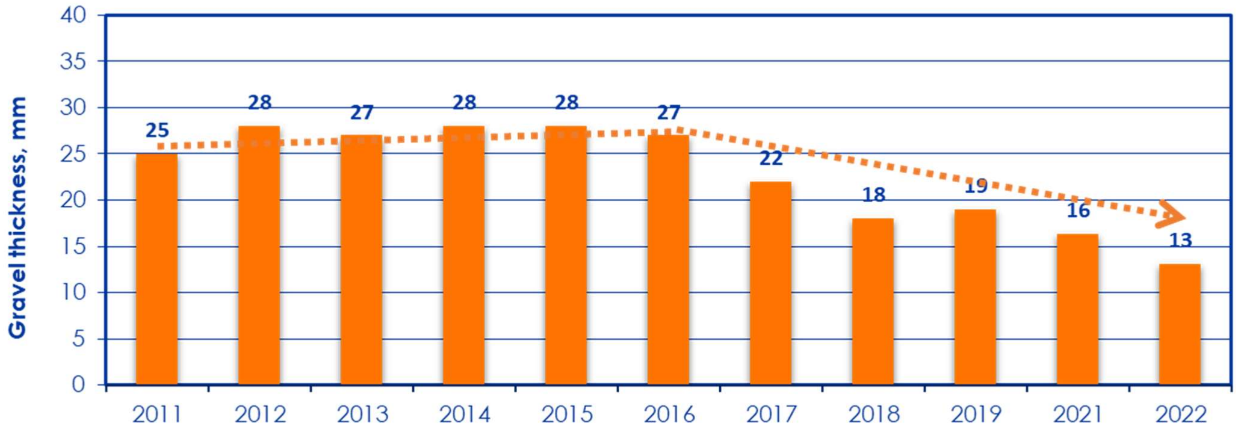



Figure 4-54: The historic trend in gravel thickness on the maintained unpaved road network from 2011 to 2022

Figure 4-55 shows how the gravel thickness distribution has changed over a decade. It is evident from the trend that majority of the unpaved road network are within the 0 to 25mm thickness range.

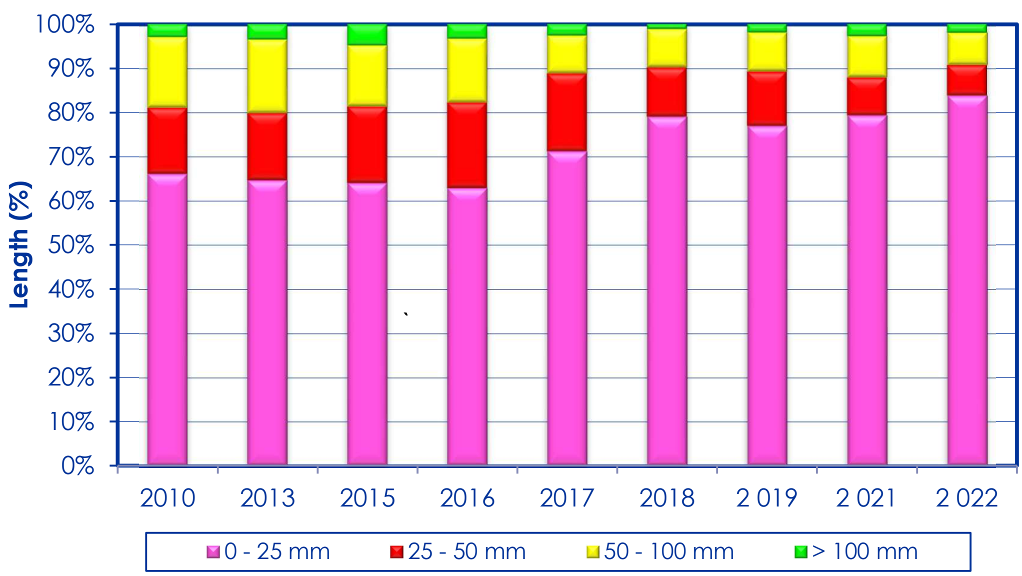



Figure 4-55: Gravel thickness distribution on unpaved roads 2010 to 2022

### 4.9.3 Resealing demand trend

The trend of resealing demand over the last decade is illustrated in Figure 4-56. The resealing demand highlighted here was determined solely considering the Reseal Condition Index (RCI) as an indication. A more accurate indication of the reseal need is provided in Section 5.1.3, in which specific limits on potholes, patching, rutting, all cracking, wide cracking, and IRI, as specified in CHAPTER 3, are also considered in addition to the RCI and VCI in determining the reseal need.

- A = reseal now if funds are available;
- B = reseal next year;
- C = reseal in the future; and
- None = No reseal priority.

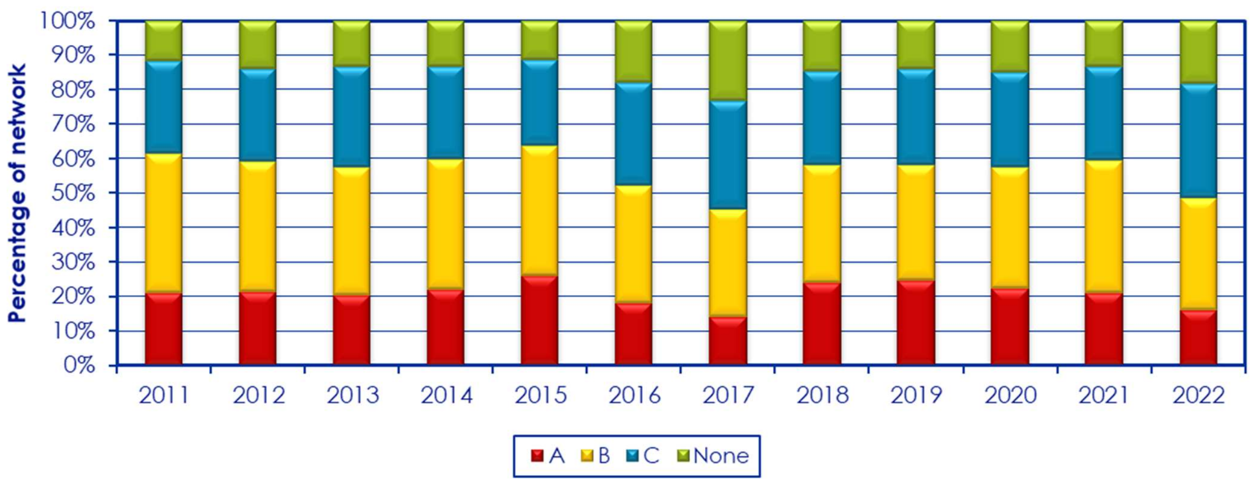



Figure 4-56: Resealing demand of paved roads according to urgency 2011 to 2022 (includes UniCity roads)

The trend of reseal condition Number (RCN) is shown in Figure 4-57. The RCN is calculated using the same formula as for NCN [TRH 22 (Committee of State Road Authorities, 1994)], but substituting VCI for Reseal Condition Index (RCI) and using the weighting condition (Wi) values listed in Table 4-41.

| Table 4-41: Condition weights for RCN calculation | |
|---|---|
| **Condition category classification of segment *i*** | **Condition weight *(Wi)*** |
| A | 3,33 |
| B | 2,33 |
| C | 1,5 |
| None | 1,0 |

Currently no benchmark has been set for RCN. However, the following is a rough guideline:

- No more than 2% in the A category;
- No more than 8% in the B category; and
- No more than 20% in the C category.

The RCN trendline as shown in Figure 4-57 follows a gradual upward trend over the last decade. The RCN remained steady between 2018 and 2021 and increased in 2022 to 45.0.

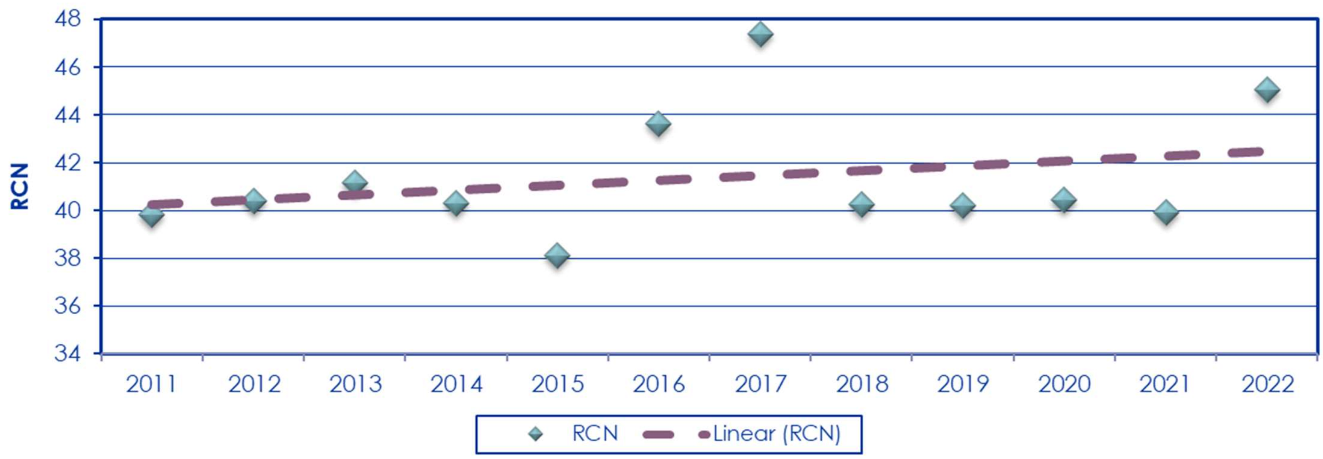



Figure 4-57: Historic trend of reseal condition number 2011 to 2022 (includes UniCity roads)

The increase in the RCN and the decrease in the demand for reseal in 2022 shows that an effective targeted reseal programme was implemented. Roads that are not resealed in time result in a moisture accelerated distress state that leads to a growing rehabilitation demand. A tipping point is reached where the rehabilitation demand outstrips available resources. If the increase in RCN in 2022 can be maintained in the future, it will result in a less vulnerable paved road network.

# 4.10 Performance gap analysis

## 4.10.1 Comparison of actual conditions with service levels

The comparison of actual conditions with service levels has been covered under paragraph 4.3.5 for roughness, rutting, surface texture and deflection measurements.

Table 4-42 reflects actual visual conditions compared with level of service per road category. The average visual conditions are above the required level of service.

**Table 4-42: Comparison of actual visual condition and levels of service for 2022 (includes UniCity roads)**

| Road class | TRH 26 class | Level of Service VCI | Average actual condition VCI |
|---|---|---|---|
| DR/OP | 4, 5 | 45 | 70.4 |
| MR | 3 | 52.5 | 73.2 |
| TR | 1, 2 | 55 | 76.7 |

## 4.11 Impact of severe weather events

The long-term impact of severe weather events on the management of road network in the Western Cape has not yet been determined. Climate predictions indicate a hotter, drier climate with less rain and the likelihood of more extreme weather leading to floods and droughts (Department of Environmental Affairs, 2013). The impact of extreme weather events that often caused floods has in the past seen significant destruction to road infrastructure, with the unpaved road network and drainage structures being most affected. The influence of prolonged drought has caused water shortages, and this has been a constraint on road works, particularly periodic maintenance of unpaved roads.

Ad-hoc flooding events give rise to the reprioritisation of infrastructure funding allocations. The flooding events of 2023 caused major disruption to the transport network in various regions in the Western Cape. The September 2023 flooding events alone caused damage estimated at approximately R500 million spread across the province. Funds needed to be redirected to the provide access to cut-off communities and reinstate damaged infrastructure. This further places strain on the MTEF budget which is currently insufficient to maintain the required LOS.

There is a need to enhance the resilience of critical infrastructure to cope with the effects of more severe weather events and this will put additional demands on funding resources. The Western Cape has a unique model which puts it in a position to act fast in severe weather events. It's in-house teams and District Municipality partnerships enables it to get resources on the ground fast. See Figure 4-58 and Figure 4-59.


Figure 4-58: Damage caused by September 2023 flooding to MR00290 - Access road to McGregor

Figure 4-59: In-house teams providing immediate availability during severe weather events

.

## 4.12 COVID-19 impact on the road network

The Covid-19 pandemic caused a multi-faceted impact on the road transportation system. The initial measures implemented by the government to contain the spread was through quarantines, travel restrictions and lockdown of cities. This has resulted in a reduction in aggregate demand, with impacts on service sectors such as tourism, retail, hospitality, and civil aviation. Figure 4-60 shows the channels of how Covid-19 has impacted on international economies (ESCAP, 2020).

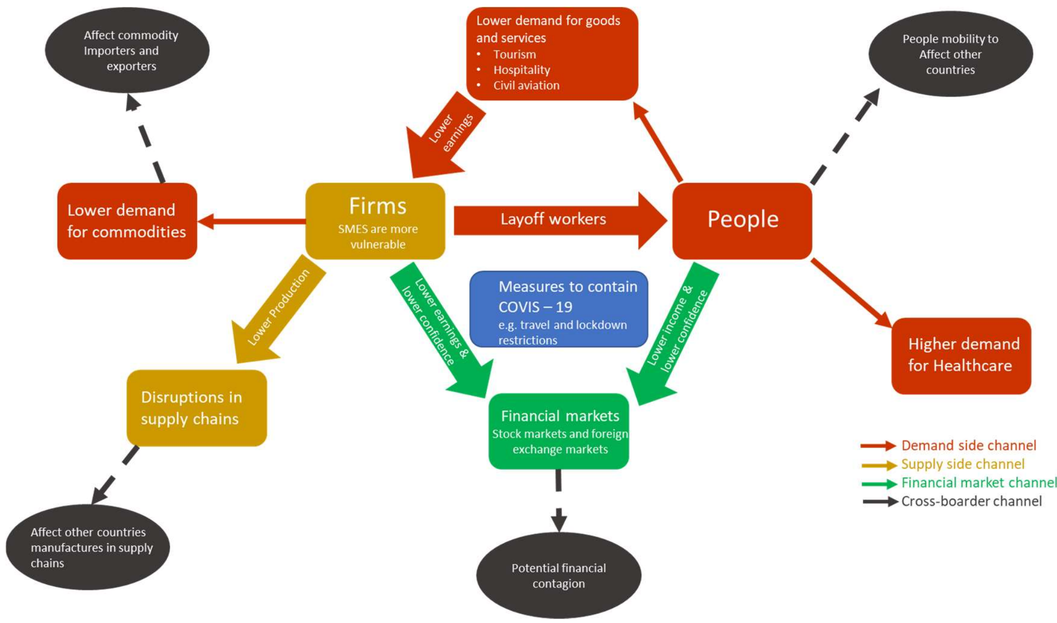



Figure 4-60: Channels of COVID-19's impact on economies

Some of the significant impacts on road transportation due to lockdown include:

- Changes to travel demand and patterns;
- Loss of toll and other income;
- Revision of road authorities' budget;
- Changes in freight movement; and
- Delivery of road work programs:
  - Delay in procurement to tender out road works;
  - Loss in reseal production on road construction sites; and
  - Liquidation of contractors and subcontractors.

The impact of Covid-19 on the management of road network in the Western Cape was not determined in any detail.

## 4.13 Composite indices

The NCN has been used to summarise road segment conditional indices to a network level index. The VCI of each road section has been weighted for the condition and length / vehicle-km of each segment to determine the NCN (Committee of State Road Authorities, 1994). The outcome of this method has been presented in the visual condition index graphs for both the paved and unpaved road network of the preceding sub-sections.

Functional indices required for a Level II RAMS have been determined. Level III and IV RAMS functional indices will be determined in future and the deduct point method will used to determine composite functional indices. These indices will be bundled to summarise the overall functional status of the road network.

It is envisaged that the road network indices will be combined to summarise the condition and functional data of various assets managed by the Branch in the long term.

## 4.14 Road Safety Assessments

The road environment and road design has an important impact on road safety. All roads have the risk that a crash will occur, but this needs to be minimized as far as possible from an engineering perspective. A Road Safety Audit can be utilised effectively as a crash prevention measure during the preliminary and design stages of any road or transportation project. It allows the identification of potential crash-causing road elements which can be removed before implementation. It also acts as a crash reduction tool on existing facilities by reporting on the safety performance and crash potential of the facility, again identifying safety deficiencies in the face of incomplete crash information.

South Africa recognized the need for implementing this road safety tool by compiling the updated South African Road Safety Audit Manual (SARSAM). The manual aims to assist road authorities to conduct road safety audits for new road projects and road safety appraisals for existing roads in order to identify potentially hazardous locations and put remedial measures in place to minimize crashes on the road network. However, this **document has not yet been formally approved by the Committee of Transport Officials** (Department of Transport, 2017).

The SARSAM uses three terms to describe road safety investigations, namely road safety engineering assessment, road safety audit and road safety appraisals. It defined these three types of investigation as follows:

> ***Road safety engineering assessment:*** *This is a screening process to establish the road safety status of sections of an existing road network. It is a network-based process performed on selected sections of the road network using a set of pre-defined key indicators to determine the feasibility of safety improvement of such a section. The road safety engineering assessment process provides a list of prioritised locations that should be further investigated.*
>
> ***Road Safety Audit:*** *This is a formal examination process of a new or upgrading project where interaction with road users takes place, in which an independent and qualified team identifies potential road safety problems and suggest measures to mitigate those problems. The road safety audit process results in a report describing potential safety concerns that should be reconsidered prior to advancing to the next stage of the design process or to physical construction or taking over completed construction works.*
>
> ***Road Safety Appraisal:*** *This is a systematic examination process of an existing road location, in which an independent and qualified team reviews onsite conditions and available historical evidence to identify existing or potential road safety problems and*

*suggest measures to mitigate those problems. The road safety appraisal process results in a report describing potential safety concerns on-site and suggested remedial measures.*

As mentioned in Section 3.1.4 of the RAMP, the only road safety investigation that needs to be reported on is Road Safety Appraisal and this safety investigation will be further discussed in this document.

### *Identification and packaging of Road Safety Appraisals*

The strategies implemented in road traffic safety management can be reactive or proactive in nature:

- A reactive approach to road safety is associated with the identification of locations experiencing safety problems (screening), problem definition (diagnosis), and the identification and implementation of countermeasures (cure); and

- A proactive approach to road safety is associated with the prevention of safety problems before they manifest themselves in the form of a pattern of crash occurrences.

In both these approaches, it is necessary to identify safety deficiencies that need to be actioned to diagnose the safety problems, and then identify and implement countermeasures to remedy the deficiencies. The lack of credible crash information on the South African road network casts a shadow upon the use of this information and any crash-based analyses. Performing rudimentary quality control on the available information often indicates that the quality and the reliability of the information would be questionable and not appropriate to be used as a basis for statistical analysis or recommendations for remedial measures. Studies has also shown that a major constraint for road safety appraisals on existing roads in the past has been the fact that the recommendations were not implemented, because it was not co-ordinated with major reseals and rehabilitation projects (Roads Traffic Management Corporation, 2012).

To overcome this, the Branch has adopted the approach of co-ordinating the road safety appraisals with reseal and rehabilitation projects. This methodology does ensure that road safety appraisals are not being done for the sake of road safety auditing, but that the opportunity is taken to make a difference in the safety performance of such a road. The fact that the appraisal process should be coordinated with the resurfacing / pavement rehabilitation process ensures the presence of the design team and the possibility to commission the appraisal as additional or specialist services through the Agreement for Consulting Engineering Services.

### *Professional Team Conducting the Road Safety Appraisals*

Since there is no approved Technical Highway Method for conducting Road Safety Appraisal, the Branch has delegated the roles and responsibilities of the independent audit team as defined in the SARSAM to the design consultant, who is registered in terms of the Engineering Profession Act. The design consultant is therefore the competent person or team responsible for the following Road Safety Appraisal objectives on projects:

- To ensure compatibility between the safety features of a road and the functional classification of the road;
- To identify any feature that can, with time, create a safety problem; and

- To identify all features in the road environment that pose a safety hazard to any of the road users.

The following activities are followed as part of the Project Identification and Report stages objectives of a project:

- Analysing exiting data – for instance the prevalence of specific of crashes as compared with control data, if possible;
- Assessment of risks whereby the design consultants would make a judgement of the importance of remedial measures for specific concerns;
- Site inspections; and
- Identification of road safety concerns should be done for all issues, irrespective of the fact that the origin may be routine maintenance related;

### *Typical strategic improvements applied on Projects*

The following improvements mechanisms are currently implemented on Reseals and Rehabilitation Projects within a constraint budget:

- Barrier lines - Barrier lines are corrected to prevent overtaking on road sections with inadequate sight distance, normally over crests and around horizontal curves. A general programme is implemented to ensure that barrier lines are long enough, well maintained and combined with additional signage and road markings where necessary;

- Road Marking and Signs are replaced and corrected according to the speed limit review;

- Investigations for passing opportunities to improve road safety;

- Access management, ensuring minimum spacing standards between intersections and reducing the number of intersections and accesses on a road;

- Schools - Safe areas around all schools must be developed where there is high conflict between vehicles and children walking and cycling to the school;

- Policy for Setting of Speed Limits - The Department of Transport has a draft policy for the setting of speed limits. Speed limits are often reduced as a symptomatic measure if crashes occur, but do not always address the real cause; and

- a policy needs to be revised by National Department of Transport, incorporating the recent changes to speed limits. Speed limits on roads should be tested against the operational speeds, and changes to speed limits should involve a multi-disciplinary team of traffic law enforcement personnel, engineers and other relevant disciplines, applying the policy on the setting of speed limits.

### *Reporting on Road Safety Appraisal Reports on Paved Network*

The Branch is not able to provide the actual kilometres and the number of reports that were implemented as part of a Road Safety Appraisal, as no data has been collected for this process. The Branch has however, updated the project inception report for the reseal projects in 2017, to enable the design consultants to document and identify potentially hazardous locations and put remedial measures in place to minimise crashes on the road network.

It is envisaged that a strategic safety engineering database is setup to record the number of Road Safety Appraisal reports compiled from the above project process. The existing project monitoring systems will also be utilised to determine the kilometres of remedial measures implemented in future.

# CHAPTER 5.NEEDS DETERMINATION

The data used in this chapter is the 2022 visual assessment data. The extent of the road network is shown in Table 2-1.

The reader should note the Western Cape Province experienced severe flooding during two flood events in 2023/24. The September 2023 flood event alone caused damage to the road network in excess of R 500 million and is still accumulating as latent infrastructure damage is exposed. Due to the events occurring post the data collection period, this damage is not reflected in the 2024/25 – 2033/34 RAMP and will only reflect in future RAMPs.

## 5.1 Current assets

### 5.1.1 Historical context

Historically, construction of most of the paved road network took place in the 1950s and 1960s. This was followed by reconstruction of parts of the trunk road network to modern standards and to upgrade their load carrying capacity in the 1970s and early 1980s. A maintenance orientated strategy of regular sealing and routine maintenance of roads was developed over this period. From the mid-1980s to the present, there was a reduction in the rehabilitation and replacement of roads with steadily rising heavy vehicle and E80 volumes, especially since the mid-1990s. This resulted in a build-up of a backlog in rehabilitation and resealing need, as well as a requirement to upgrade trunk roads with old geometric standards to current standards and to upgrade unpaved roads carrying high traffic volumes to paved standards.

### 5.1.2 Factors influencing demand

The increase in population as well as the expected growth in the economy of the Western Cape will translate directly into a greater demand for transport, and road transport.

The main factors influencing the demand for additional funding to maintain current assets are the backlog in the following:

- Routine maintenance of all roads;
- Regravelling of unpaved roads;
- Upgrading of unpaved roads to paved roads;
- Resealing of paved roads;
- Light Rehabilitation of paved roads; and
- Rehabilitation and reconstruction of paved roads.

Anticipated changes in community expectations with regards to transport may also affect demand. However, it is difficult to estimate future changes in community needs, apart from stating that the road infrastructure of the Western Cape will not, given current budget levels, be able to support a sustained high growth rate. As the economy grows, the demand for road infrastructure will become a serious service delivery issue unless stringent transport demand management imperatives such as car-pooling, rail-readiness in terms of freight-transfer, transit-oriented-development and intelligent transport systems, etc., are put in place over the medium to long term to transform the land transport burden from being predominantly private-vehicle-based to a multi-modal shared-based system.

### 5.1.3 The demand for resealing

The demand for resealing is determined using the condition ratings of the visual assessments. Resealing is the process of constructing a new, waterproof surface on an existing road in order to prevent damage causing premature, moisture-induced failure and ongoing deterioration of a road, but cannot prevent the normal, direct traffic-related deterioration of the pavement layers. It should be noted that riding quality (roughness) is not affected by reseals.

**Resealing is the most important preventive maintenance action for preservation of the WCG network**

Figure 5-1 shows the distribution of historic resealing versus the future predicted need for resealing and the proposed resealing length of the Branch. The predicted need was calculated according to the expected seal life of the current seals on the network.

The analysis indicates that 2 291 km of paved roads are at the end of their expected surface life and need resealing in 2024/25. Note that 332 km of reseals forming part of the committed works programme of 2023/24 was assumed to be completed and the assumed impact was considered in estimating the need for 2024/25. A further expected need for resealing of approximately 2 046 km is predicted for the period from 2025 to 2028.

The actual rate of resealing has decreased from 756 km for the period of 2013 to 2017, to 304 km for the period of 2018 to 2022. According to the Branch's MTEF Programme for the period 2023/24 to 2027/28, on average 300 km of road is scheduled to be resealed annually. The planned resealing levels for the next five years are slightly lower than the previous five years. Considering the high predicted resealing need shown in Figure 5-1, the current rate of resealing needs to be increased as a preventative measure to prevent a decline in network performance over the next few years and costly repairs in future. Under the current MTEF budget, an average of 533 km of road is recommended to be resealed annually for the period 2024/25 to 2028/29.

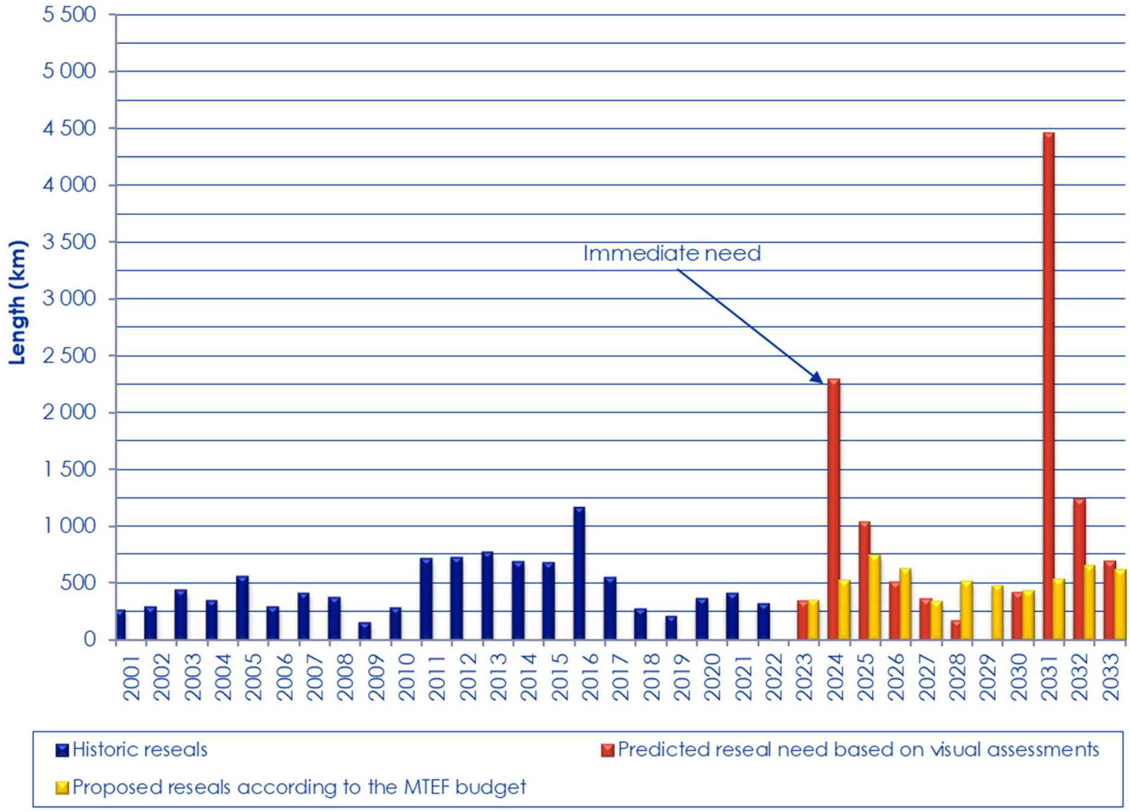



Figure 5-1: Historic resealing of paved roads versus the predicted need and proposed MTEF budget resealing programme from 2001 to 2033

The resealing need categorised according to urgency is shown in Figure 5-2. About 45% of the seals on paved roads will need to be replaced within the next two years. Note that 332 km of reseals forming part of the committed works programme of 2023/24 was assumed to be completed and the assumed impact was considered in estimating the need for 2024/25.

***Note:*** Only immediate resealing needs are included, i.e., no secondary treatment needs are included and the resealing needs for roads in category D that require rehabilitation within the next ten years are not included.

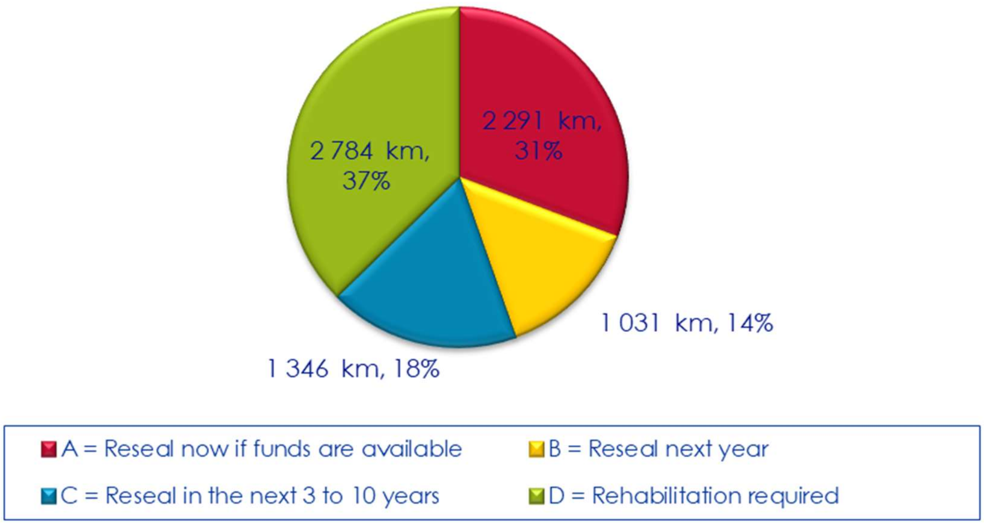



Figure 5-2: Resealing need on paved roads according to urgency in 2024

### 5.1.4 The need for drainage maintenance

In addition to keeping the paved roads waterproofed with regular resealing, the importance of adequate drainage is emphasised. Table 5-1 provides the statistics for surface drainage and there is a substantial backlog of surface drainage maintenance.

Side drainage maintenance needs are assessed during the annual visual assessments. This dataset is currently being verified and will in future form part of the report on the need for drainage maintenance.

**Table 5-1: Surface drainage maintenance needs 2022**

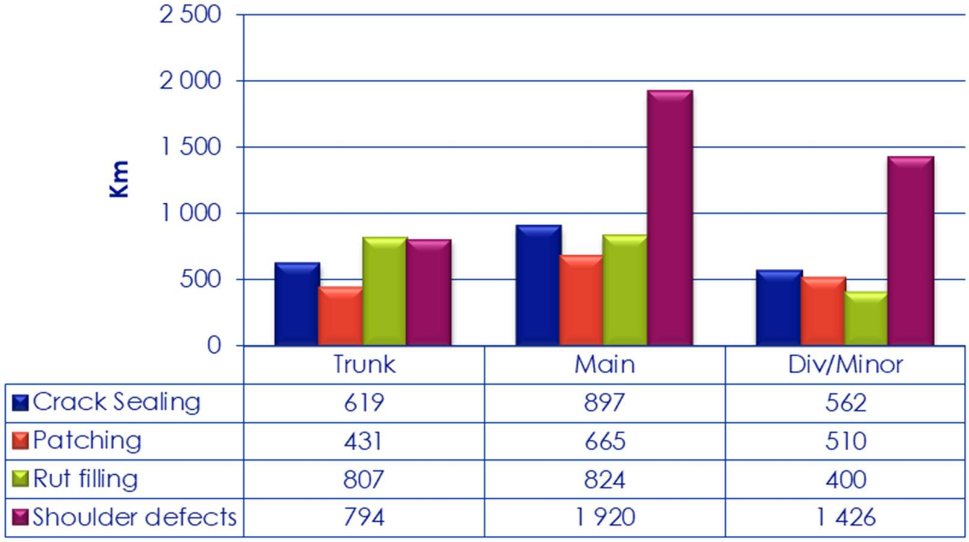
| RCAM class | Paved roads | | Unpaved roads | |
|---|---|---|---|---|
| | Carriageway-km | % of RCAM class of the network | Km | % of network |
| 1 | 86,00 | 36,2 | No data currently available | No data currently available |
| 2 | 847,9 | 28,9 | | |
| 3 | 1 347,87 | 44,7 | | |
| 4 | 627,34 | 51,4 | | |
| 5 | 31,95 | 70,8 | | |

### 5.1.5 Maintenance demand

The maintenance demand in terms of crack sealing, patching, filling of ruts and unpaved shoulder defects is shown in Figure 5-3 and Figure 5-4 according to road type and RCAM classifications respectively. The length provided is the kilometres of road where the severity of the defect is ≥3. These figures indicate a significant backlog in maintenance.

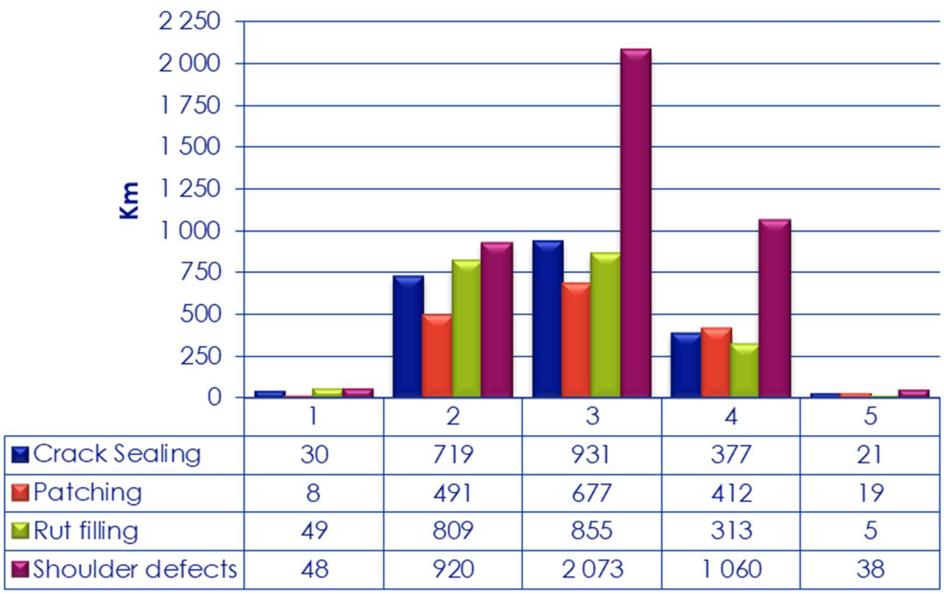
*Limitations*:

- Surface failures have not been considered in the determination of the demand for patching, and
- Unpaved shoulder defects include ratings for off-road conditions where paved shoulders exist.




| | Trunk | Main | Div/Minor |
|---|---|---|---|
| Crack Sealing | 619 | 897 | 562 |
| Patching | 431 | 665 | 510 |
| Rut filling | 807 | 824 | 400 |
| Shoulder defects | 794 | 1 920 | 1 426 |

Figure 5-3: Maintenance demand in km of road according to road category 2022




| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Crack Sealing | 30 | 719 | 931 | 377 | 21 |
| Patching | 8 | 491 | 677 | 412 | 19 |
| Rut filling | 49 | 809 | 855 | 313 | 5 |
| Shoulder defects | 48 | 920 | 2 073 | 1 060 | 38 |

Figure 5-4: Maintenance demand in km of road according to RCAM class 2022

The demand for line marking has been determined in terms of the number of kilometres of those markings that are in fair condition to worse, including where there are no markings. The total demand is approximately 2 285 km. This represents 31% of the paved road network. Figure 5-5 provides the distribution and data for each RCAM class. Class 3 has the highest demand for line marking.

- Assuming the limit of demand is set at 20% of the network per annum, i.e. paint on average once every 5 years, the average length of road for remarking would be at least 1 491 km per annum (excluding the extra requirements for multi-lane freeways and dual carriageways). The current total demand for line marking is approximately 2 285 km, which is significantly more than the expected demand. This indicates that there is a backlog of maintenance for line marking.
- Road paint marking framework contracts have been established to assist with the backlog of maintenance for line marking.

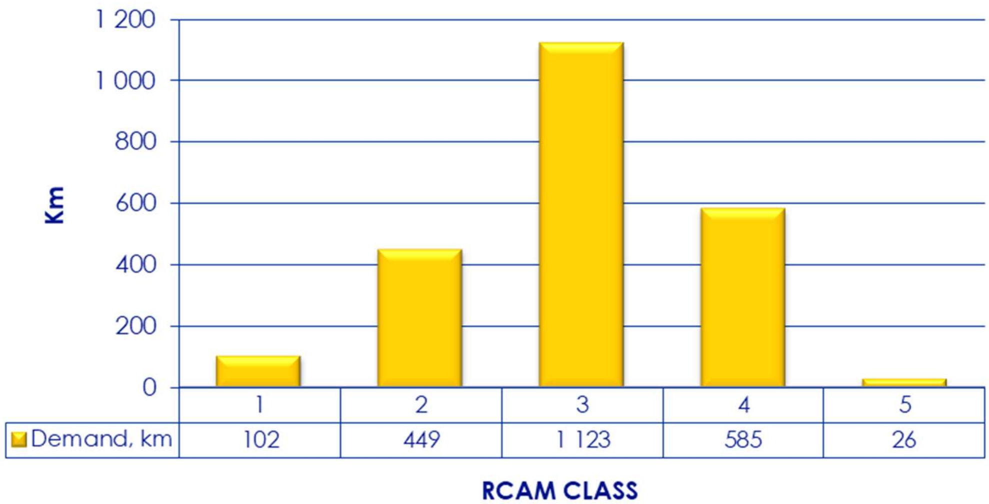



Figure 5-5: Demand for line marking where condition is fair or worse in 2022

### 5.1.6 Rehabilitation and reconstruction demand

The demand for reconstruction and rehabilitation can be estimated from the remaining life of a road pavement based on the most recent roughness measurements. This method does not take any other distress deterioration into account such as wide cracking or rutting, and therefore underestimates the need. A higher, more realistic rehabilitation need is estimated by the Intervention Budget where a desirable level of service is also considered.

The analysis is based only on roughness data and indicates that approximately 926 km (12%) of roads require immediate rehabilitation. This need is based on the 90th percentile of roughness profile measurements. These roads have very poor riding quality conditions and generate excessive costs to road users as well as escalating routine maintenance costs to the Branch. This need was determined purely on roughness thresholds, as defined in TRH 4: Structural design for flexible pavements for interurban and rural roads (Committee of State Road Authorities, 1996), and recorded in Table 3-1. Figure 5-6 shows the lengths of roads not complying with these roughness levels of service and Figure 5-7 shows the distribution of roughness by class of paved road length in 2022.

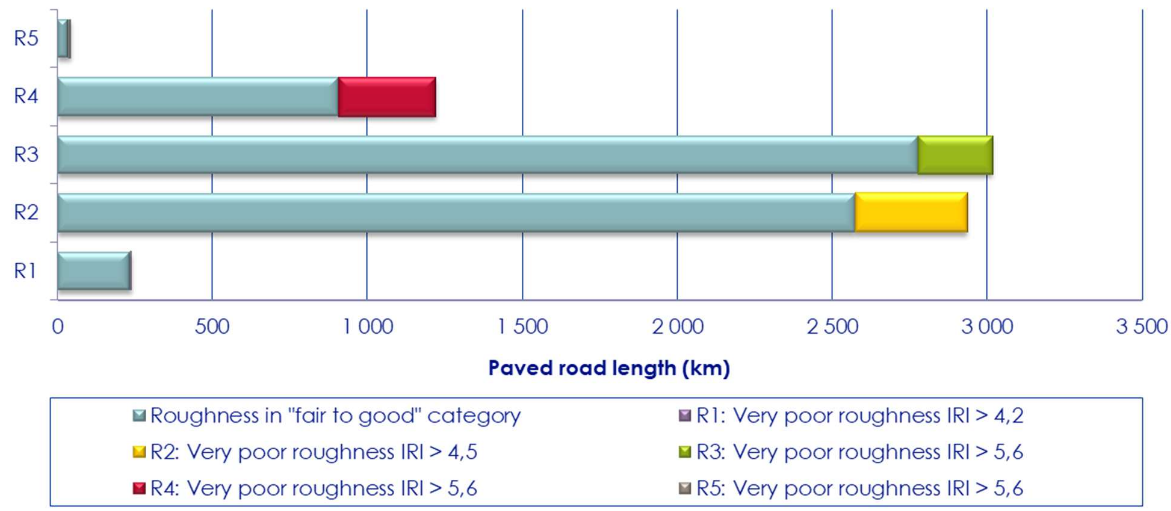



Figure 5-6: Proportion of paved roads that do not comply with minimum standards for roughness in 2022

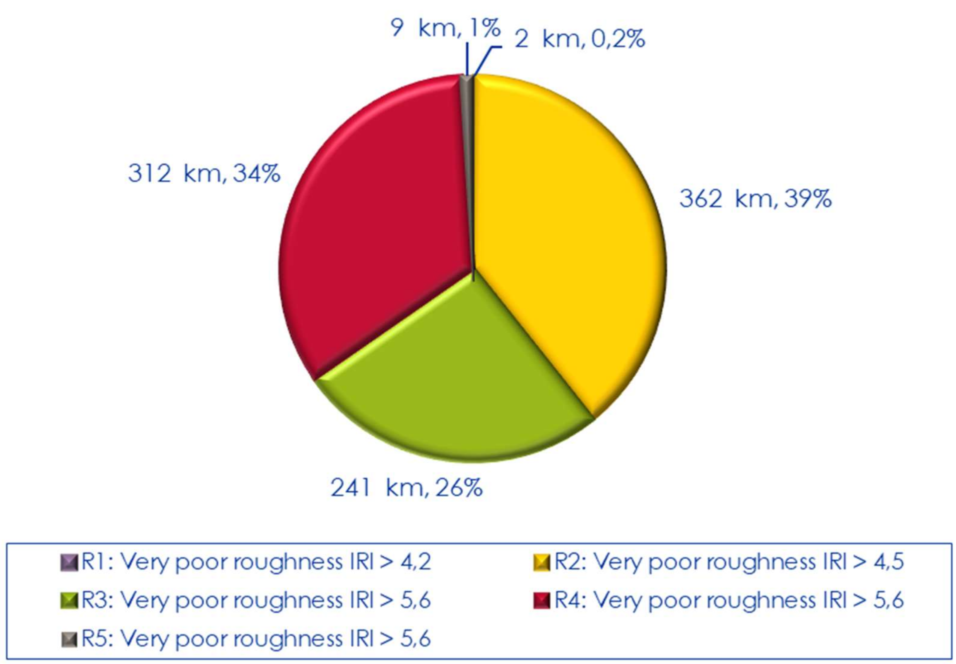



Figure 5-7: Distribution of very poor paved roads according to roughness values in 2022

Figure 5-8 shows the distribution of historic rehabilitation versus the future predicted need for rehabilitation and the proposed rehabilitation length under the current MTEF budget. Treatment lengths include light rehabilitation and reconstruction.

Over the last five years (2018 to 2022) the average rate of rehabilitation was approximately 82 km per annum. Similarly, under the current MTEF budget, an average 74 km of road is recommended to be rehabilitated annually for the period 2024/25 to 2028/29. This is, however, only 3% of the immediate rehabilitation need of 2 161 km for 2024/25. Note that 81 km of rehabilitation forming part of the committed works programme of 2023/24 was completed and the impact considered in estimating the need for 2024/25.

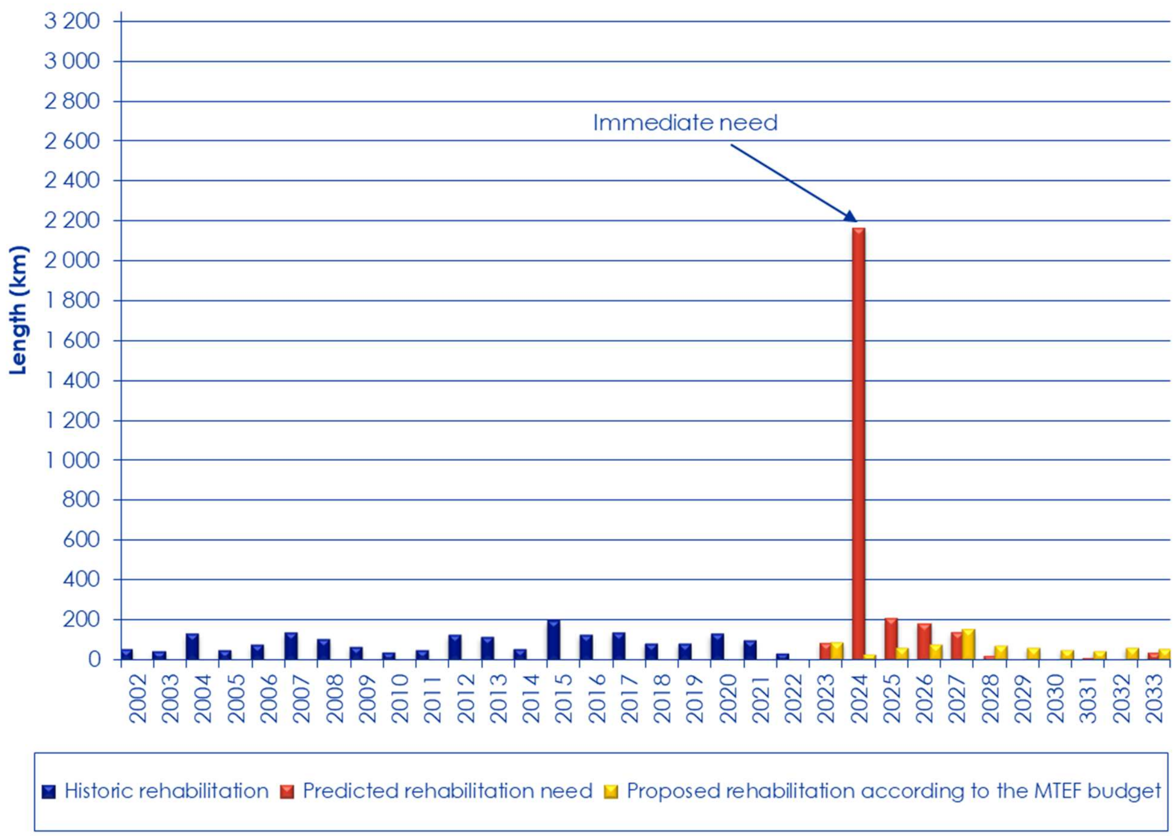



Figure 5-8: Historic rehabilitation of paved roads versus immediate rehabilitation need and proposed intervention of the MTEF budget for 2002 to 2033

### 5.1.7 Key constraints affecting the maintenance of paved roads

There are three key constraints that affect the maintenance of paved roads, i.e., the supply of:

- Layerworks materials, i.e. crushed stone and natural basecourse, subbase, selected and fill materials;
- Surfacing materials, i.e., crushed stone chips and bitumen; and
- Water for compaction.

#### *Layerworks materials*

Road building materials for surfaced roads layerworks have historically been obtained from so-called "borrow pits" (for gravel) and quarries (for crushed stone) that are situated adjacent to the road at optimal distances for construction. The Mineral and Petroleum Resources Development Act (Parliament of the Republic of South Africa, 2002), the National Environmental Management Act and its amendments (Parliament of the Republic of South Africa, 1998), and the regulations pertaining to these Acts severely limits the ability of the Branch to obtain and process suitable materials for layerworks used on the unpaved road network. The natural supply of suitable gravel wearing course materials is also severely limited by the geology of the Western Cape and the way the rocks have been weathered. In recent times, basecourse and subbase materials have increasingly been purchased from commercial quarries, which increases construction costs.

### *Surfacing materials*

As for basecourse materials, the establishment of quarries is very restricted and most of the stone for surfacing is purchased from commercial sources.

### *Bitumen*

The supply of bitumen has been intermittent and there are sporadic shortages often caused by refinery maintenance. With the limited season for resealing, any shortage of bitumen for resealing and asphalt surfacing has an impact on the Branch's ability to optimally maintain the paved road network.

### *Water for compaction*

Water for compaction of layerworks is severely restricted in some areas. The impact of climate change is causing higher temperatures and reduced rainfall that will have an increasing impact on the Branch's ability to rehabilitate and maintain the paved road network.

### 5.1.8 The demand for replacement of gravel wearing course

Gravel wearing course material is a scarce resource and the investment required to increase the gravel thicknesses is considered in the light of the predicted roughness after the regravelling and the expected savings in road user costs that result from the reduced roughness. If the traffic is low, the benefits may not be commensurate with the costs of regravelling. The unpaved road network has been classified according to four levels of service (Table 3-3) that assist in determining where the regravelling of a road should be a priority. Roads that are classified with low and very low levels of service are maintained by means of spot regravelling and blading, and regravelling longer lengths must be motivated. This analysis method was used for the Technical Needs (Immediate Need) analysis. However, for the MTEF budget the road network was split into economic and non-economic roads, the non-economic gravel roads were only maintained with spot regravelling and blading and the economic roads were maintained with regravelling.

Figure 5-9 shows the regravelling demand compared to the historic replacement of gravel wearing course and the proposed regravelling length of the Branch.

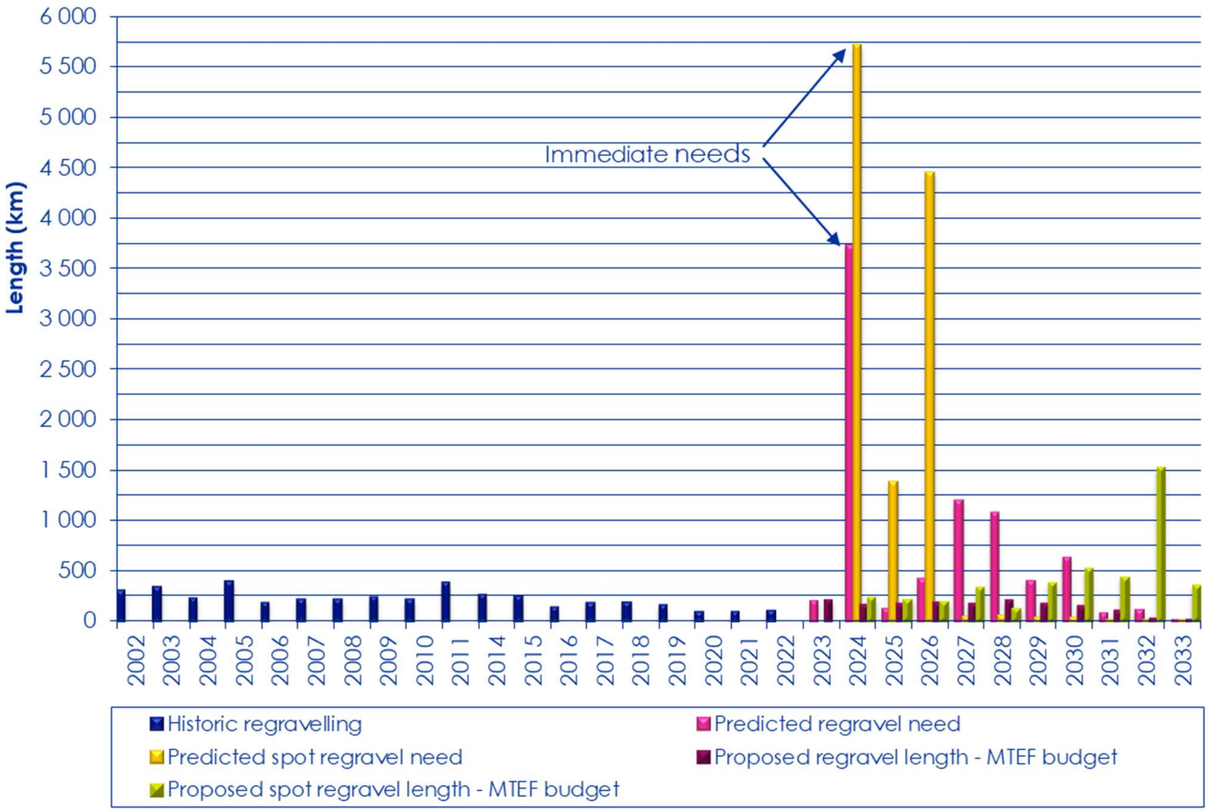



Figure 5-9: Historic regravelling of maintained unpaved roads versus immediate need and proposed intervention of the MTEF budget for 2002 to 2033

Historically, the MTEF funding levels were insufficient to satisfy the need for gravel replacement. At current MTEF budget levels, the Branch can only afford to regravel on average 170 km annually and maintain on average 215 km annually by means of spot regravelling for the period 2024/25 to 2028/29. Approximately 9 434 km (91%) of unpaved roads operate with minimal gravel wearing course materials (below 25 mm). As current funding is insufficient to regravel all 9 434 km of unpaved roads with a minimal gravel wearing course, the maintenance activities for the lower levels of service will consist of mainly spot regravelling. There are many roads that have outcrops of rock that prevent blading maintenance and therefore, in the absence of gravel wearing course, it is practically impossible to maintain these roads to the required level of service.

The presence of clay and sand subgrades influences a road's ability to support traffic loads and the surface smoothness. Unpaved roads having a clayey subgrade and low traffic could therefore provide an adequate level of service without regravelling. Other factors, such as when the road is below ground level and prone to flooding, may necessitate raising the vertical alignment followed by regravelling.

### 5.1.9 Key constraints affecting the maintenance of unpaved roads

There are two key physical constraints affecting the maintenance of unpaved roads, i.e., the supply of:

- Gravel wearing course; and
- Water for compaction.

Other constraints are the availability of:

- Skilled labour, i.e. plant operators, supervisors and technicians/ technologists; and
- Appropriate and reliable construction plant.

#### ***Supply of gravel wearing course***

The supply of gravel wearing course is hampered by strict environmental and mining legislation as well as the geology of the Western Cape. The high cost of wearing course from commercial sources renders its use generally economically unfeasible. The use of wearing course from commercial sources is further restricted by high haulage costs because the roads to be regravelled are often far from commercial centres. Most available gravel materials lack the plasticity required for the ideal gravel wearing course, requiring the establishment of additional sources of fine, plastic materials to mix with the substandard gravels. Again, these sources of plastic fines, often from dams or rivers, are limited, and their use is often prohibited or severely limited by legislation.

In many areas of the Western Cape, the best materials have already been used and therefore only substandard materials remain. The need to process coarse gravels to break them down to a suitable grading is also becoming more common. The use of grid rolling has not always been successful, and it will become increasingly necessary to resort to the crushing of materials and mixing them with plastic fines. Screening of hard gravels to waste is an additional process often required. Without a full environmental impact assessment, it will not be possible to crush material in a borrow pit, adding additional uncertainty and cost to the processing of the gravel in a borrow pit. Alternative methods are being investigated, e.g. the crushing of coarse/oversize materials on the road with an in-line crusher.

The number of borrow pits to maintain the gravel road network had historically been based on a borrow pit spacing of 30 km, resulting in a total number of about 350 borrow pits for the network. The cost to establish this number of borrow pits is estimated at R262 million (R750 000 per borrow pit). Another reality that needs to be considered is that borrow pits have a limited life and need to be replaced when mined out.

The cost of establishing a borrow pit varies because of the number of variables involved in the approval process, e.g. location, geology, ownership, land use and environmental, botanical and heritage impacts. Due to the large investment the Branch has made to date into the sourcing of gravel wearing course, a decision was made to use the currently approved borrow pits for roads that are a practical distance from the pits. Investigation of new borrow pits has been delayed until such time that the borrow pits in the process of approval have been through all approval processes. Some is awaiting approval from DMR after financial guarantees, was submitted. The remaining borrow pits that are in other legal approval processes, will be mined when all approvals has been received. The total number of legalised borrow pits will be in excess of 150, once these processes have been completed.

### *Water*

The availability of water for compaction is expected to decline as climate change accelerates. There will consequently be a significant impact on the Branch's ability to maintain the unpaved road network. Investigations are currently under way to determine the possibilities of using sea water along the coast and mineralised water in inland areas. There will be an extra, yet undetermined cost, in establishing the inland sources of water. These costs relate to the environmental approvals required as well as drilling, pumping and temporary storage costs.

## 5.1.10 Effect of climate change on demand

The need to build resilience to climate change was identified in paragraph 4.11 . To date there is no strategy in place to identify where additional resilience measures are justified, and the nature and cost of these measures, which will affect demand in many ways. As noted previously, a drier climate will affect the supply of water for roadworks, perhaps increasing the cost. The incorporation of the effects of climate change on the identification and prioritisation of projects has not yet been tackled.

## 5.1.11 Demand prioritisation and resource allocation

The priorities for meeting the desired Branch Strategic Objectives to provide an efficient and effective road network in support of growth and development are applied to the candidate project list. The Deighton Total Infrastructure Management System is used for this purpose, which currently facilitates the trade-off analysis between rehabilitation, upgrades of unpaved roads and periodic maintenance.

The planning process for capital projects is represented diagrammatically in Figure 5-10 as a funnel through which the pool of candidate projects flow to become scheduled programmes of projects.

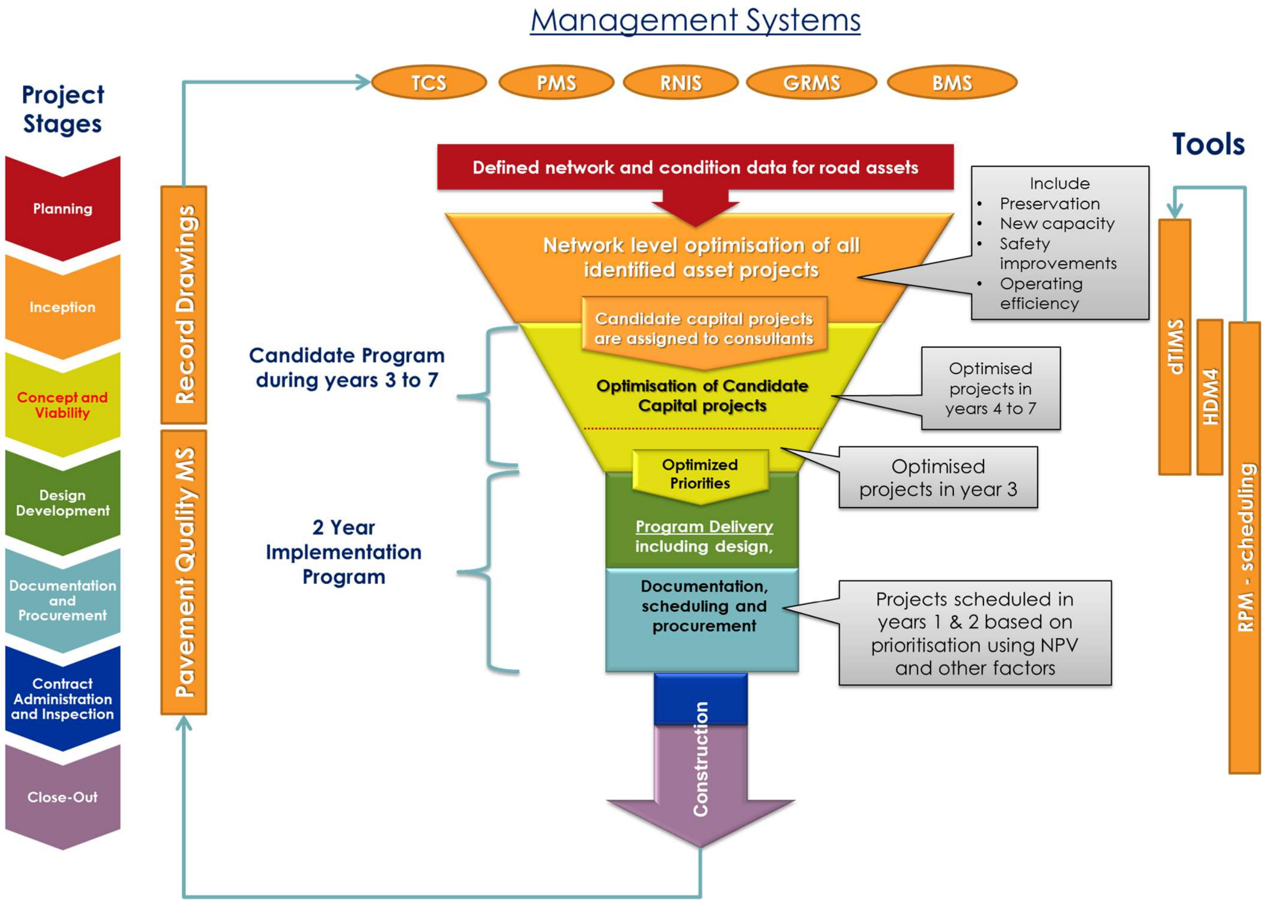



Figure 5-10: Process for capital projects from identification to construction

### 5.1.12 Background to the lifecycle benefit-cost analysis

The decision support system for optimal resource allocation, called Deighton Total Infrastructure Management System from Deighton Associates, Canada, was customised for the Branch to conduct a lifecycle benefit-cost analysis (LCBCA) on its paved and unpaved road networks. The dTIMS software was developed specifically for the management of linear infrastructure assets, adopting the heuristic optimisation methodology (also called near optimisation) to find optimal solutions under constrained resources, usually funding. This methodology is also used in HDM-4 for a more detailed project-level analysis.

According to Deighton, optimisation in dTIMS can be described as follows:

*"Optimisation chooses the strategies that maximise the outcome, defined by the user, while adhering to a set of constraints such as budget or minimum level of service. It can be defined as a tool within a good Pavement Management System that provides you with quantitative feedback and suggestions, ultimately allowing you to knowingly revise a program by using your judgment to weigh political, engineering and economic factors."*

Previously, the selection of intervention activities was based on pavement condition, a decision tree and engineering judgement. While this decision methodology includes other criteria such as traffic and road classification, it does not provide solutions that are optimised to a specific objective function that reflects the strategic objectives of the Branch and includes performance modelling, strategic analysis, network level consequence performance, and

LCBCA. The latter forms the basis for optimisation in the dTIMS software, namely the ability to analyse the incremental benefit of alternative intervention activities, at different cost levels.

According to the draft TMH 22 (Committee of Transport Officials, 2013), "analysis systems are used to process and analyse data in order to provide decision support to asset managers". Robertson (Robertson, 2004) classified analysis systems into six decision support levels (DSLs) in terms of the characteristics and sophistication of the analysis process (Table 5-2). DSL1 and DSL2 are typically based only on technical parameters. DSL3 and higher are "economy based", requiring lifecycle cost analyses.

**Table 5-2: Classification of decision support levels for RAMS**

| Decision support level | Dominant characteristic |
|---|---|
| 1 | Basic asset data, rule-based work allocation |
| 2 | Project and network level assessment, geographic reference |
| 3 | Life cycle cost analysis (LCCA) of authority impacts, i.e. capital and maintenance costs |
| 4 | LCCA of authority and user impacts, economic prioritisation |
| 5 | Optimum investments within constraints, sensitivity analysis |
| 6 | Economic, social, environmental multi-criteria assessment, risk analysis |

The Deighton dTIMS software was used to conduct the LCBCA to determine the long-term consequences of the current expenditure levels on the Western Cape road network. dTIMS has decision support capabilities up to DSL6 (Committee of Transport Officials, 2013), but is currently being applied at DSL5 in the Branch.

### *Optimisation levels and methods*

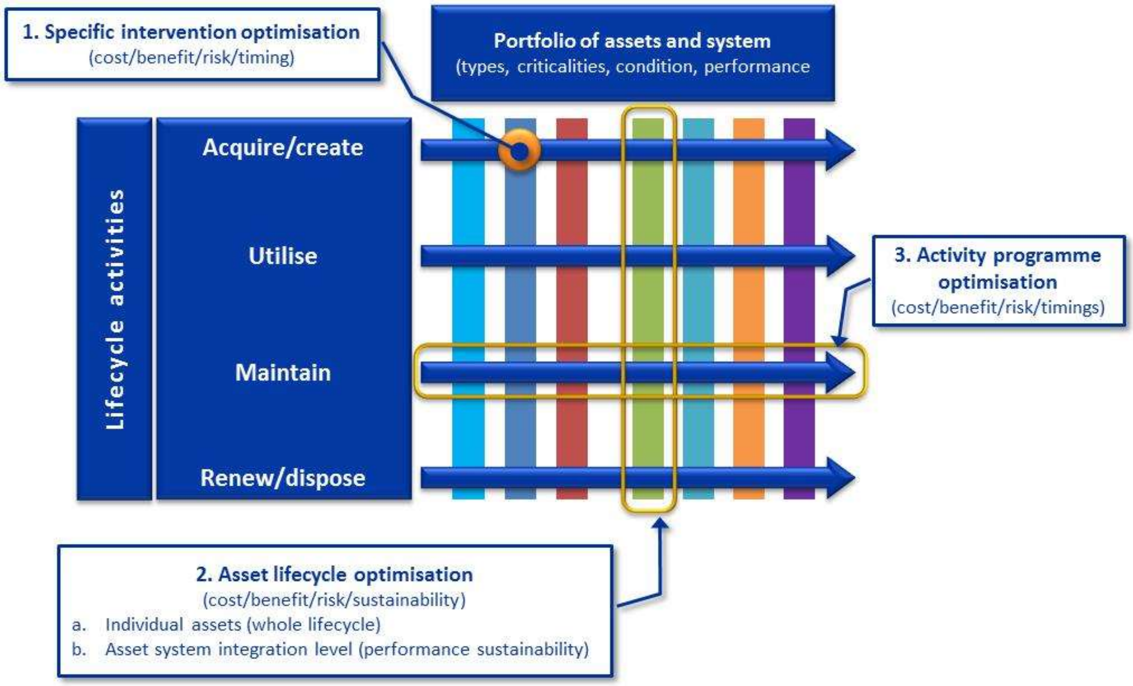
Three levels of optimisation, as required by PAS 55 (Institute of Asset Management, 2004), the forerunner of SANS 55001:2015/ISO 550001 (International Standards Organization for Standardization, 2015), are included in dTIMS:

- Specific intervention – dTIMS uses the efficiency frontier method (the set of optimal treatments that offers the highest expected return for a defined capital investment. Treatments that lie below the efficient frontier are sub-optimal, because they do not provide enough return for the invested capital. Portfolios that cluster to the right of the efficient frontier are also sub-optimal, because they have a higher cost for the defined return).

- Asset lifecycle – dTIMS uses the efficiency frontier method.

- Activity programme – dTIMS identifies sections to generate an activity programme of road sections after which a stand-alone system (developed in Excel) combines these activities into larger candidate projects. Candidate projects are aggregated to ensure project length is maximised to achieve economy of scale efficiencies. The candidate projects are then re-distributed over a 5-year period based on the net present value (NPV) of the dTIMS optimised objective function and ensures that the fund allocation is consumed according to availability per year.

These levels of optimisation (British Standards Institute, 2008) are illustrated in Figure 5-11.




Asset management - whole-life management of physical asset (Lloyd, 2010)
Figure 5-11: Three levels of optimisation required in asset management decisions

The dTIMS software has been calibrated to model the deterioration and maintenance effects of roads in the Western Cape. Future paved road performance is modelled by the HDM-4 models in terms of cracking, rutting, ravelling, potholes and road roughness. Models developed by the CSIR are used for modelling gravel loss and road roughness. For any given fund allocation, the software selects maintenance, rehabilitation and upgrading alternatives to maximise the overall benefit to the network.

The activities investigated in this lifecycle benefit-cost analysis optimisation are listed below:

- regravelling;
- resealing;
- light rehabilitation - The inclusion of the light rehabilitation treatment adds a holding action (for constraint budgets) and roads that has passed reseal is prevented of deteriorating to rehabilitation. Light rehabilitations cost is 40% of Rehabilitation cost;
- rehabilitation (reconstruction is included with rehabilitation); and
- upgrading of unpaved roads to paved standards.

The budget portions excluded from this analysis are the budget values for the following items:

- programme support;
- access improvements;
- new facilities;
- capital improvement projects (paved road upgrading);
- transfers to municipalities;
- routine maintenance; and
- maintenance of bridges.

## 5.1.13 Specifications of the LCBCA

### *Assumptions and limitations*

The LCBCA is based on several assumptions and limitations. These include:

- All consequences derived from analysing the MTEF funding scenarios in this report are based on the assumed funding levels.
- The prediction model for gravel loss is not very accurate as the original formulation by Dr Paige-Green was based on the road network in northern South Africa. The HDM-4 model calibrated to Western Cape conditions is envisaged for future implementation.
- The HDM-4 deterioration models have been calibrated for a rural network. However, there are four very important urban roads in the Cape Metropolitan Region, namely TR9/1, TR27, TR11/1 and TR2/1, for which the calibrations are inadequate. For these roads, other factors, such as congestion, the variable pavement structure and asphalt surfaces, have a large influence on the optimisation of periodic maintenance and up-grades, especially the timing of treatments. A detailed asset management plan for this sub-network is envisaged. Details of the projects will then be included in dTIMS.
- The reconstruction treatment is a subset of rehabilitation.

### *Objective function used for preservation of the uneconomic network*

The area-under-the-condition curve (AUC) objective function was used for the analysis of the road network to determine the priority needs for the road network. Figure 5-12 illustrates the area-under-the-condition curve pictorially.

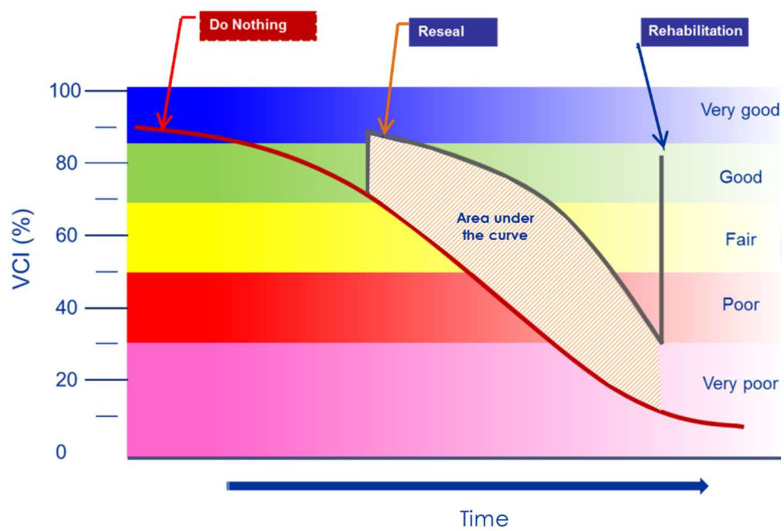



Figure 5-12: Illustration of Area-Under-the-Condition Curve

For each strategy, the benefit is calculated for each year in the analysis period, weighted by AADT and totalled for the analysis period. In theory, the 'benefit' is the area between the two curves, weighted by traffic. Any repair strategy that improves the condition of the road segment would thus result in a positive area above the 'do nothing' curve. During the optimisation analysis, the incremental benefit of alternative intervention strategies with increasing costs are measured in terms of the area-under-the-condition curve.

This method can be applied to both high and low trafficked roads, thus complying with the objective of preservation of the Branch Road Network.

The AUC objective function is calculated by summing the present value of the difference between the condition index resulting from the intervention strategy (a combination of intervention activities over the analysis period) and the condition index for the do-nothing alternative, for each year in the analysis period. The area-under-the-condition curve benefit calculations are weighted by traffic (AADT).

The equation to calculate this benefit for an intervention strategy on a road segment is:

$$Benefit = \sum_{i=1}^{TotYears} AADT_i \,(IS\_Cond_i - DN\_Cond_i)$$

Where:

| | |
|---|---|
| *Benefit* | = Benefit of an Intervention Strategy for a road segment |
| *TotYears* | = Total number of years in the analysis period |
| *i* | = Year in the analysis period |
| $IS\_Cond_i$ | = Condition of the road segment for the Intervention Strategy in year i |
| $DN\_Cond_i$ | = Condition of the road segment for the Do Nothing Strategy in year i |
| $AADT_i$ | = AADT on the road segment in year i |

The Branch is currently investigating alternative methods for the LCBCA and conducting this in parallel for comparative means. Any major changes to the LCBCA will only be done after a multiple year comparison. This investigation includes an "augmented" area-under-the-benefit-curve (AAUC) objective function developed by the Branch. Details of the development of AAUC objective function is presented in Appendix G.

### Financial inflation

No financial inflation was incorporated into the analysis.

### Discount rate

As no inflation is considered in the analysis, a real discount rate of 2.704%, which has been adjusted to remove the effects of inflation was used in the analysis. This was determined considering a nominal interest rate of 11.75% (South African Reserve Bank, 2023) and an inflation rate of 8.97% (Stats SA, 2023).

### Performance prediction models

The HDM-4 pavement performance prediction models are used to predict the deterioration of paved roads on the network. This paragraph explains how and where the HDM-4 models are incorporated into the Branch's dTIMS analyses.

The HDM-4 software contains seven items within its workspace. These are:

1. Vehicle fleets;
2. Road networks;
3. Work Standards;
4. Projects;
5. Programs;
6. Strategies; and
7. Configuration.

Table 5-3 presents how the HDM-4 models were incorporated within dTIMS.

**Table 5-3: Incorporation of HDM-4 models into dTIMS**

| Part | Description of functionality customised in dTIMS | Source/ incorporation of HDM 4 models and methodology within dTIMS | Comments and parallel with HDM-4 |
|---|---|---|---|
| A | Database containing the road network and network information data, most recent assessment data, traffic data, committed projects and pavement structure data. | • Data necessary for the analysis and based on the HDM-4 methodology is obtained from the Branch's RNIS.<br>• dTIMS is open-ended and any number of data attributes can be stored and used in an analysis. | • Item 2 (Road networks) of HDM-4's workspace is used to import and store the road network and its associated data attributes.<br>• For an analysis in HDM-4, the source of data would also be the RNIS of the Branch.<br>• dTIMS is open-ended and has no limitation on the data fields that are used in the analysis. In contrast HDM-4 has a defined set of data attributes and does not make provision for additional attributes to be used in the analysis. For example, it is simpler in dTIMS to conduct a differentiated needs analysis where intervention criteria are varied according to road class or region. |
| B | Calibrated pavement performance/ deterioration models for paved and unpaved roads | • The HDM-4 manuals (specifically Volume 4), contain comprehensive model descriptions of all pavement performance models and their associated input data, coefficients and calibration factors. The formulae of these models were captured in dTIMS.<br>• The HDM-4 formulae of each pavement performance distress such as all cracking, roughness, rutting, etc. have calibration factors to adjust the predicted performance to local performance. The calibration factors determined for the Western Cape are captured and updated in the Branch's dTIMS system.<br>• Additional models that are not part of the HDM-4 methodology are also customised in | • The pavement performance models of HDM-4 were captured within the HDM-4 software by the HDM software developers. The models cannot be viewed/ changed by the software users, but they are detailed in Volume 4 of the HDM-4 manuals.<br>• Item 7 (Configuration) of HDM-4's workspace is used to enter the calibration factors. |

| Part | Description of functionality customised in dTIMS | Source/ incorporation of HDM 4 models and methodology within dTIMS | Comments and parallel with HDM-4 |
|---|---|---|---|
| | | dTIMS. These are the calculation of asset values and composite condition indices. | |
| C | Vehicle operating cost models | • The relationship between road roughness, terrain and vehicle operating costs is obtained from HDM-4. Prior to each analysis, is Zutari's (previously Aurecon) obtains the updated relationship according to HDM-4 from WCG's website https://axs.pgwc.gov.za/axs/axs.main . This website was developed from HDM-4's Road User Effects, described in Volume 4 of the HDM-4 set of manuals.<br>• The economic unit costs are updated via the website. | • Item 1 (Vehicle fleets) of HDM-4's workspace is used to enter the basic characteristics and economic unit costs of the network fleet.<br>• Like B above, the road user effects models of HDM-4 were captured within the HDM-4 software by the software developers. The models cannot be viewed/ changed by the software users but they are detailed in Volume 4 of the HDM-4 manuals. |
| D | is Zutari's (previously Aurecon) asset value model for calculating the current and future predicted asset values. Also models for the calculation of composite indices incorporating all HDM-4 models. | • This is Zutari's (previously Aurecon) methodology. HDM-4 does not make provision for calculation of asset values nor composite indices. | • Not applicable |
| E | Intervention treatments. Their effects and unit costs. | • Customised according to Branch requirements.<br>• dTIMS is open-ended and can accommodate any number and type of treatments.<br>• The user has full control over the effect of intervention treatments. Note 1 has details on studies conducted for the Branch to refine the effect of treatments (reset values). | • Item 3 (Works Standards) of HDM-4's workspace is used to enter the intervention treatments, and their unit costs.<br>• The user has limited control over the effect of intervention treatments in HDM-4. |
| F | Budget scenarios and maintenance policies to be investigated. | • Customised according the Branch requirements. Both dTIMS and HDM-4 can accommodate any number of budget/ policy scenarios to be optimised.<br>• Multi-year road maintenance, rehabilitation and upgrading plans are generated with ease. | • Items 6 and 7 (Programmes and Strategies) are used to conduct network level analyses.<br>• Multi-year road maintenance, rehabilitation and upgrading plans (Item 6 Programmes) can be generated for a sub-network of candidate projects. Experience has shown this cannot be achieved for a large road network with many road segments to be analysed. |

| Table 5-3: Incorporation of HDM-4 models into dTIMS | | | |
|---|---|---|---|
| Part | Description of functionality customised in dTIMS | Source/ incorporation of HDM 4 models and methodology within dTIMS | Comments and parallel with HDM-4 |
| G | Objective functions for optimisation (e.g. minimization of transport costs, or maximisation of condition thus preservation of road network as an asset) | • Customised according the Branch requirements. dTIMS can accommodate any objective function inclusive of the objective functions built into HDM-4.<br>• For the Branch analyses, two objective functions are incorporated namely maximising condition (AUC) and minimising TTC over a forecasting period of 15 years. | • Objective functions are selected in items 6 and 7 (Programmes and Strategies).<br>• Only three objective functions can be used: Minimise NPV, maximise IRI, minimise cost. |

Note 1

The following reports and papers, pertaining to the incorporation of the HDM-4 models into the decision support system, were prepared by is Zutari's (previously Aurecon) for the Branch:

- HDM-4 calibration study for the Western Cape Government: based on Long Term Pavement Performance Maintenance System (LTPPMS) data from 1995 to 2013.
- Study 1: Preliminary Evaluation of the HDM Road Deterioration Models for the Western Cape Road Network, May 2006. Authors: I Wolmarans and J Viktor.
- Study 2: Further Investigation of the Calibration Data and Performance Modelling of the Road Network of the Western Cape, September 2007. Authors: I Wolmarans and J Viktor. This study consisted of various tasks pertinent to the LTPPMS and its application:
    - Determine how effective the HDM-4 models (calibrated for the Western Cape) are in the prediction of the network's condition over a long period. The outcome of this analysis was the comparison of the observed condition parameters in 2006 (based on the 2006 road condition survey data) against the predicted condition parameters in 2006 (based on the calibrated HDM-4 Road Deterioration models with performance predicted from 1996 to 2006).
    - Perform calibration study to determine new calibration factors for the HDM-4 Road Deterioration models of the Western Cape based on LTPPMS.
    - Investigate the observed effects (Works Effects) of the different maintenance and rehabilitation activities to improve the treatment reset values of the HDM-4 models for Western Cape.
    - Investigate the distress types for cracking that are typically collected according to the TMH 9 visual condition assessment methodology of South Africa. Determine TMH 9-crack types to be converted to HDM-4 units and update formulae to convert the TMH 9 distress ratings to HDM-4 units for network level analyses.
    - Scrutinise the calibration data for the Western Cape on a LTPPMS by LTPPMS basis to determine the relevance of each section after more than ten years of data collection. Furthermore, other influencing data such as traffic and pavement information were investigated for currency and accuracy.
- Road Deterioration Calibration study and report, based on LTPPMS data from 1995 to 2004, June 2005.
- Road Deterioration Calibration study and report, based on LTPPMS from 1995 to 2002, 2003.
- Bi-annual reports on the "Strategic analysis of the Western Cape road network with the objective to preserve the road network". These reports are based on the calibrated HDM III and HDM-4 Road Deterioration, Works Effects and Road User Effects models included in the dTIMS™ CT decision support system of the PMS and have been in use since 1999. One of these reports was also presented at the Annual Deighton Users' Conference in Canada, 1997.
- Visual assessment manual for the calibration of HDM-III / IV. 1996.

### *Calibrated HDM-4 models*

Calibration factors are used to fit the models to the conditions in the Western Cape. The most recent factors are listed in Appendix I – Calibration factors for modelling performance, and are sourced from the HDM-4 calibration study performed in 2013 (Aurecon, 2013) for the WCG Transport Infrastructure Branch.

A review of the calibration of the HDM-4 models are currently ongoing.

### *Unpaved roads deterioration models*

The steady state prediction models, developed by Dr P Page-Green of the CSIR (Page-Green, 1996), are used for the prediction of gravel loss and roughness on unpaved roads.

### *Triggers used to identify treatments*

The triggers are summarised in Table 5-4 for paved roads and in Table 5-5 for the unpaved roads.

**Table 5-4: Triggers for paved roads**

| RCAM Classes 1 & 2 | Weighted average area of Wide Cracks ≤10%: All Cracks ≤2,5% and Reseal Condition Index >50% | Weighted average area of Wide Cracks ≤10%: All Cracks >2,5% or Reseal Condition Index ≤50 % | Wide Cracks >10% |
|---|---|---|---|
| P90 Roughness ≤4,2 IRI or Condition Index ≤55% | No Maintenance | Reseal | Light Rehabilitation / Rehabilitation |
| P90 Roughness >4,2 IRI or Condition Index >55% | Light Rehabilitation / Rehabilitation | Light Rehabilitation / Rehabilitation | Light Rehabilitation / Rehabilitation |
| | Reconstruction[1] | Reconstruction[1] | Reconstruction[1] |
| **RCAM class 3** | **Weighted average area of Wide Crack ≤10%: All Cracks ≤2,5 % and Reseal Condition Index >50%** | **Weighted average area of Wide Crack ≤10%: All Cracks >2,5% or Reseal Condition Index ≤50 %** | **Wide Cracks >10%** |
| P90 Roughness ≤4,5 IRI or Condition Index ≤53% | No Maintenance | Reseal | Light Rehabilitation / Rehabilitation |
| P90 Roughness >4,5 IRI or Condition Index >53% | Light Rehabilitation / Rehabilitation | Light Rehabilitation / Rehabilitation | Light Rehabilitation / Rehabilitation |
| **RCAM classes 4 & 5** | **Weighted average area of Wide Crack ≤10%: All Cracks ≤2,5% and Reseal Condition Index >50%** | **Weighted average area of Wide Crack ≤10%: All Cracks >2,5% or Reseal Condition Index ≤50 %** | Wide Cracks >10% |
| P90 Roughness ≤5,6 IRI and Condition Index ≤45% | No Maintenance | Reseal | Light Rehabilitation / Rehabilitation |
| P90 Roughness >5,6 IRI and Condition Index >45% | Light Rehabilitation / Rehabilitation | Light Rehabilitation / Rehabilitation | Light Rehabilitation / Rehabilitation |
| Note 1: If Remaining Life is <5 years and Structural Number is <2,5 | | | |

| Table 5-5: Triggers for unpaved roads | | |
|---|---|---|
| **Level of Service (LOS)** | **Gravel Thickness <50 mm** | **Gravel Thickness ≥50 mm** |
| **Very Low** | Spot Regravel | No Maintenance |
| **Low** | Spot Regravel | No Maintenance |
| **Medium** | Regravel or<br>Upgrade to Paved Standard[1] | Regravel or<br>Upgrade to Paved Standard[1] |
| **High** | Regravel or<br>Upgrade to Paved Standard[1] | Upgrade to Paved Standard[1] |
| Note 1: Depending on economic rates and budget | | |

## *Analysis period*

10 years.

## *Analysis procedures*

- Values of future predicted costs and budgets are not inflated and all rand values in this document correspond to the buying power of the rand in 2022.
- The budget components of rehabilitation, upgrades, and preventive maintenance activities are investigated in the optimisation analysis. The remainder of the budget is for items not directly associated with pavement deterioration and is not considered in this analysis. The current funding for regravelling, resealing, rehabilitation and upgrading of unpaved roads to paved roads are combined and reallocated to minimise total transport costs and loss in asset value. The result is an optimised allocation of the MTEF funding scenario.
- The funding levels for normal maintenance, new assets, upgrade of surfaced roads and other overhead items in the MTEF budget were not investigated.
- The intervention levels used to calculate the Intervention Funding Scenario are listed in Table 5-6.

| Table 5-6: Intervention levels | | | | |
|---|---|---|---|---|
| **RCAM class** | **Paved roads** | | **Unpaved roads** | |
| | **Riding quality Max IRI (m/km)** | **Condition[1] Min (%)** | **Level of Service[2] to regravel at 50 mm** | **Level of Service[2] to spot regravel at 50 mm** |
| **1** | 4,2 | 55,0 | | |
| **2** | 4,2 | 55,0 | Medium and High | |
| **3** | 4,5 | 52,5 | | |
| **4** | 5,6 | 45,0 | | Low and Very Low |
| **5** | 5,6 | 45,0 | | |

Notes
1. Condition refers to the overall visual condition index as defined in draft TRH 22.
2. Roads were classified by level of service and intervention level. The intervention level for replacement of gravel material is 50 mm.

- For this intervention scenario, the objective of the analysis was to maintain the overall NCN of paved roads at approximately 70% within the next 5 years while maintaining the proportion of poor to very poor roads below 10% as well as maintaining the majority of roads within the tabulated intervention levels For unpaved roads, the objective is to maintain all gravel roads within in the next 10 years with a minimum gravel wearing course thickness of 50 mm except for those unpaved roads in the low and very low level of service classification, which will be maintained with spot regravelling.
- For the rehabilitation of trunk roads, the cost of rehabilitation was based on the current width.

The effect of a deteriorating paved road network versus routine maintenance has also been quantified—see paragraph 5.2. Other relevant observations are:

- The quality of the traffic data meets best practice requirements in terms of collection and processing.
- Traffic levels play an important role when projects are scheduled during the optimisation process. All assumptions of future traffic levels in the Western Cape are based on historic trends extracted from the Traffic Counting System.

### *Unit rates used in the analysis*

Unit rates are used to estimate the cost of the intervention activities, called treatments, which are investigated in this analysis. In order to determine the effective amount of work that can be accomplished for a given allocation of funds, it is necessary to determine unit rates for doing fixed portions of work. The unit rates adopted in this report were derived from the latest projects undertaken in the province. During this analysis the unit rates for rehabilitation are uniquely defined for each road segment according to its current condition. The rehabilitation costs were further adjusted to account for mountainous terrain, where the estimated rehabilitation cost is increased by 30%.

The unit rates in Table 5-7 were used in the analysis to determine the extent of work that can be achieved for each funding level.

### *Network*

The following network was used in the analysis:

- All trunk, main and divisional roads investigated, i.e., 16 861 km. Subsidised municipal main roads are excluded from the analysis.
- The minor roads (15 530.27 km), except for a few exceptions (937 km) that carry high levels of traffic, are not included in the lifecycle benefit-cost analysis, because these roads are not cost-effective to maintain. Traffic volumes on the minor roads are very low, and it is estimated that less than 1% of the province’s traffic use these roads.

**Data**

The data used in the analysis are as follows:

- The visual survey data of 2022 for both paved and unpaved roads;
- The 2022 high speed roughness and transverse profile measurements;
- Traffic information from the Traffic Counting System in 2022;
- The latest models for calculating the cost to the road user in terms of vehicle operating costs (detailed in Appendix I – Calibration factors for modelling performance); and
- The funding levels of the MTEF budget as of November 2023.

<table>
<tr><th colspan="7">Table 5-7: Historic and current unit rates of maintenance actions modelled</th></tr>
<tr><th>Treatment Type</th><th>Rates 2016/17</th><th>Rates 2017/18</th><th>Rates 2018/19</th><th>Rates 2019/20</th><th>Rates 2021/22</th><th>Rates 2022/23</th></tr>
<tr><th>Regravelling</th><th colspan="6">Rx1000/km</th></tr>
<tr><td>Regravel</td><td>345</td><td>6 m - 772</td><td>6 m - 772</td><td>6m - 767</td><td>800</td><td>924</td></tr>
<tr><th>Resealing and Rehabilitation</th><th colspan="6">R/m2</th></tr>
<tr><td>Resealing</td><td>215</td><td>200</td><td>200</td><td>225</td><td>200</td><td>202</td></tr>
<tr><td>Light Rehabilitation</td><td>-</td><td>301</td><td>301</td><td>382</td><td>382</td><td>415</td></tr>
<tr><td>Rehabilitation[2]</td><td>848</td><td rowspan="8">829</td><td rowspan="8">829</td><td rowspan="8">962</td><td rowspan="8">980</td><td rowspan="8">1 061</td></tr>
<tr><td>Rip, stabilise base and seal</td><td>442</td></tr>
<tr><td>Rip, stabilise base as subbase, add base and seal</td><td>890</td></tr>
<tr><td>Add new base and seal</td><td>865</td></tr>
<tr><td>Asphalt overlay</td><td>582</td></tr>
<tr><td>Rip, rework and stabilise base and asphalt overlay</td><td>845</td></tr>
<tr><td>Remove base, stabilise subbase, replace base, stabilise and seal</td><td>595</td></tr>
<tr><td>Reconstruction</td><td>1 551</td></tr>
<tr><th>Upgrading</th><th colspan="6">R millions/km</th></tr>
<tr><td>Upgrading unpaved roads to paved standards</td><td>6,9</td><td>10,8</td><td>10,8</td><td>11,45</td><td>12,5</td><td>13,2</td></tr>
<tr><td colspan="7">Note<br>1. Spot regravelling on unpaved roads classified as Low and Very Low LOS roads is done at a cost of 10% of the cost to regravel the entire road length<br>2. Rehabilitation cost in mountainous terrain is increased by a further 30%</td></tr>
</table>

### 5.1.14 Historical budget context

Limited resources constrain the Branch's core function of providing optimal road infrastructure and backlogs in road infrastructure provision and maintenance have continued to grow, however, there has been a slight decrease in backlog since 2022/23. The backlog in regravelling, resealing and rehabilitation (including reconstruction) of paved roads and the upgrading of unpaved roads to paved roads, has been estimated since 2003. The rapid increase in this backlog is evident from Table 5-8 and Figure 5-13.

| Table 5-8: The backlog in rehabilitation, resealing of paved roads and the regravelling and upgrading of unpaved roads to paved standards | | | |
|---|---|---|---|
| **Financial Year** | **Backlog (Rand million)** | **Backlog adjusted for 2023 Rands (Rand million)** | **Budget shortfall as a ratio of annual budget[1]** |
| **2003/04** | 2 140 | 3 116 | 1.8 |
| **2005/06** | 2 573 | 5 346 | 3.1 |
| **2007/08** | 3 535 | 4 185 | 2.5 |
| **2009/10** | 5 465 | 7 661 | 4.5 |
| **2012/13** | 7 044 | 8 321 | 4.9 |
| **2014/15** | 10 124 | 10 369 | 6.1 |
| **2016/17** | 21 724 | 12 928 | 7.6 |
| **2017/18** | 23 700 | 13 330 | 7.8 |
| **2019/20** | 24 234 | 17 106 | 10.1 |
| **2020/21** | 26 502 | 32 484 | 19.1 |
| **2022/23** | 32 968 | 35 438 | 20.8 |
| **2024/25[2]** | 30 839 | 34 186 | 20.1 |

Note 1: This shortfall is determined by dividing the 5-year average annual budget (Table 5-12) into the Technical Needs Budget.
Note 2: The impact of the committed works programme of 2023/24 which reduces the backlog by R792 million has been incorporated. At the time of analysis, it was assumed these works would reach completion in the committed year.

***Note:*** The steep rise in backlog from 2014/15 to 2016/17 can be attributed to:

- The change in the way that rehabilitation need is identified: up to 2014/15 the average roughness was used in identifying the need, whereas in 2016/17 onwards the 90$^{th}$ percentile roughness values were used as recommended in draft TMH 22 (Committee of Transport Officials, 2013); and
- Deterioration of the network leading to a greater need for rehabilitation and resealing.

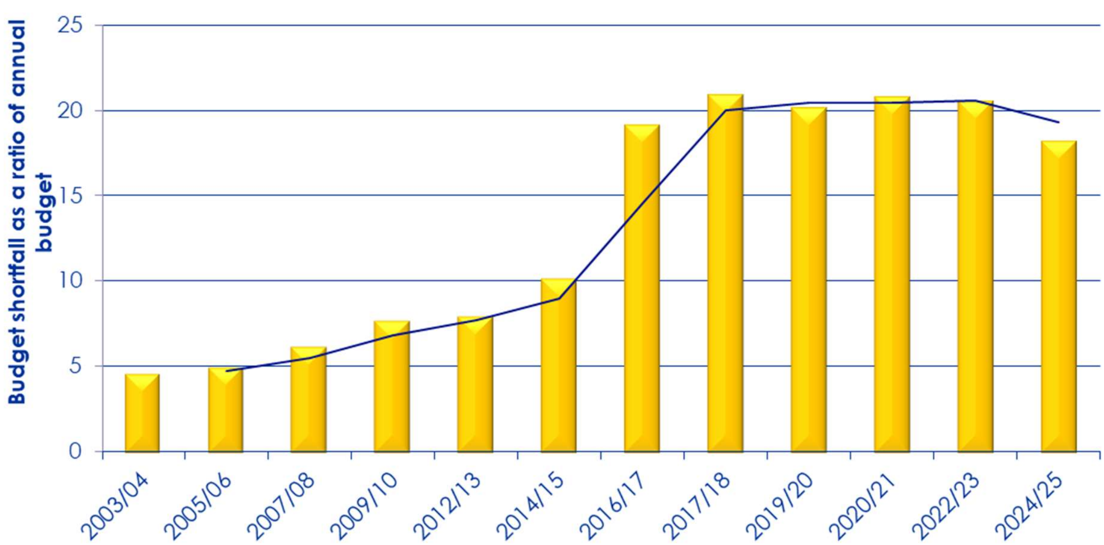



Figure 5-13: The budget shortfall in regravelling, resealing, rehabilitation and the upgrading of unpaved roads to paved roads as a ratio of the 5-year average annual budget

### 5.1.15 Analysis of funding levels

Table 5-9 provides a description of the funding (budgets) that have been investigated for their impact on future network conditions and costs.

| Table 5-9: Funding scenarios investigated | |
|---|---|
| **Scenario** | **Description** |
| **Provincial MTEF Budget** | The current funding level investigates the consequences of the MTEF Budget allocation for regravelling, resealing, light rehabilitation/rehabilitation/ reconstruction and upgrading to paved standards on the performance of the network. The allocations were calculated from the Rational Portfolio Management Project Management System deliverables and therefore do not include any treatments other than the four referred to here. |
| **Optimised MTEF Budget** | The current MTEF funding scenario with optimised fund allocation across the different intervention treatments, i.e., to gain maximum benefit from the available funding level. Using the current MTEF funding level, the fund allocations for regravelling, resealing, light rehabilitation/rehabilitation and upgrading to paved standards are optimised. The allocations were calculated from the project deliverables and therefore do not include any treatments other than the four referred to here. |
| **Intervention Budget** | A funding level is determined with the objective of maintaining the overall NCN of paved roads at approximately 70% whilst maintaining the proportion of poor to very poor paved roads below 10%. For unpaved roads, the objective is to regravel those roads classified with medium and high LOS and those unpaved roads classified as low and very low LOS with spot regravelling. Compliance with intervention levels is achieved immediately for paved roads and is phased-in over 10 years for unpaved roads. |
| **Technical Needs Budget** | This budget reflects the total current demand of the road network. It is a theoretical budget scenario preventing all roads from deteriorating beyond the treatment intervention thresholds. All intervention activities, i.e., preventive maintenance, rehabilitation and upgrading, are adhered to as soon as the need arises, without regard to cost, i.e., an unconstrained budget. The result of this scenario is minimised transport costs and roads that are preserved in an optimal condition. The objectives of this scenario are as follows:<br>• The backlog of paved roads in a poor to very poor condition is removed immediately;<br>• Paved roads are resealed timeously;<br>• Unpaved roads with justifiable economic benefits are upgraded to paved standards immediately;<br>• Unpaved roads with insufficient gravel material are regravelled immediately; and<br>• The road network is maintained in an optimal condition after the backlog has been cleared. |

### *MTEF budget analysis*

An objective of this analysis is to determine the consequences of the proposed Medium-Term Expenditure Framework budget of the Branch on the road network. The analysis was performed in dTIMS and the results are compared to an "Ideal" scenario. In particular, the lifecycle benefit-cost analysis determines how effective this MTEF budget is in meeting the Branch road preservation needs. Thus, the objective is to answer the questions:

- Is the MTEF funding level sufficient to meet the periodic maintenance, rehabilitation and upgrading needs of the WCG roads?
- Is the allocation of the MTEF funds among periodic maintenance, rehabilitation and upgrading optimal?

For the analysis of the MTEF budget, the combination of the TTC and the AUC objective functions described in paragraph 5.1.13 was used.

The breakdown of the MTEF budget for the Branch for the financial year 2024/25 is shown in Figure 5-14 and Table 5-10 shows the breakdown from 2024/25 to 2028/29. The current funding for 2024/25 is R4 452 million (calculated using the MTEF funding for all budget categories included in the Vote 10 budget), compared to R3 953 million in 2022/23. The budget for regravelling, resealing, rehabilitation and upgrading to paved standards has increased by 13%. Figure 5-15 shows the proportions of the 2024/25 MTEF budget analysed in this report.

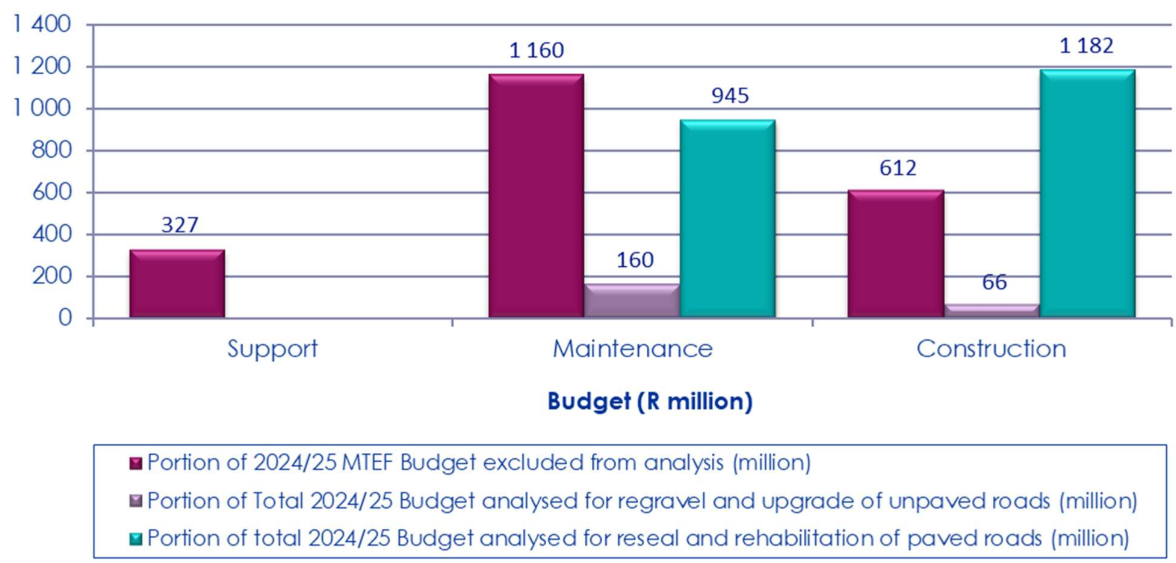



Figure 5-14: Transport Infrastructure Branch funding for 2024/25 as at November 2023

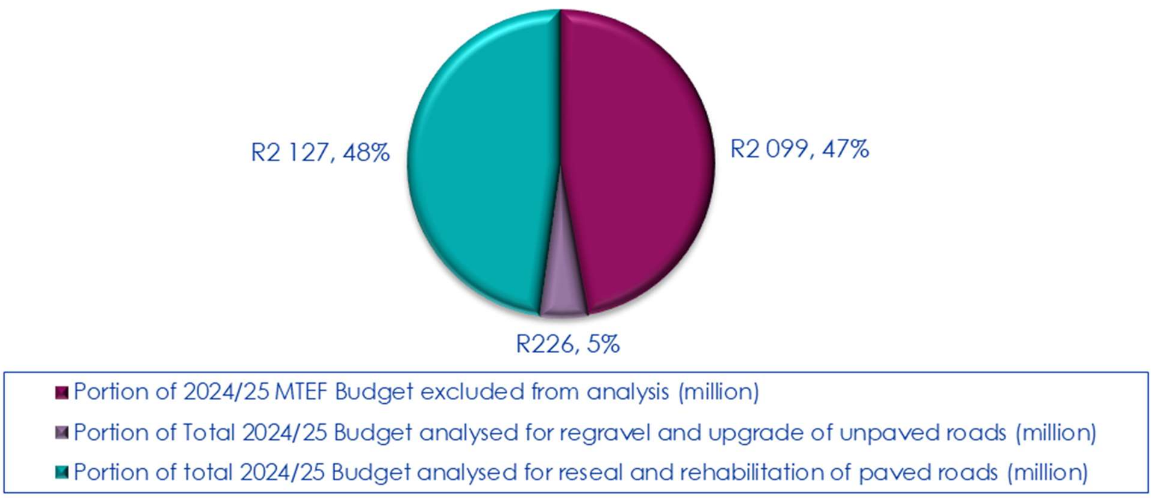



Figure 5-15: Proportions of 2024/25 MTEF budget analysed in this report

**Table 5-10: Funding allocation according to the MTEF budget as at November 2023**

| Budget Item | MTEF Budget | | | | |
|---|---|---|---|---|---|
| | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (x R1000) | 2027/28 (x R1000) | 2028/29 (x R1000) |
| DDG roads | 2 656 | 2 936 | 3 122 | 4 329 | 4 545 |
| Programme support | 140 781 | 149 116 | 156 334 | 166 844 | 175 180 |
| Planning | 37 942 | 57 961 | 61 435 | 66 154 | 72 061 |
| Design | 145 832 | 198 418 | 208 676 | 220 558 | 231 984 |
| Total support | 327 211 | 408 431 | 429 567 | 457 885 | 483 770 |
| **Rehabilitation and reconstruction of surfaced roads** | **1 182 000** | **500 600** | **302 444** | **494 435** | **240 000** |
| **Gravel road upgrading** | **65 500** | **109 000** | **135 500** | **241 000** | **208 000** |
| Paved road upgrading | 220 700 | 182 000 | 67 000 | 310 000 | 374 929 |
| Access, new facilities and safety | 366 301 | 484 601 | 483 383 | 606 000 | 726 856 |
| Transfers: Cities and municipalities | 13 900 | 21 000 | 22 000 | 26 760 | 24 000 |
| Construction operations | 10 920 | 12 798 | 13 448 | 14 117 | 14 827 |
| Total Construction | 1 859 321 | 1 309 999 | 1 023 775 | 1 692 312 | 1 588 612 |
| **Reseal** | **945 355** | **621 503** | **1 125 211** | **596 178** | **848 293** |
| **Regravel** | **160 225** | **168 240** | **176 650** | **185 485** | **194 755** |
| Routine maintenance | 444 415 | 392 090 | 411 685 | 432 275 | 453 885 |
| Other maintenance items (Bridges, transfers and agency fees) | 715 113 | 892 343 | 800 178 | 801 284 | 804 375 |
| Total Maintenance | 2 265 108 | 2 074 176 | 2 513 724 | 2 015 222 | 2 301 308 |
| Total of the Branch | 4 451 640 | 3 792 606 | 3 967 066 | 4 165 419 | 4 373 690 |
| Annual increase | | 14,8% | 4,6% | 5,0% | 5,0% |
| **Total budget optimised** | **2 353 080** | **1 399 343** | **1 739 805** | **1 517 098** | **1 491 048** |

| Table 5-10: Funding allocation according to the MTEF budget as at November 2023 | | | | | |
|---|---|---|---|---|---|
| **Budget Item** | **MTEF Budget** | | | | |
| | **2024/25 (x R1000)** | **2025/26 (x R1000)** | **2026/27 (x R1000)** | **2027/28 (x R1000)** | **2028/29 (x R1000)** |
| **Optimised budget as proportion of total budget** | **53%** | **37%** | **44%** | **36%** | **34%** |

For the next five years, the portion of the annual MTEF budget allocated for periodic maintenance, light rehabilitation/rehabilitation and upgrading to paved roads ranges between 34% and 53% of the total budget of the Roads Network Management Branch. It is this portion of the MTEF budget that is optimised in the analysis to find the optimal allocation for periodic maintenance, rehabilitation and the upgrading of unpaved roads to paved standards.

The current and historic MTEF Budget proportions are shown in Figure 5-16. The portion of allocated funds for maintenance, rehabilitation and upgrading remains at approximately half of the funds.

The maintenance activities investigated are those with identifiable intervention levels and reset values associated with the pavement performance prediction models (Appendix I – Calibration factors for modelling performance).

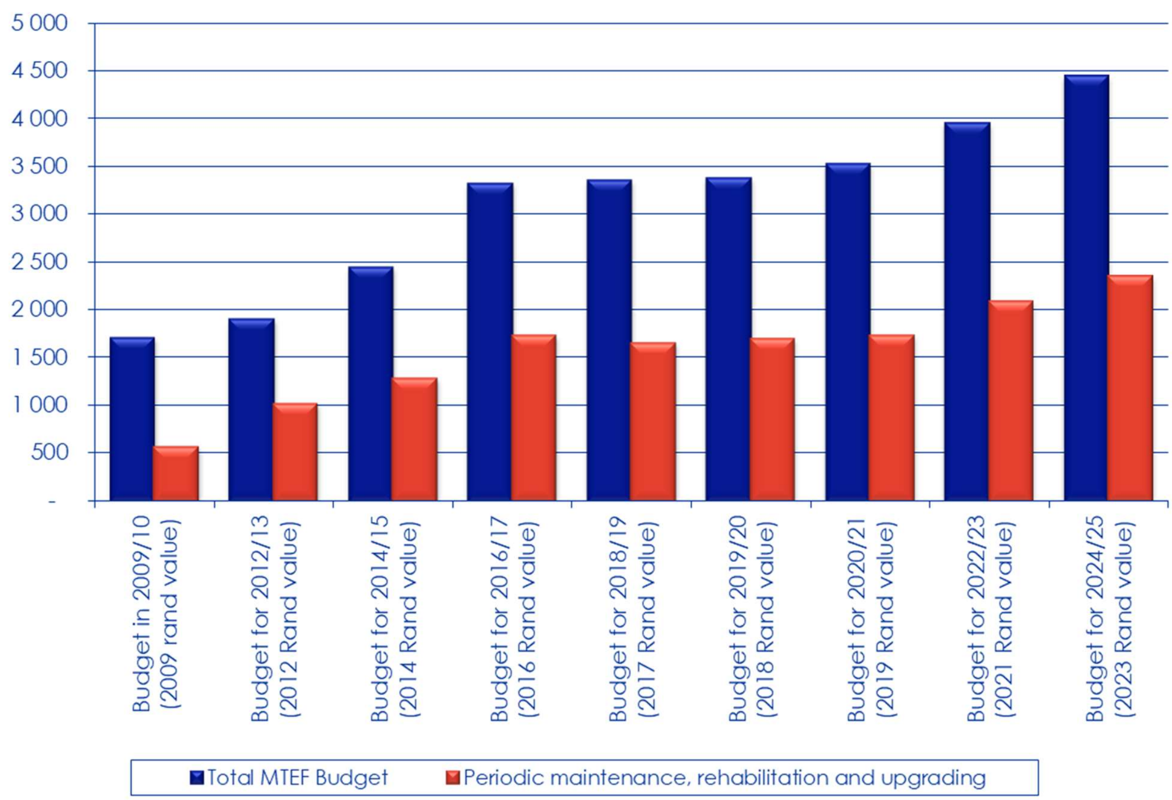



Figure 5-16: Current and historic MTEF budgets and the proportions that are optimised

The fund allocation presented in Figure 5-17 and Table 5-10 is being implemented by the Branch. Major investments for paved roads are planned for the period 2024/25 to 2028/29. Allocation includes the treatment of light rehabilitation that is utilised in constraint economic development based on the budgets of Table 5-10.

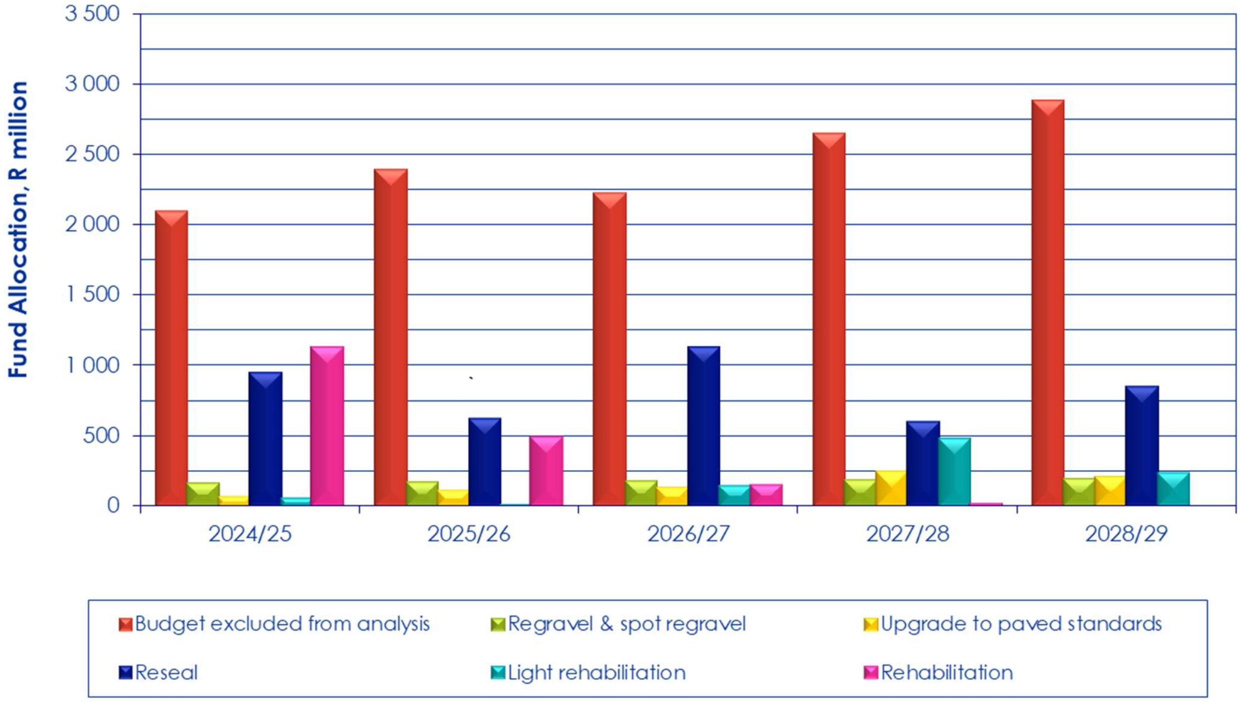



Figure 5-17: The provincial allocation of MTEF budget, analysing the allocation for regravelling, resealing, light rehabilitation, rehabilitation and upgrading to paved standards

### *Comparison of actual MTEF Budget with Optimised MTEF Budget*

An analysis was performed in dTIMS to investigate the consequences of the proposed provincial allocation of the MTEF budget and the results are compared to an "Ideal" scenario (ideal split of the current MTEF budget).

Table 5-11 shows the provincial allocation of the MTEF budget per treatment category compared to the "Optimised MTEF Budget", which optimally assigns funds to the five activities. This re-allocation maximises the benefit, while minimising the loss in asset value for the province and its road users.

Figure 5-18 graphically compares the Provincial MTEF budget allocation to the Optimised MTEF budget allocation according to the results of the optimisation process.

The comparison of the Optimised MTEF Budget versus the Provincial MTEF Budget highlights the focus of the Optimised funding scenario on paved roads. The Optimised MTEF budget allocates 99% of funding over the next 5 years to resealing, light rehabilitation and rehabilitation of paved roads compared to the Provincial MTEF budget of 81%. The optimal split results in the maximum investment return for the current funding level. The Optimised MTEF Budget invests an additional 26% of the paved road funding towards light and heavy rehabilitation. Paragraph 5.1.16 has full details on the consequences of this maintenance scenario.

Paved roads carry 96% of the vehicle-km driven on the WCG road network and the higher investment in paved roads is clearly due to the number of road users on paved roads.

The five activities investigated for the Optimised MTEF Budget are discussed below.

**Table 5-11: Provincial versus optimised MTEF budget**

| Budget Item | | All amounts in 2022 Rand Value (millions) | | | |
|---|---|---|---|---|---|
| | | Provincial | | Optimised | |
| | | 2024/25 | Average 2024/25 to 2028/29 | 2024/25 | Average 2024/25 to 2028/29 |
| Optimised activities | Spot regravelling | 160 | 177 | 0,21 | 1,53 |
| | Regravelling | | | 0 | 0,7 |
| | Resealing | 945 | 827 | 1 087 | 578 |
| | Light Rehabilitation | 57 | 186 | 96 | 426 |
| | Rehabilitation | 1 125 | 358 | 1 128 | 686 |
| | Upgrading to paved standards | 65 | 151 | 43 | 9 |
| **Totals** | | **2 353** | **1 699** | **2 353** | **1 700** |

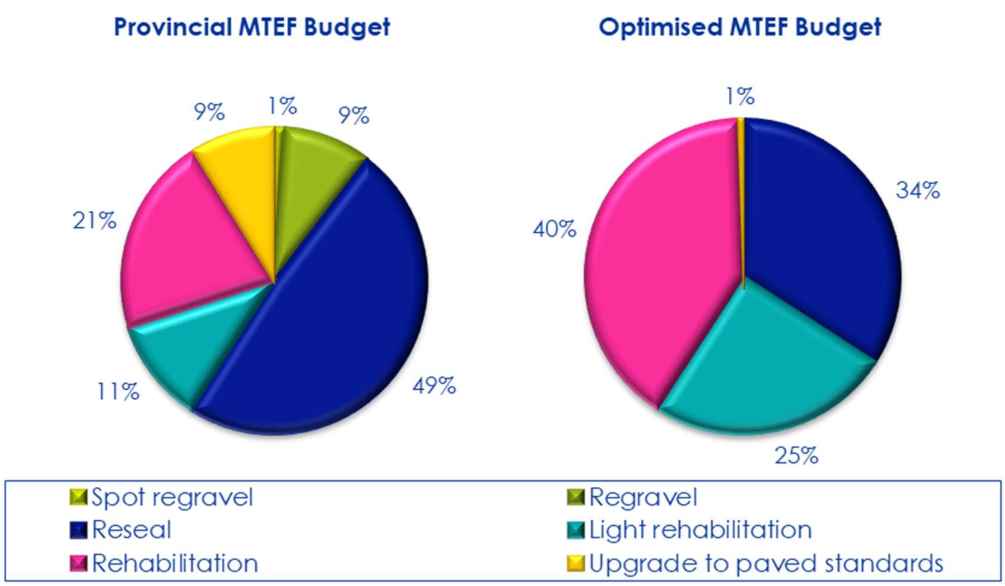



Figure 5-18: Comparison of the provincial MTEF budget versus the optimised MTEF budget, average annual expenditure for the period from 2024/25 to the end of 2028/29

### Resealing

Deterioration of the roads caused by normal traffic, excluding overloaded vehicles, cannot be prevented. Should the pavement structure deteriorate beyond the point of effective resealing intervention, the only option is light rehabilitation/rehabilitation of the pavement layer(s). Resealing, in the short to medium term, prevents an explosive growth of expensive light rehabilitation/rehabilitation projects. The benefit in terms of cost savings and network condition yield the largest return if more of the available funding is allocated to resealing. The importance of road maintenance to ensure sustainability of the road network by means of optimal timing and frequency of preventive maintenance is emphasised. Picture 5-1 and Picture 5-2 show evidence of how a road in poor condition can deteriorate rapidly within a year due to lack of appropriate periodic maintenance.

Picture 5-1: TR22/1 on 17/6/2006

Picture 5-2: TR22/1 on 12/7/2007 showing development of potholes

The current strategy of the Branch (paragraph 1.4.4) resulted in approximately 20% (1 522 km) of the paved road network being resealed over the last 5 years. This is a little less than required for an estimated average 10-year optimum seal life.

- Since 2014/15, the unit cost for the resealing of paved roads has increased slightly. The average cost per square metre is now R202.
- The optimisation analysis reduces the average allocation of funding for the resealing of paved roads, which shows that the number of reseals over the past years has been too little allowing the roads to deteriorate to where only light/heavy rehabilitation can fix the problems.
- The allocation for reseals could decrease by an average of R249 million per annum over the next five years.

**Light Rehabilitation**

- The provincial fund allocation for light rehabilitation is less than the optimal funding allocation identified by the Optimised MTEF funding scenario.
- The average light rehabilitation investment should increase by approximately R239 million per annum over the next five years.

### Rehabilitation

- The provincial fund allocation for rehabilitation is less than the optimal funding allocation identified by the Optimised MTEF funding scenario.
- The average rehabilitation investment should increase by approximately R328 million per annum over the next five years.

### Regravelling and upgrading of unpaved roads

The reallocation of investment in the Optimised MTEF Budget directly affected the available funding for the unpaved road network and the fund allocation for all unpaved roads subsequently reduced.

- Over the next five years, the provincial fund allocation for regravel and spot regravel is on average R174 million more per annum than the optimal funding allocation identified by the Optimised MTEF funding scenario. Focusing on the paved road network, the Optimised MTEF funding scenario only allocates on averaged R2 million per annum.
- Approximately 151 km of unpaved roads are upgraded in the first five years under the Provincial MTEF budget and only 9 km of these roads are upgraded in the optimised analysis. These roads all have economic reasons for upgrade to paved standards.

### Comparison of Provincial MTEF budget and Optimised MTEF budget over 10 years

The Provincial and Optimised MTEF Budgets for the next ten years are compared in Figure 5-19. Theoretically, according to optimisation analysis of the MTEF Budget, the network will gain maximum benefit if the funding for paved roads is increased on average by R477 million per annum over the next ten years. This proposed increase in expenditure on rehabilitation (including light rehabilitation) will only have a small effect on the overall condition of the paved road network—see paragraph 5.1.16.

Overall, the road network condition is very unlikely to improve under the current MTEF Budget and unit rates, but the optimised allocation of funding assures the best possible preservation of the roads.

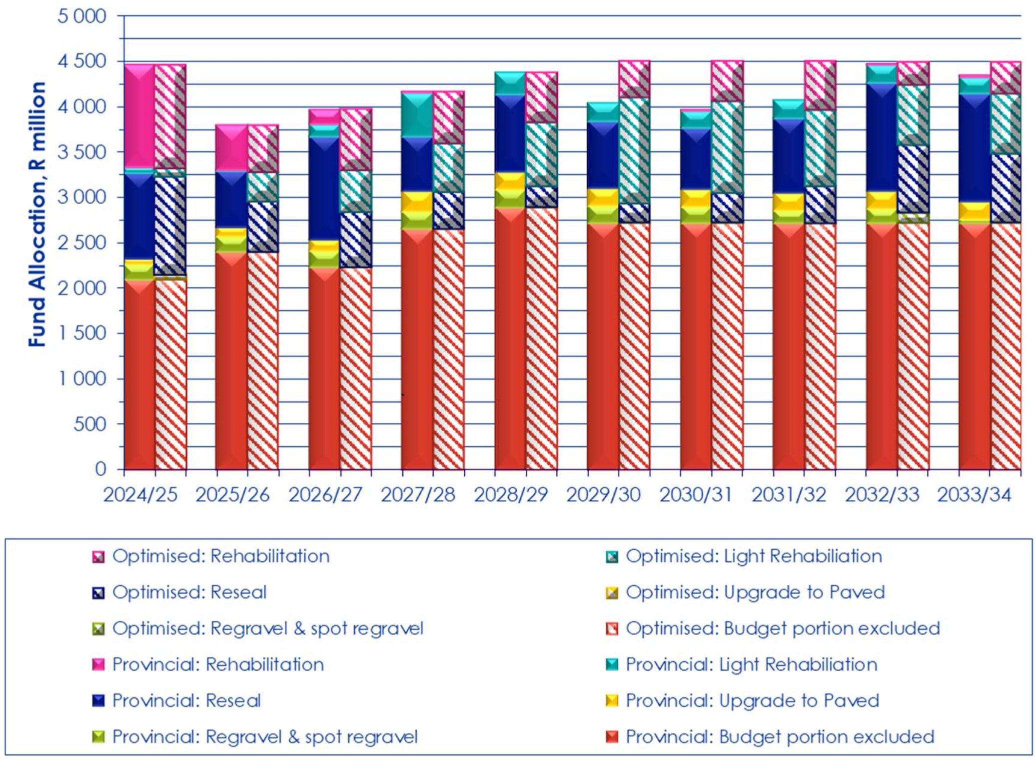



Figure 5-19: Provincial and optimised allocations of the MTEF funds over the next 10 years

### *MTEF Budget compared to the Intervention Budget*

The Intervention Budget analysis estimates a realistic funding level to maintain the desired levels of service of the road network. It includes roads requiring:

- Upgrading to paved standards;
- Regravelling;
- Resealing;
- Light Rehabilitation; and
- Rehabilitation due to pavement deterioration.

The Intervention Budget requires funding of approximately R7 091 million per annum over the next five years to maintain both the paved and unpaved road networks at their levels of service. The Intervention Budget will improve the performance of the road network. The extent of the improved performance levels is shown in paragraphs 5.1.16 and 5.1.17.

The Provincial MTEF Budget Allocation is compared to the Intervention Budget to determine the shortfall. It calculates the extra funds that are required for regravelling, spot regravelling, resealing, light rehabilitation, rehabilitation / reconstruction and upgrading to paved standards to ensure most of the roads function above the intervention levels. Table 5-12 shows the results of the analysis.

| Table 5-12: Intervention budget for 10 years | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | All budget amounts in 2022 Rand Value (millions) | | | | | | |
| | Regravelling | Upgrading to Paved | Resealing | Light Rehabilitation | Rehabilitation | Other[1] | Total |
| 2024/25 | 384 | 618 | 1 450 | 563 | 5 530 | 2 099 | 10 644 |
| 2025/26 | 552 | 570 | 426 | 347 | 5 320 | 2 393 | 9 608 |
| 2026/27 | 345 | 244 | 227 | 235 | 5 660 | 2 227 | 8 939 |
| 2027/28 | 1 098 | 1 400 | 210 | 418 | 3 385 | 2 648 | 9 159 |
| 2028/29 | 681 | 1 191 | 143 | 435 | 4 020 | 2 883 | 9 353 |
| 2029/30 | 1 140 | 1 354 | 94 | 255 | 3 436 | 2 712 | 8 991 |
| 2030/31 | 1 156 | 1 047 | 672 | 406 | 2 995 | 2 712 | 8 988 |
| 2031/32 | 564 | 237 | 2 081 | 391 | 2 175 | 2 712 | 8 162 |
| 2032/33 | 709 | 0 | 1 775 | 240 | 2 238 | 2 712 | 7 674 |
| 2033/34 | 629 | 0 | 1 456 | 271 | 2 255 | 2 712 | 7 323 |
| 5 Year Average 2024/25 to 2028/29 | **612** | **805** | **491** | **400** | **4 783** | **2 450** | **9 541** |
| Provincial MTEF Budget | | | | | | | |
| Average for 2024/25 to 2028/29 | 177 | 151 | 827 | 186 | 358 | 2 450 | 4 149 |
| Annual average shortfall | 435 | 654 | -336 | 214 | 4 425 | 0 | 5 392 |
| Note 1: The budget amount "Other" refers to all expenditure that is not optimised in dTIMS | | | | | | | |

Compared to the Intervention Budget, the MTEF budget is insufficient. The performance of the majority of roads cannot be maintained without continued deteriorating performance levels, as discussed in paragraphs 5.1.16 and 5.1.17. The outcomes from the Intervention Budget (all categories of work) are as follows:

- An annualised expenditure of approximately R9 541 million (inclusive of R2 450million additional costs not analysed in dTIMS) is required over the next five years for the network. Within the next five years, the majority of paved roads will then function within the roughness and condition threshold values given in Table 5-5, and within the next ten years, all unpaved roads will function according to the levels of service in Table 5-5.

- Excluding other costs, the required average annual funding level of the Intervention Budget over the next five years is 317% (R5 392 million) more than the Provincial MTEF funding level for preventive maintenance such as resealing, spot regravelling and regravelling and for light rehabilitation, rehabilitation and upgrades to paved standards.

The objectives of each of the categories of preservation and upgrading are dealt with below:

### Rehabilitation, light rehabilitation and resealing

In order to maintain the paved road network to appropriate condition levels in the long term, an average expenditure of approximately R5 674 million is required for resealing, light rehabilitation and rehabilitation over the next five years. This is R4 303 million more than the MTEF budget.

### Regravel

An average annualised need over the next ten years was determined to be in excess of 1 100 km for spot regravelling and more than 700 km for regravelling of the wearing surfaces. This is directly related to the 91% of unpaved roads operating in a poor to very poor condition. For unpaved roads classified as medium and high LOS, the Intervention Budget in this analysis has the objective of gradually regravelling roads with inadequate gravel thicknesses. For unpaved roads classified as low and very low LOS, the maintenance intervention of spot regravelling is used on roads with inadequate gravel thickness.

An average annualised expenditure of approximately R612 million is required for regravelling and spot regravelling over the next five years, R435 million more than the MTEF budget.

### Upgrade unpaved roads to paved standards

Compared to the MTEF Budget, the proposed annualised funding level for upgrades is approximately R654 million more for the Intervention Budget. In the analysis of the Intervention Budget, approximately 336 km of unpaved roads were selected to be upgraded to paved standards in the first five years. These all carry more than 400 vehicles per day.

An average of approximately R805 million per annum is required for upgrading to paved standards over the next five years.

## *Technical Needs Budget*

The funding required to meet the criteria of the **Technical Needs Budget** was determined using the dTIMS optimisation software (Table 5-13).

Table 5-13: Technical needs budget for 10 years and the MTEF Budget shortfall

| Technical Needs Budget (R million) | | | | | |
|---|---|---|---|---|---|
| **Year** | **Regravelling** | **Upgrade to paved** | **Reseal** | **Rehabilitation** | **Total** |
| **2024/25** | 3 966 | 4 254 | 3 983 | 18 635 | 30 839 |
| **2025/26** | 242 | 123 | 1 093 | 1 820 | 3 278 |
| **2026/27** | 796 | 760 | 853 | 1 588 | 3 997 |
| **2027/28** | 1 108 | 480 | 586 | 1 252 | 3 425 |
| **2028/29** | 1 003 | 0 | 260 | 160 | 1 424 |
| **2029/30** | 368 | 0 | 0 | 0 | 368 |
| **2030/31** | 585 | 0 | 656 | 0 | 1 241 |
| **2031/32** | 69 | 0 | 7 126 | 15 | 7 210 |
| **2032/33** | 104 | 0 | 2 102 | 0 | 2 206 |
| **2033/34** | 14 | 0 | 1 237 | 312 | 1 562 |
| **Provincial MTEF Budget Allocation for 2024/25** | 160 | 65 | 945 | 1 182 | 2 353 |
| **2024/25 MTEF theoretical budget backlog[1]** | 3 806 | 4 189 | 3 038 | 17 453 | 28 486 |

Note 1:
The theoretical budget backlog is determined by comparing the 2024/25 Provincial MTEF fund allocation to the 2024/25 Technical Needs Budget

The Technical Needs Budget is a **theoretical funding level** that is used to determine the investment required to remove the backlog of roads requiring rehabilitation, periodic maintenance and upgrading to paved standards, as follows:

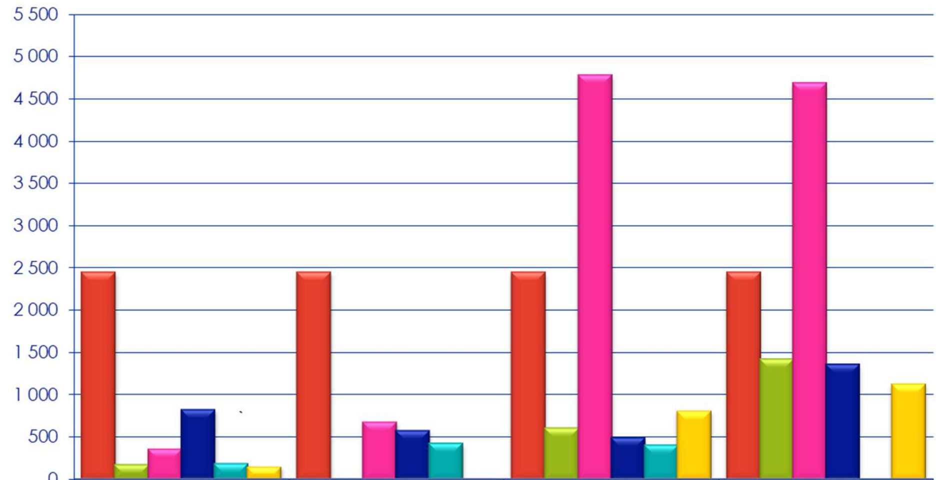
- All unpaved roads are upgraded to paved standards where it is economical to do so. The upgrading demand is approximately R4,3 billion and affects approximately 343 km (3%) of unpaved roads.
- All medium and high LOS unpaved roads are maintained with a minimum gravel thickness of 50 mm. Low and very low LOS roads are maintained by means of spot regravelling. The regravelling need is R3,97 billion, approximately 9 434 km (91%) of unpaved roads.
- Cost-effective preventive maintenance on paved roads (resealing) is applied as soon as the need arises. Roads are not permitted to deteriorate to a state where rehabilitation is necessary. The resealing need is R3,98 billion, approximately 2 291 km (31%) of paved roads.
- Light rehabilitation is not a function of the Technical Need Budget as this is not a constraint circumstance. The heavy rehabilitation need is R18,6 billion, approximately 2 147 km (29%) of the paved road network.

This immediate (2024/25) investment need was calculated at R31 billion to eliminate the backlog, excluding the items that were not optimised, e.g., safety improvements, routine maintenance, new infrastructure, overheads, etc. For the 4-year period thereafter, 2025/26 to 2028/29, an average annual funding of approximately R3 031 million is required to maintain both paved and unpaved roads at these optimum performance levels. This funding level would result in the optimum benefit.

### *Comparison of the four budgets*

The four budgets are compared in Figure 5-20.

The **Intervention Budget** is approximately four times the total MTEF Budget and the **Technical Needs Budget** is five times the total MTEF Budget.




| | Provincial MTEF | Optimised MTEF | Intervention | Technical Needs |
|---|---|---|---|---|
| Budget excluded from optimisation analysis | 2 450 | 2 450 | 2 450 | 2 450 |
| Regravel & spot regravel | 177 | 2.2 | 612 | 1 423 |
| Rehabilitation | 358 | 686 | 4 783 | 4 691 |
| Reseal | 827 | 578 | 491 | 1 355 |
| Light rehabilitation | 186 | 426 | 400 | - |
| Upgrade to paved standards | 151 | 9 | 805 | 1 124 |

Note 1:
Based on the current MTEF budget statement, an average additional amount of R2 450 million will be required annually for support, access, new facilities, transfers, surfaced road upgrading, routine maintenance and maintenance of bridges.

Figure 5-20: Distribution of funding for various budgets based on a 5-year average

The cash flows in Figure 5-21 show the funding demand of the four budget scenarios over a 5-year period for regravelling, resealing, light rehabilitation/rehabilitation and upgrading to paved standards.

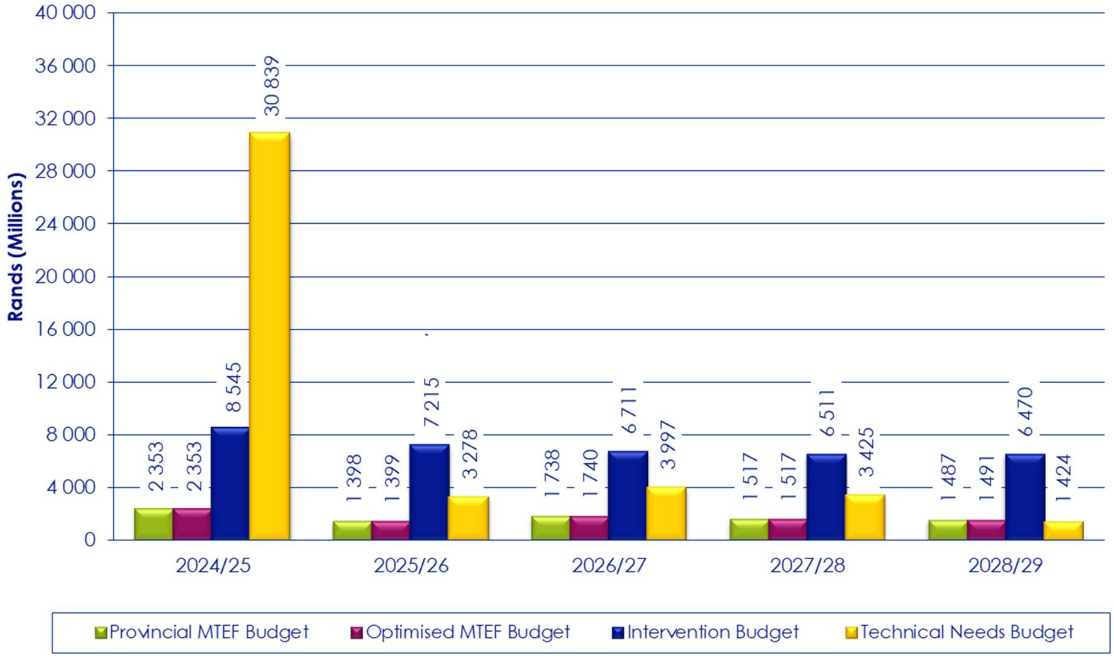
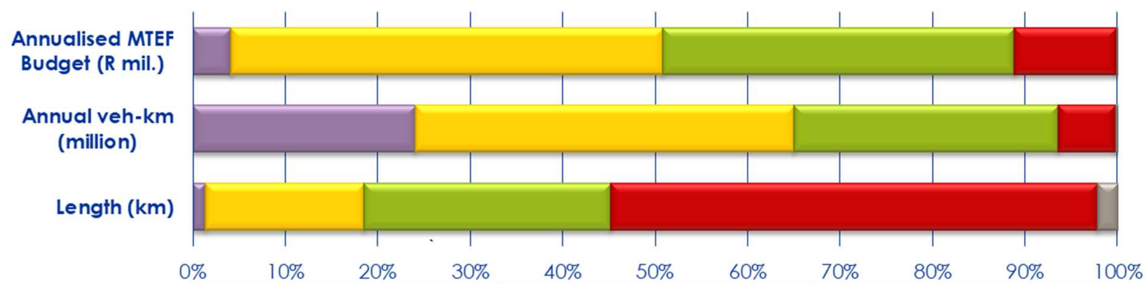



Figure 5-21: Predicted expenditure for regravelling, resealing, light rehabilitation, rehabilitation and upgrading of unpaved roads to paved standards for the four budgets

## *Optimised fund allocation according to RCAM classification*

Figure 5-22 presents the optimised fund allocation of the MTEF budget per RCAM classification for the road network. The optimisation analysis allocated most of the funding towards the higher RCAM class roads, thus affecting most of the traffic and promoting mobility in those parts of the network where there is economic development and commerce.




| | Length (km) | Annual veh-km (million) | Annualised MTEF Budget (R mil.) |
|---|---|---|---|
| RCAM 1 | 238 | 2 474 | 73 |
| RCAM 2 | 3 065 | 4 208 | 832 |
| RCAM 3 | 4 737 | 2 943 | 677 |
| RCAM 4 | 9 387 | 629 | 197 |
| RCAM 5 | 370 | 22 | 2 |

Figure 5-22: Road network according to RCAM classification versus the MTEF budget allocation

### 5.1.16 Consequences of budgets on paved roads

The consequences likely to follow from each of the four budgets are summarised under this section to highlight the predicted performance of the paved road network.

#### *Level of service*

Figure 5-23 shows the predicted overall network condition of paved roads in terms of the NCN. For both the Provincial MTEF Budget and the Optimised MTEF Budget, it is expected that the network condition will decline considerably over the next ten years. Furthermore, the NCN benchmark of 70%, as described in paragraph 4.9.1, will not be maintained under the current MTEF budget. The MTEF Budget would need to be increased by 317% to ensure paved roads perform above the NCN benchmark of 70%, over the 10-year analysis period. The Technical Needs Budget fixes the immediate need on all paved roads.

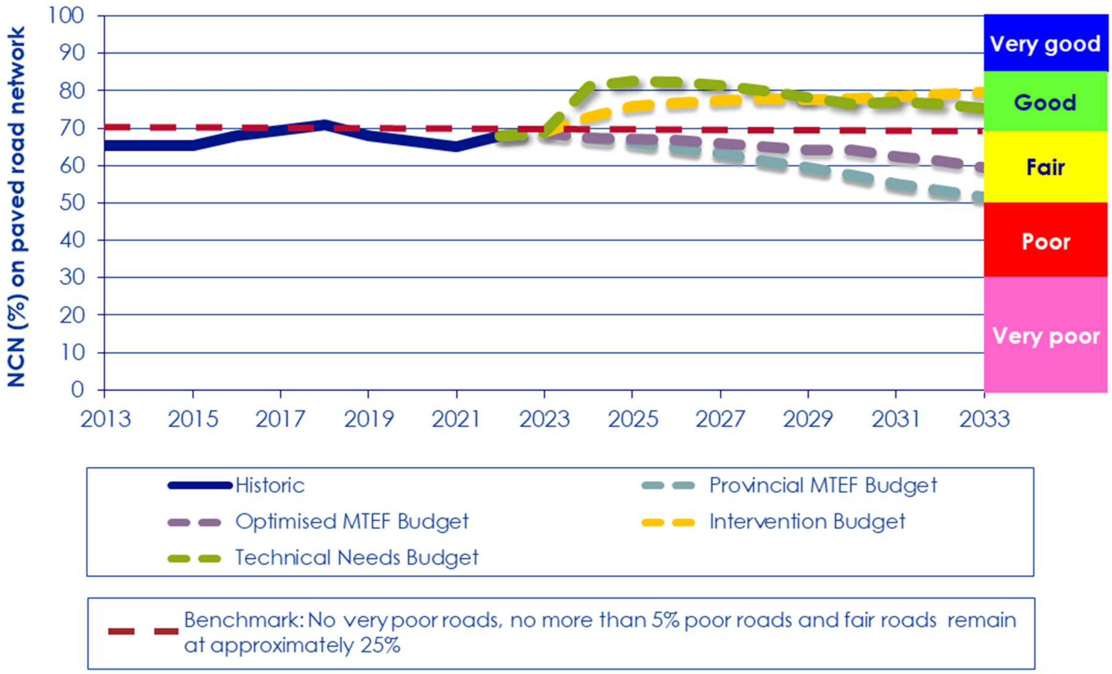



Figure 5-23: Average network condition of paved roads

Currently 31% of paved roads do not meet the minimum intervention levels as detailed in Table 5-5. Figure 5-24 presents the predicted proportion of paved roads that will deteriorate beyond the intervention levels over the next ten years. Note that upgrades to paved standards are included in the prediction.

For the MTEF Budget it is predicted that:

The length of paved roads operating below the intervention levels will increase from 31% to approximately 79% over the next ten years.

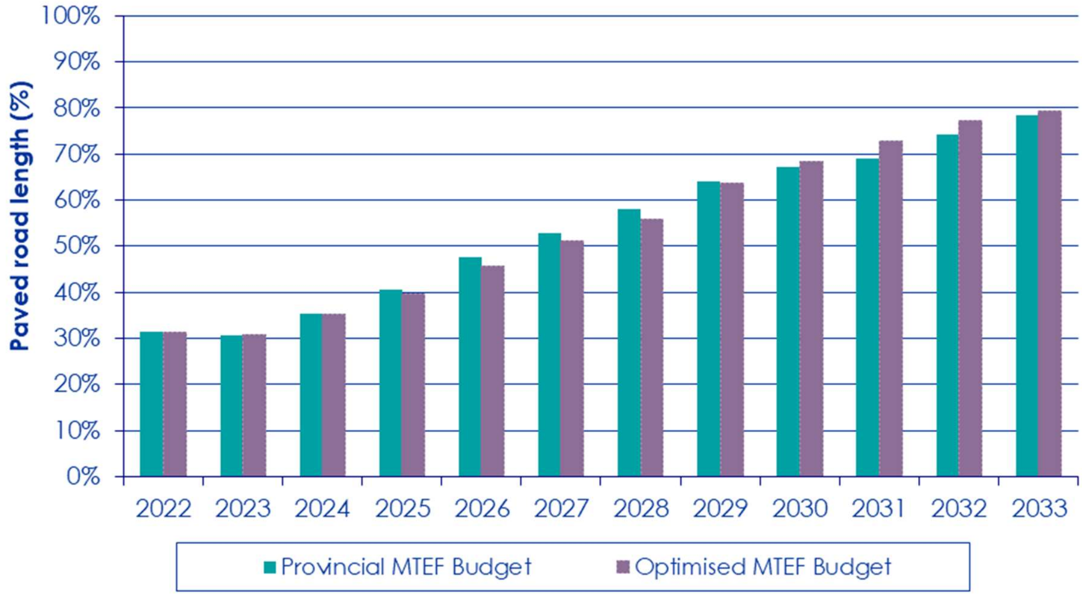



Figure 5-24: Percentage length of the paved road network not meeting the minimum intervention levels

### *Proportion of paved roads in a poor or very poor condition*

Figure 5-25 shows the expected increase in the backlog of poor and very poor roads for the four budgets. At current MTEF funding levels, it is expected that the percentage of paved roads in a poor or very poor condition will increase by 7% to 16% over the next ten years, increasing to above 10% of the paved network. The MTEF Optimised Budget, however, reduces the rate of decline.

The proportion of poor and very poor roads remains below 10% of the length of the paved network for the Intervention Budget.

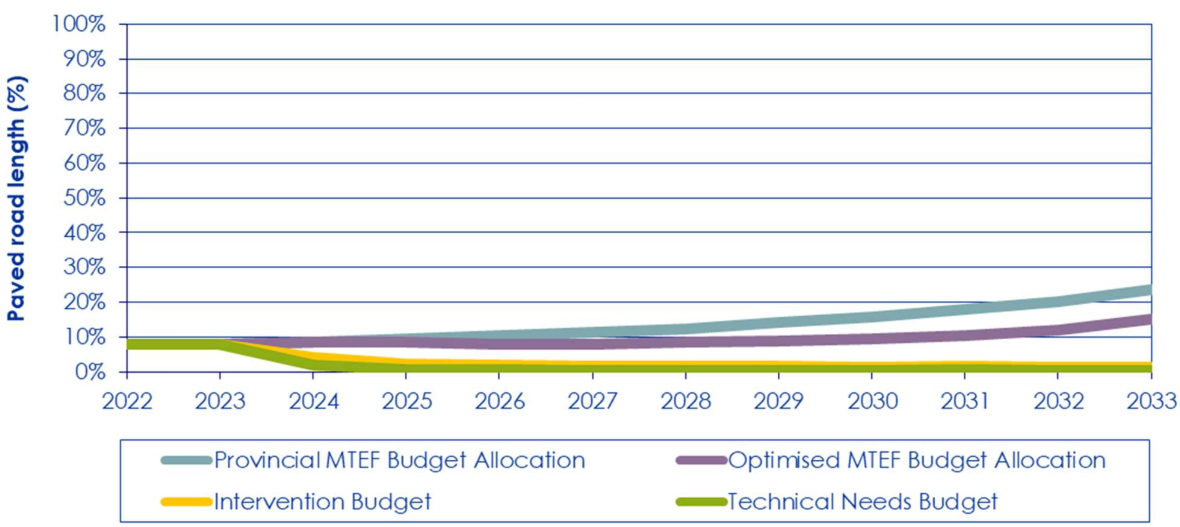



Figure 5-25: Percentage length of paved roads in poor and very poor condition

### *Change in asset value of paved roads*

Figure 5-26 shows changes in asset value for all budgets. The current asset value, calculated as the depreciated replacement cost of the network, is approximately R93 billion (Table 5-14). The current MTEF budget cannot prevent a long-term decrease in asset value, however, compared to the Provincial MTEF Budget, a lower decrease in asset value is predicted under the Optimised MTEF Budget.

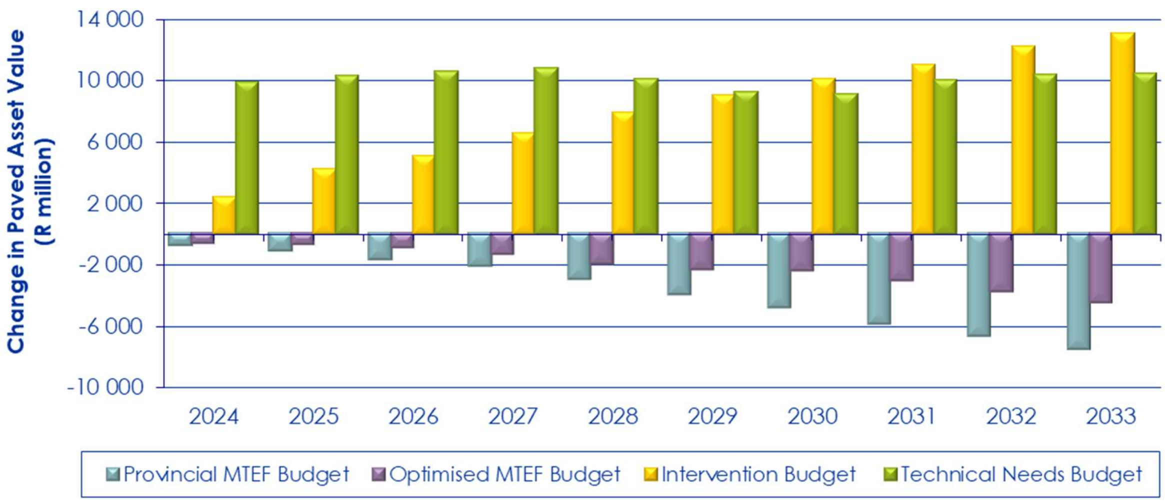



Figure 5-26: Change in asset value of paved roads compared to 2022 values

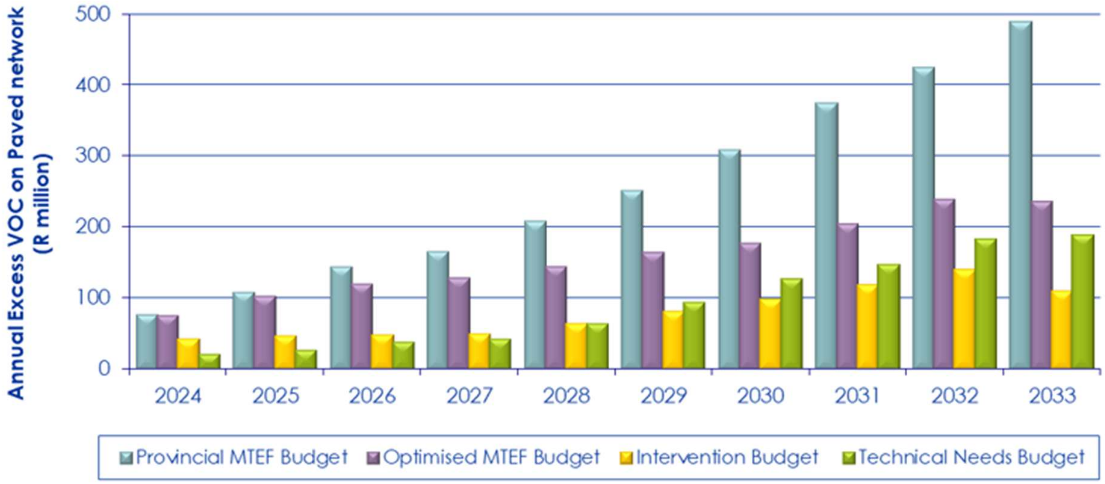
### *Excess vehicle operating costs on paved roads*

Excess user cost (EUC) is an unnecessary expense for the road user and an inevitable outcome of substandard riding quality of the roads in the network. An IRI of 3,1 was used as the upper threshold for paved roads with a good riding quality. These costs are compared to the Technical Needs Budget analysis and the results are summarised in Table 5-14.

**Table 5-14: Predicted EUC on paved roads, over and above the minimum EUC achievable by the technical needs budget**

| EUC | Provincial MTEF Budget | Optimised MTEF Budget | Intervention Budget |
|---|---|---|---|
| Additional[1] cumulative EUC after 5 year (R million) | R 511 | R 377 | R 58 |
| Average EUC for next 5 years (R million) | R 140 | R 113 | R 50 |
| Additional[1] length of road exceeding IRI 3,1 during the 5-year period | 2 670 km | 2 419 km | 204 km |
| Note 1: Additional in comparison to the optimum achievable performance according to the Technical Needs Scenario. | | | |

The top graph in Figure 5-27 shows the additional EUC for the funding scenarios and the bottom graph shows the additional length of paved roads operating with these excess costs to the road users.



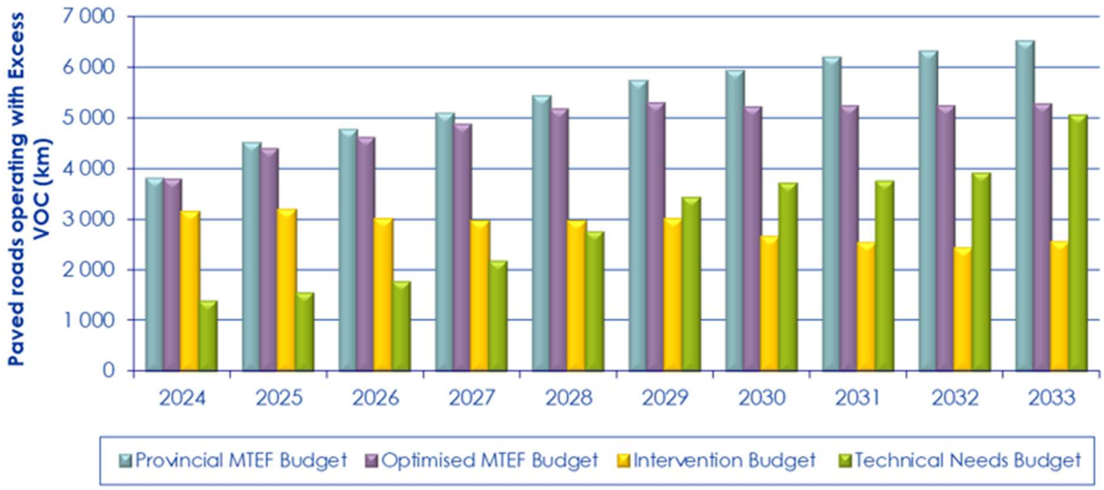




Figure 5-27: Total excess vehicle operating costs in terms of (a) annual cost and (b) km

### 5.1.17 Consequences of different funding scenarios on unpaved roads

The results of the different budgets analysed are summarised in this section to highlight the predicted performance of the maintained unpaved road network for each of the funding scenarios.

#### *Average gravel thickness*

The predicted network gravel thickness of maintained unpaved roads is shown in Figure 5-28. Effective blading requires a minimum thickness of gravel wearing course of at least 50 mm, depending on the particle size distribution of the gravel.

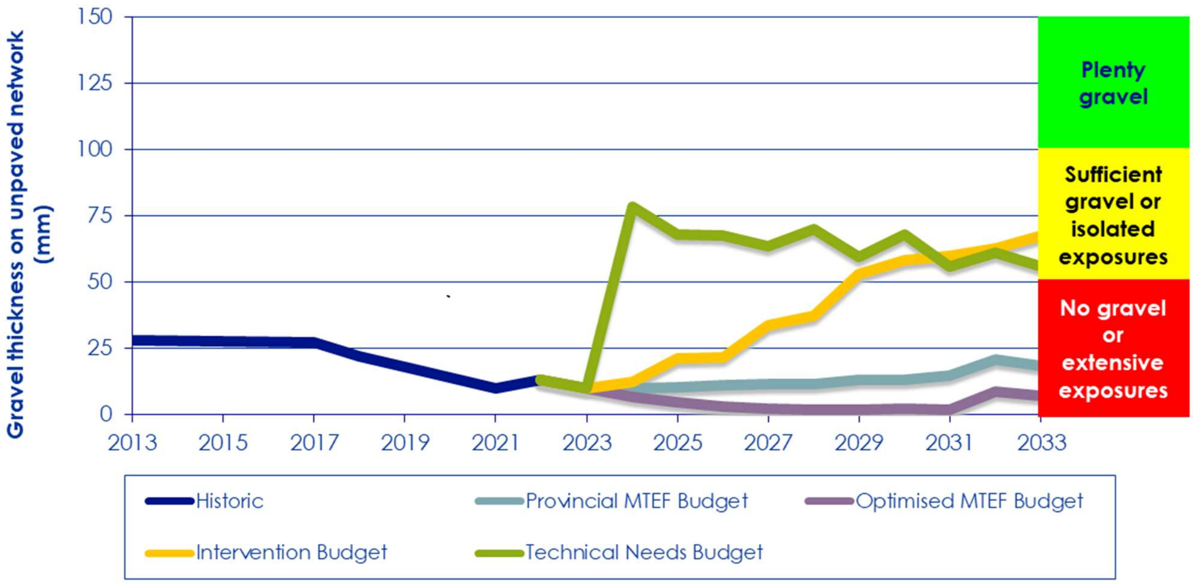



Figure 5-28: Average gravel thickness of maintained unpaved roads

- The Provincial and Optimised MTEF budget respectively allocate on average R159 million and R17 million per annum for regravelling over the next ten years.
- MTEF funds allocated to regravelling are insufficient to reach this minimum target thickness of 50 mm, and the gravel thickness is expected to decrease over the next ten years under the Optimised MTEF funding level and only slightly increase under the Provincial MTEF funding level.
- The optimisation analysis allocates more funding towards the maintenance and rehabilitation of paved roads resulting in the continued deterioration of the unpaved road network.
- The Intervention Budget improves the overall thickness of gravel wearing course as well as the driving conditions experienced by road users. The investment requirement is an average annual amount of R612 million for the next 5 years and increasing to R840 million towards the last 5 years of the analysis for both regravelling and spot regravelling.
- The Technical Needs Budget (Table 5-12) maintains the unpaved roads at optimum performance levels, where all unpaved roads without sufficient gravel material in the medium and high LOS category are regravelled during the first analysis year. Thereafter, all roads are either regravelled or maintained by spot regravelling as required. The immediate funding need for regravelling is R3,4 billion and approximately R528 million for

spot regravelling, thereafter an average of R476 million is required annually over the following nine years to meet the minimum intervention levels.

Figure 5-29 presents the predicted proportions of unpaved roads that will deteriorate beyond the intervention levels. All roads with less than 50 mm gravel wearing course material are included, as well as roads that carry traffic in excess of 400 vehicles per day. The demands of the unpaved road network significantly exceed the MTEF funding level.  The proportion of unpaved roads not meeting the intervention levels will increase over the next ten years under the Optimised MTEF budget, which allocates more funding towards the preservation of the paved road network. Under the current Provincial MTEF funding allocation, the proportion of unpaved roads not meeting the intervention levels is expected to decrease.

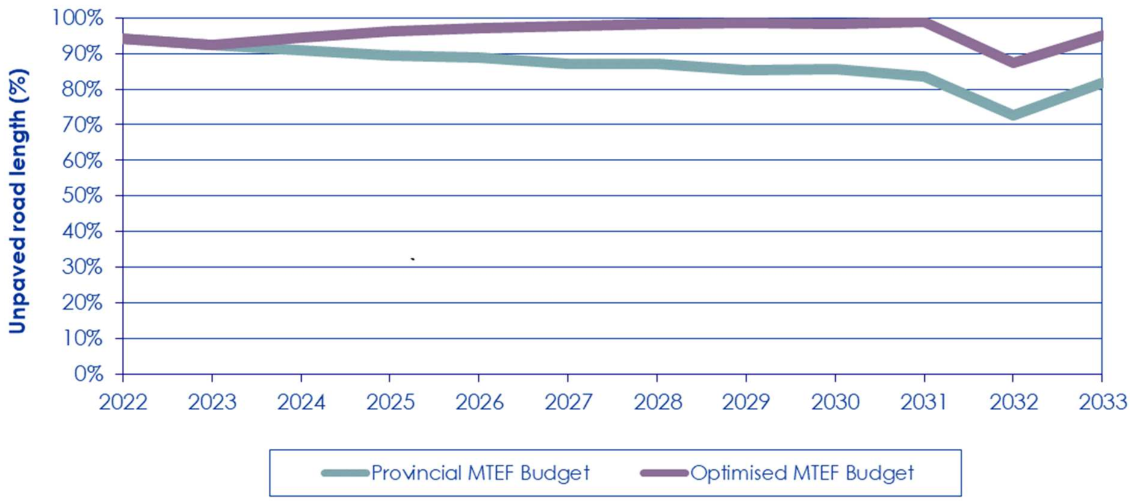



Figure 5-29: Length of the unpaved road network not meeting the minimum intervention levels

### *Proportion of unpaved roads with no gravel*

Figure 5-30 shows the proportion of the unpaved network without any gravel. According to the Intervention Budget, an annual amount of approximately R726 million is needed to achieve appropriate levels of gravel thickness on all unpaved roads within the next ten years. The Technical Needs Budget immediately eliminates all roads with no gravel material.

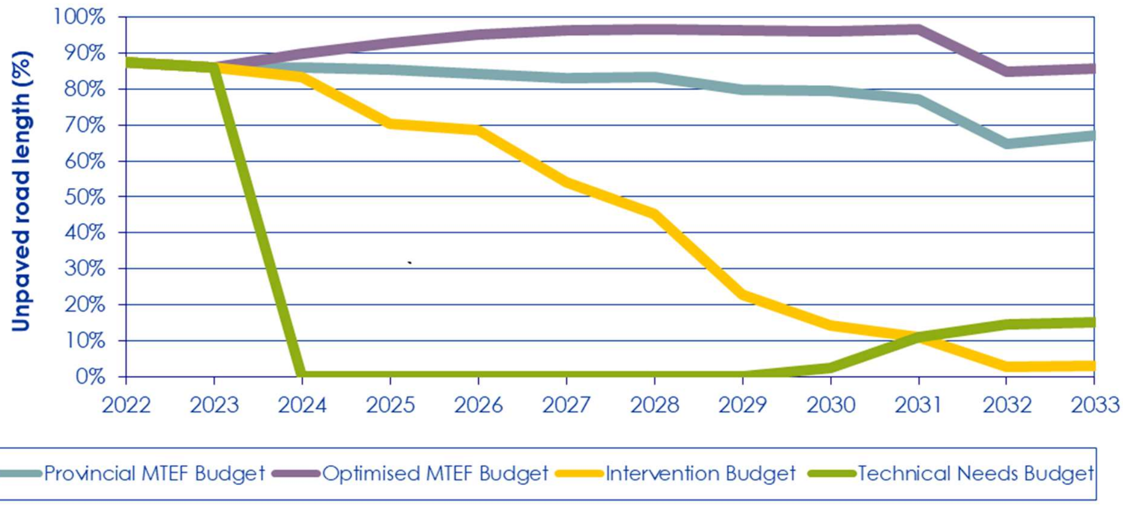



Figure 5-30: Proportion of unpaved roads without gravel, excluding earth roads

### *Passability of unpaved roads with no gravel*

According to draft TRH 20 (Committee of State Road Authorities, 1990), passability is a function of the shear strength of the top layer of the wearing course. With insufficient quantities of coarse gravel in the gravel layer and inadequate subgrade shear strength, passability problems will occur. It is assumed that an average minimum gravel thickness of 50 mm will ensure passability and assist with the maintenance of unpaved roads.

As data on subgrade strength is available from the GRMS, it is envisaged that the strength of the subgrades will be incorporated in a future analysis in order to more accurately determine passability problems.

For this analysis, roads with less than 150 AADT, currently 77% (more than 7 916 km), as well as earth roads, were not included as these roads are not maintained with regravelling. Despite a lack of gravel on these roads, many operate with acceptable passability.

Figure 5-31 shows the predicted proportion of unpaved roads with possible passability problems. The proportion of roads with possible impassability problems is expected to increase to over 20% and 30% over the next ten years for the Provincial and Optimised MTEF Budget, respectively.

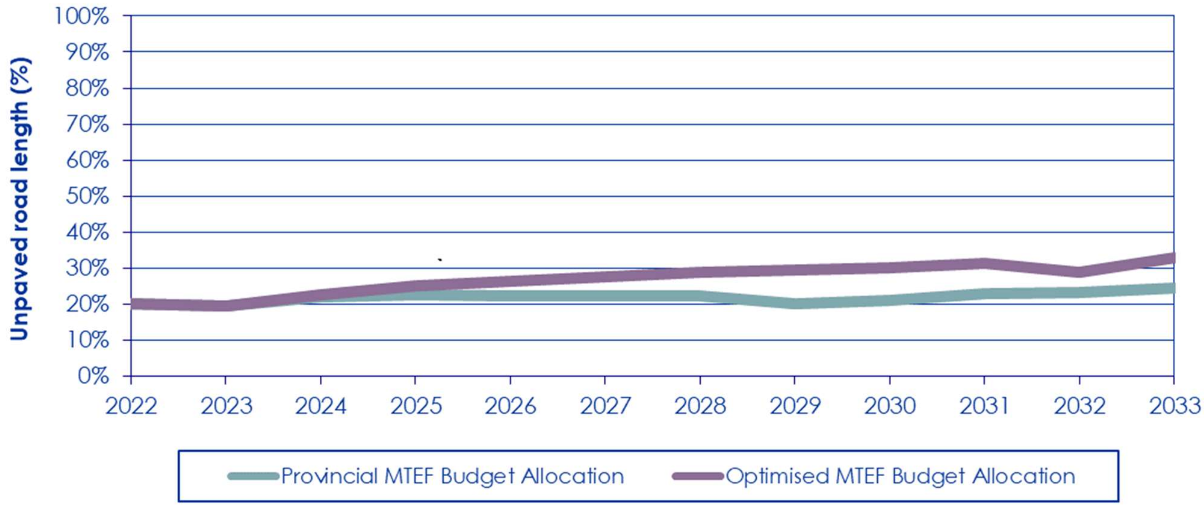



Figure 5-31: Predicted proportion of maintained unpaved roads with possible passability problems where gravel thickness is <50 mm

### *Change in asset value of unpaved roads*

Figure 5-32 shows the change in the asset value of unpaved roads for all budgets. The current asset value, calculated as the depreciated replacement cost of the network, is approximately R1,1 billion (Table 5-14). By 2031, the current Provincial MTEF funding allocation is predicted to have a positive influence on the asset value levels. Note that upgrades to paved standards are excluded.

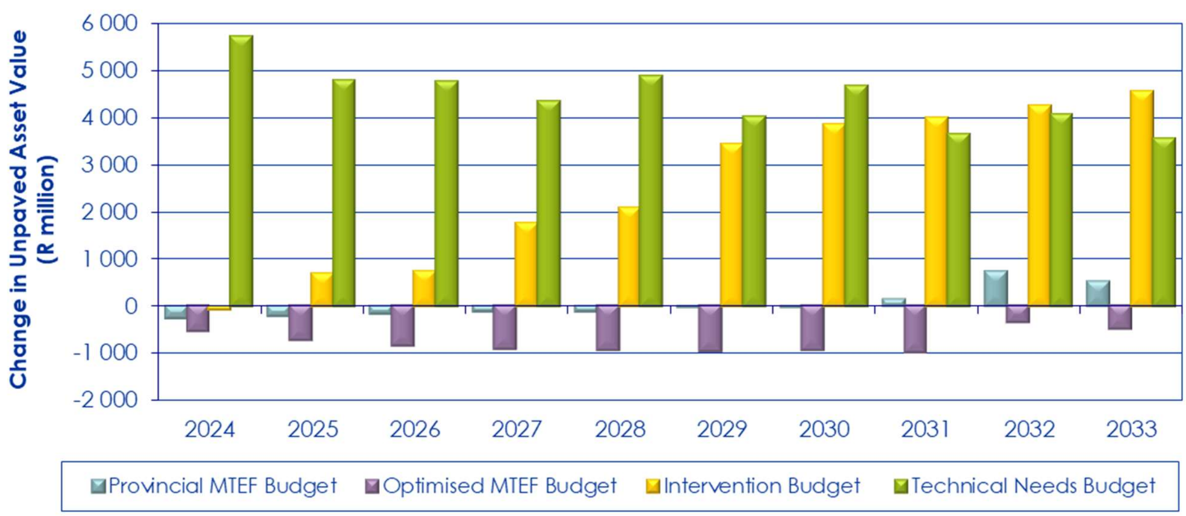



Figure 5-32: Change in asset value of maintained unpaved roads compared to 2022 values

## 5.1.18 Consequences of different funding scenarios on the asset value of the road network

The theoretical asset values, estimated as the current replacement cost for each of the various budgets analysed using dTIMS in 2023, are shown in Table 5-15.

***Limitation:*** The asset values do not include the drainage structures and other inventory items such as road signs, etc.

**Table 5-15: Predicted asset value comparing the provincial MTEF budget versus the optimised MTEF budget**

| Budget Item | All values in R million (rounded to nearest R100 million) | | | |
|---|---|---|---|---|
| | Provincial Allocation | | Optimised Allocation | |
| | Paved Roads | Unpaved Roads | Paved Roads | Unpaved Roads |
| Current replacement cost (CRC) | R 109 829 | R 9 558 | R 109 829 | R 9 558 |
| Depreciated replacement cost (DRC) | R 93 126 | R 1 122 | R 93 126 | R 1 122 |
| DRC as a percentage of CRC | 85% | 12% | 85% | 12% |
| DRC 5 years | R 90 148 | R 1 010 | R 91 166 | R 180 |
| Change in replacement cost after 5 years | -R 2 978 | -R 113 | -R 1 961 | -R 943 |
| Replacement cost after 5 years as a percentage of CRC | 82% | 11% | 83% | 2% |
| Change in replacement cost after 5 years - Total of paved and unpaved roads | - R 3 091 | | - R 2 903 | |

Figure 5-33 shows the change in asset value of the road network in 2022 Rands for the different budgets.

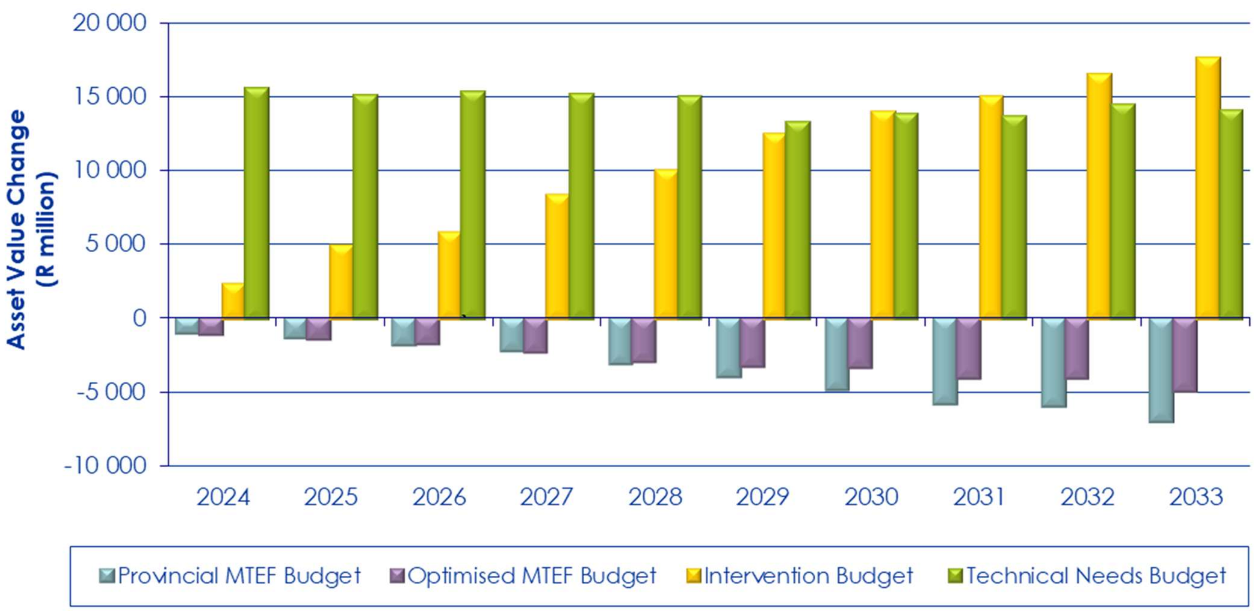



Figure 5-33: Change in asset value of the road network compared to 2022 value

- Under the current constrained MTEF funding level, the asset value of the combined paved and unpaved road network decreases.
- According to the analysis results, both the Intervention Budget and Technical Needs Budget will lead to increased asset value levels because the overall gravel thickness will increase, and paved roads will be maintained at improved performance levels.

The predicted asset values in terms of depreciated replacement cost are detailed in Table 5-16. In the long-term the current funding level will result in a decrease in asset value for the road network.

***Limitation:*** the predicted asset values do not include drainage structures and other inventory items such as road signs, etc.

**Table 5-16: Asset value for 2022 versus predicted asset value after 5 years**

| Budget Scenario | Depreciated replacement cost (R million) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Current cost in 2022 | | | Predicted in 2028 | | | Change in asset value after 5 years | | |
| | Paved roads | Unpaved roads | Total network | Paved roads | Unpaved roads | Total network | Paved roads | Unpaved roads | Total network |
| **Provincial MTEF Budget** | R 93 126 | R 1 122 | R 94 249 | R 90 148 | R 1 010 | R 91 158 | -R 2 978 | -R 113 | -R 3 091 |
| **Optimised MTEF Budget** | R 93 126 | R 1 122 | R 94 249 | R 91 166 | R 180 | R 91 345 | -R 1 961 | -R 943 | -R 2 903 |
| **Intervention Budget** | R 93 126 | R 1 122 | R 94 249 | R 101 069 | R 3 208 | R 104 278 | R 7 943 | R 2 086 | R 10 029 |
| **Technical Needs Budget** | R 93 126 | R 1 122 | R 94 249 | R 103 263 | R 6 021 | R 109 284 | R 10 136 | R 4 899 | R 15 035 |

The current allocation of the MTEF budget cannot prevent a future loss in the asset value of paved and unpaved roads. However, should funding be increased to achieve the intervention level, the asset value of the entire network will increase to over R100 billion by 2028.

The current MTEF funding level cannot improve network condition of both paved and unpaved roads in the long-term (5+ years). The asset value of the paved road network is expected to decline under both MTEF funding levels, as shown in Figure 5-34. However, as the Optimised MTEF budget focuses more on the paved road network, the decline in the asset value of paved roads is slower.

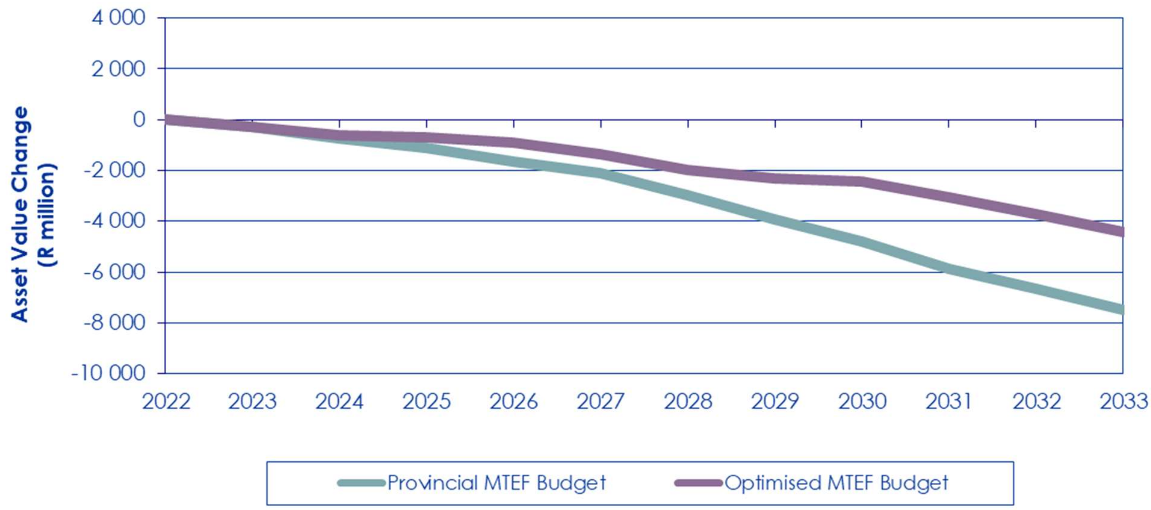



Figure 5-34: Change in asset value of paved roads

As shown in Figure 5-35, the asset value of unpaved roads is expected to decline under the Optimised MTEF budget, whereas the asset value increases under the Provincial MTEF budget, at the expense of the paved road network.

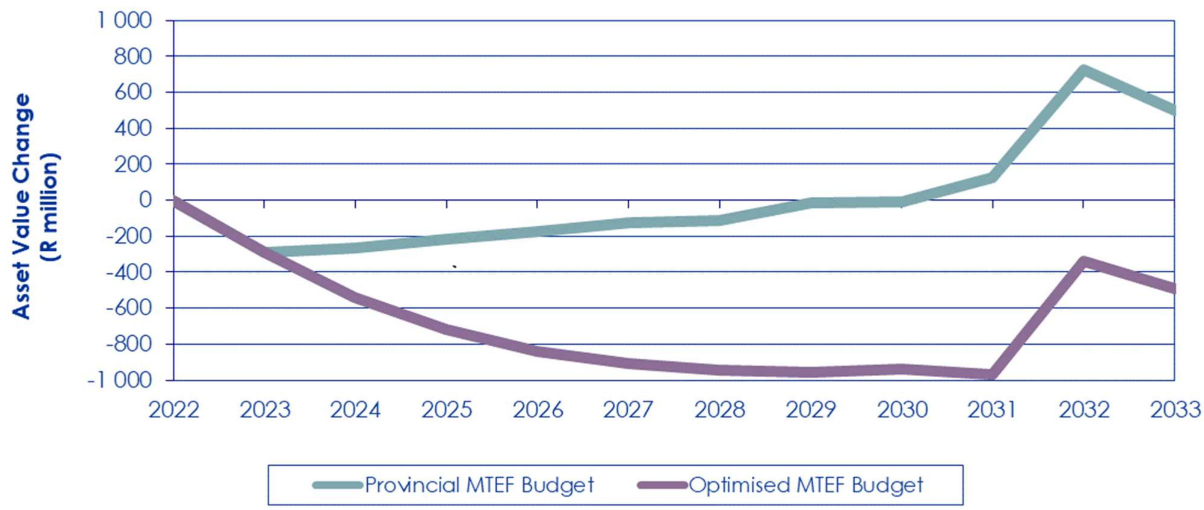



Figure 5-35: Change in asset value of unpaved roads

### *Consequences of different funding scenarios on excess user costs*

The total predicted excess vehicle operating costs that the road users will bear after five and ten years are shown in Figure 5-36. For the Provincial MTEF Budget, the cumulative excess user costs directly affecting the motorists, is expected to be approximately R701 million after five years and R2,6 billion after ten years. These excess costs are a burden on the road users and the economy as a result of inadequate investment in maintaining the road network. The cumulative excess user costs are less under the Optimised MTEF Budget. Excess user costs are expected to be approximately R567 million after five years and R1,6 billion after ten years.

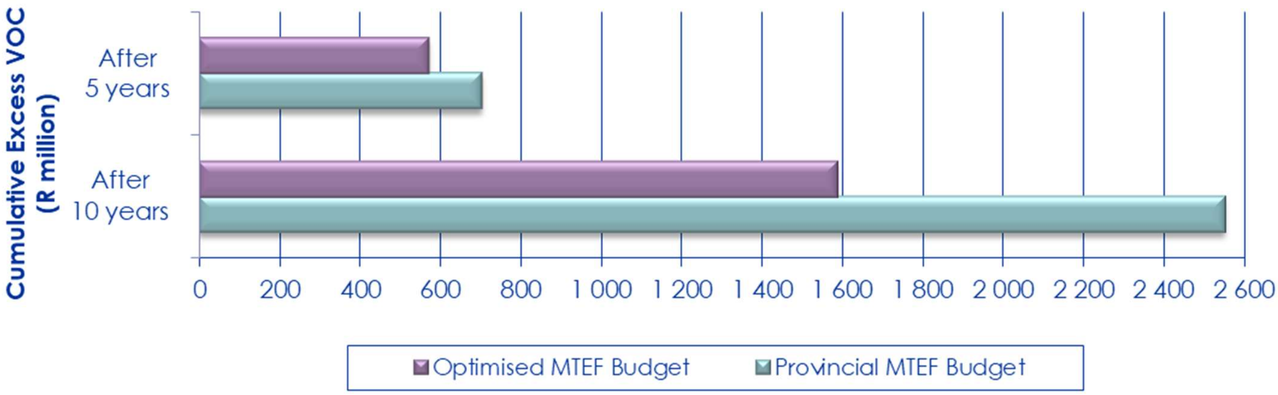



Figure 5-36: Total excess vehicle operating costs for the current funding levels on paved roads

## 5.1.19 Consequences of current funding level on the budget shortfall

Figure 5-37 presents the immediate need of the Branch's maintained road network, based on the 2022 visual assessment data.

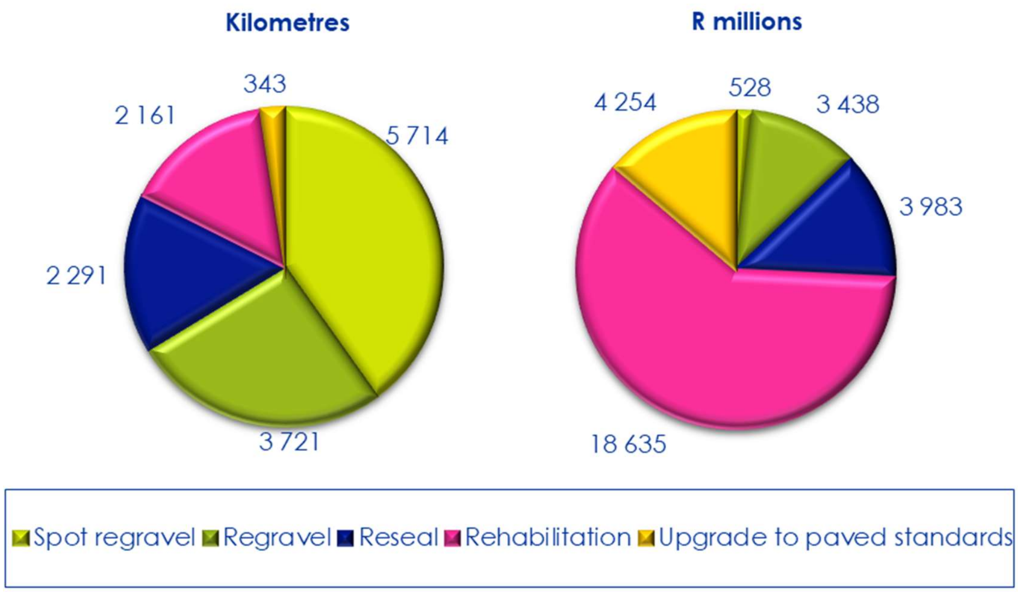



Figure 5-37: Immediate need according to the technical needs budget

The budget shortfall is the difference between the current MTEF budget and the Technical Needs Budget. The funding shortfall of the MTEF budget can therefore be calculated from the need according to the Technical Needs Budget, as shown in Table 5-12 on page 141, i.e., the budget required to eliminate the backlog in maintenance and maximise road user benefits and to preserve the asset value.

The extent of the budget backlog was calculated as the difference in the fund allocation of the Provincial MTEF Budget Allocation and the Technical Needs Budget in 2024/25:

- The immediate need for gravel road maintenance is approximately R3 438 million for regravelling of 3 721 km of roads classified as medium and high LOS. An amount of

R528 million is needed for spot regravelling of 5 714 km of roads classified as low and very low LOS. Under the current Provincial MTEF Budget, only 23% of regravelling needs and 19% spot regravelling needs will be addressed over the next five years.

- There are currently 343 km of unpaved roads where the benefit that would result from upgrading exceeds the benefit that is gained by regravelling. The funding demand of this activity is approximately R4 254 million. Under the current Provincial MTEF Budget, only 26% of upgrading needs will be addressed over the next five years.

- Roads experiencing structural deterioration and requiring rehabilitation make up 2 161 km of road and will require funding of approximately R19 billion. Only 17% of the rehabilitation needs will be addressed over the next five years under the current Provincial MTEF Budget.

- Since 2014/15, the budget backlog has increased significantly due to:

    - The change in the way that rehabilitation need is identified based on the 90th percentile roughness values;
    - Deterioration of the network leading to a greater need for rehabilitation and resealing; and
    - Increased costs.

- The immediate need for resealing is 2 291 km of road, requiring R3,98 billion. In comparison to the Technical Needs Budget, 100% of the need will be addressed over the next five years under the Provincial MTEF budget. Resealing is an important preventive measure to waterproof roads in a “fair” condition, delaying further deterioration. Once the opportunity to reseal a road has passed, the only option is expensive rehabilitation or reconstruction.

## 5.2 Summary of the paved and unpaved networks

Figure 5-38 shows the length of the paved and unpaved roads analysed in this RAMP versus the vehicle km, asset value and Provincial MTEF fund allocation for the preservation of the road pavement structures and surfaces by means of regravelling, resealing, rehabilitation and upgrading of unpaved roads to paved standards.

Under the current Provincial MTEF Budget, it has been found that neither the paved road network nor the unpaved road network can be maintained at the desired level of service.

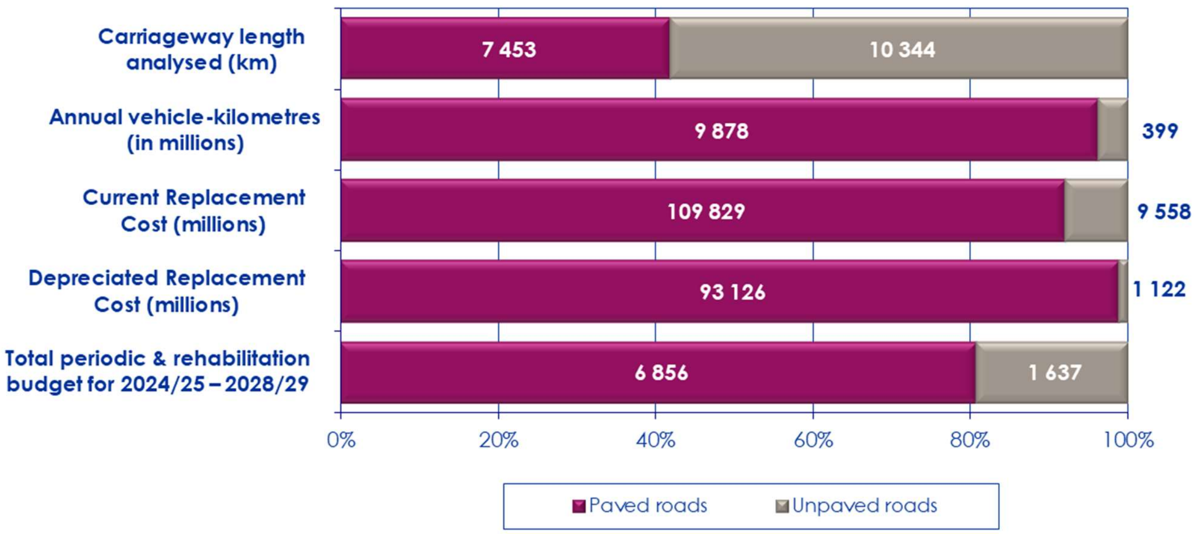



Figure 5-38: Comparison of paved and unpaved roads

## 5.3 Relationship of routine maintenance to condition

In this analysis, the ability of the Branch to conduct routine and emergency maintenance must also be considered. There is a direct relationship between the cost of pavement-related routine maintenance of the paved road network and road condition. For example, if the funding levels for resurfacing and rehabilitation are lower, the need for pavement related routine maintenance will increase and the following consequences are unavoidable:

- An ever-increasing need for routine maintenance will draw funds away from periodic maintenance and rehabilitation/ reconstruction.
- This will cause further deterioration of the surface condition of the road network that requires an accelerating need for additional funds.
- The future need for rehabilitation will accelerate, while the length of road that can be maintained with preventive maintenance, such as resealing, will decrease. The predicted future funding need will continue to increase.
- Teams responsible for routine maintenance will be inundated with demanding work, such as pothole repairs and patching. If these distresses are neglected the routine maintenance need will be amplified.

Table 5-17 shows the routine maintenance cost versus the proportion of the paved roads in poor to very poor condition, based on the data that has been adjusted for inflation.

| Table 5-17: Routine maintenance cost versus proportion of poor and very poor paved roads | | | | |
|---|---|---|---|---|
| % Poor and very poor paved roads | 0 | 14 | 16 | 19 |
| Averaged routine maintenance need per km per year (2022 rand) | 8 261 | 15 470 | 17 816 | 19 404 |

The proportion of poor and very poor roads in a road network provides an indication of the overall condition of the network. An increase of 6% in unit rates since 2021/22 was adopted according to the unit rate increase observed in the province. As expected, the need for routine maintenance increases as the road network deteriorates. There will, however, always be a minimum need for routine maintenance even when paved roads are maintained at optimum levels. The current proportion of poor and very poor roads is 9% with an associated annual routine maintenance cost of approximately R12 500 per km (Figure 5-39). If the relationship is extrapolated linearly, it is expected that this cost will increase to approximately R14 500 per km by 2028 and R25 000 per km by 2033 under the current funding policy. However, an exponential increase in routine maintenance cost is possible, implying that the linear extrapolation may under-predict the expected maintenance cost.

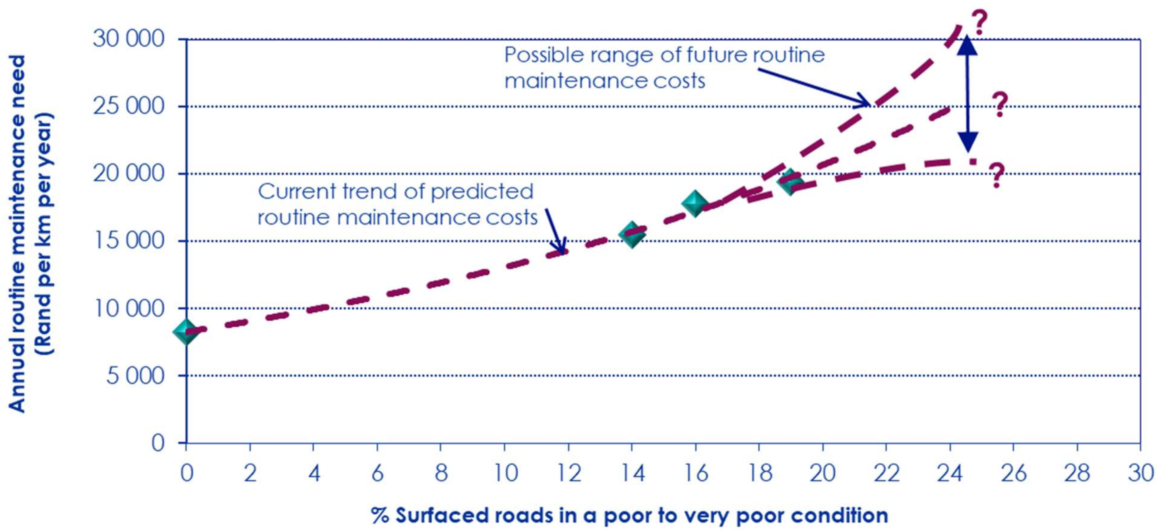



Figure 5-39: Routine maintenance cost versus condition of the paved road network

### 5.3.1 Recommended funding level for current assets

To remain competitive and derive the benefits from increased economic growth, the Western Cape will have to invest more in its road network than is currently the case.

In the long term, the funding level of the Intervention Budget is recommended as a **"Desired Budget"** for the resealing, regravelling, rehabilitation and upgrading activities of the Branch. The average annual funding determined for the Intervention Budget is R 7 091 million (excluding other cost not optimised in the analysis). This budget is approximately 317% more than the total MTEF funding. The recommended budgets for the paved and unpaved road networks are described below.

#### *Paved road network*

Approximately R5 674 million per annum to ensure the backlog of poor and very poor roads is kept to a minimum, provided preventive maintenance is done timeously. This comprises the following five-year averages:

- R491 million for resealing
- R400 million for light rehabilitation; and
- R4 783 million for rehabilitation.

#### *Unpaved road network*

To ensure gravel wearing courses are maintained, R612 million per annum is required for regravelling and spot regravelling over the next five years. An amount of R805 million per annum is required to upgrade to pavement standards.

#### *Bridge and other structures*

Due to the lack of condition data, it is only possible to estimate a recommended funding level from the cost of previous work. This is estimated to be in the region 4% of capital works per annum, i.e. approximately R158 million per annum.

#### *Other current assets*

This is not included in the analysis and therefore cannot be estimated.

### 5.3.2 Candidate projects and Forward Works Programme

The list of candidate projects is the start of a process that leads to the Forward Works Programme (FWP) that is scheduled in the Roads Programme. Candidate Projects are an output from dTIMS that combines the identified sections into candidate projects.

The Forward Works Programme for all categories of work is provided in Appendix K – Forward Works Programme and alignment of projects.

## 5.4 Asset sustainability

Two methods of determining the asset sustainability are discussed in this section, namely, the Asset Sustainability Ratio and the Asset Renewal Funding Ratio. Where reliable forecasts of renewal requirements are available, the Asset Renewal Funding Ratio is the preferred method to be adopted. Should reliable forecasts not be available, the Asset Sustainability Ratio should cautiously be adopted.

### 5.4.1 Asset renewal funding ratio

The Asset Renewal Funding Ratio (ARFR) expressed as a percentage, is defined as the capital expenditure (capex) on the replacement of assets (renewals) divided by the replacement expenditure identified as warranted to meet the intervention levels defined in Table 5-6. It is an estimate of the extent to which the infrastructure assets are being replaced to meet the abovementioned intervention levels.

$$ARFR = \frac{Capital\ expenditure\ on\ renewals}{Replacement\ expenditure\ to\ meet\ intervention\ levels}$$

Using the average annual capex for the period 2023/24 to 2029/30 and the average annual replacement expenditure for the period 2023/24 to 2033/34 required to meet specified intervention levels (as identified by the Intervention Budget scenario discussed in Section 5.1), the ARFR is 26%. This value indicates that the current renewal investment is far below the required renewal investment needed to meet the intervention levels. A value of 100% is desirable.

#### *Limitations*

- Capital expenditure allocated towards the construction of new roads and the regravelling of unpaved roads have not been included.

### 5.4.2 Asset sustainability ratio

The Asset Sustainability Ratio (ASR), expressed as a percentage, is defined as the capital expenditure (capex) on the replacement of assets (renewals) divided by depreciation expense. It is an estimate of the extent to which the infrastructure assets are being replaced as they reach the end of their useful lives. The depreciation expense represents an estimate of the extent to which the infrastructure assets have been consumed. Capital expenditure on renewals (replacing assets that the WCG already has) is an estimate of the extent to which the infrastructure assets are being replaced as they reach the end of their useful life.

$$ASR = \frac{Capital\ expenditure\ on\ renewals}{Depreciation\ expense}$$

The depreciation expense (DE) is calculated from roughness measurements as these relate directly to the need for renewal of the network. The formula for DE is:

$$DE = \frac{Current\ replacement\ cost \times (Predicted\ average\ roughness\ for\ current\ yr\ if\ no\ assets\ are\ renewed) - Previous\ yr\ average\ roughness)}{Depreciation\ range\ of\ smooth\ to\ major\ roughness}$$

Using the capex and depreciation expense for the period 2022/23 to 2023/24, the ASR is 21%. This value indicates that the road network is being consumed (depreciated) far faster than it is being renewed. A value of 50% or more is desirable.

### *Limitations*

- There is a large amount spent on periodic maintenance that contributes to sustainability by reducing the deterioration in roughness of the network, but this is not included in the calculation.
- Capital expenditure allocated towards the construction of new roads and the regravelling of unpaved roads have not been included.

## 5.5 Plans for overload control infrastructure

### *Routine maintenance*

Routine maintenance of the existing weighbridge facilities at Vissershok, Joostenbergvlakte, Somerset West, Rawsonville, Swellendam, Beaufort West, Moorreesburg and Klawer is undertaken as and when necessary. This includes periodic maintenance in the form of repainting and refurbishments.

### *Renewal and replacement plan*

Nominal amounts are provided for future maintenance, renewal and replacement of equipment that fails or becomes unreliable. The multi-deck scales are verified every 6 months. Various modules of the new CSIR software have been implemented.

### *Upgrading and new facilities plan*

- Low speed weigh-in-motion (LSWIM) screeners have been found to be effective for screening and it would be desirable to construct these at various facilities. This would entail the construction of a separate lane for heavy traffic.
- Further improvements at Rawsonville, Joostenbergvlakte and Somerset West have, however, been placed on hold until such a time when a decision of the future tolling of the N1 and N2 has been taken.
- A new facility is planned for Gouda.

## 5.6 Management of key moveable assets – Road plant

The Sub directorate: Mechanical Services of the Transport Branch provides a mechanical support service in the Western Cape. This fleet is managed from Head Office Mechanical Services and used by the regional offices and district municipalities. A plant management and rental rate system is currently available and used to cost and measure utilisation. However, the operational costs are not currently charged back to ensure that the fleet can be renewed (i.e. every 20 years) where and when necessary, it is envisaged that this will be reinstated.

The impact of the poor rate of exchange between the rand and foreign currencies on the cost of plant is significant and it will become more difficult to replace plant in the future, even at the average interval of 20 years. Heavy vehicles and road maintenance machines are purchased according to the approved preference procurement policy, and according to the approved budgets of the three regional offices. Standard items are purchased by using the National Treasury Contract RT57. The rest of the equipment will be purchased by means of ad hoc tenders and quotations.

## 5.7 Demand for new assets

The increase in population as well as the expected growth in the economy of the Western Cape will translate directly into a greater demand for transport, and in particular road transport. The legislation and strategic initiatives that influence the demand for new assets are provided in paragraph 5.7.3.

### 5.7.1 Road Investment Strategy

The demand for new assets will in future be guided by the Road Investment Strategy – refer to paragraph 1.4.4 on developing asset management strategies.

### 5.7.2 Gap analysis for demand determination

The demand for capital improvements on the provincial road network is assessed in the categories described below.

### *Paved road upgrades*

- Near or at road design capacity: increase paved road width on existing alignment; and
- Pavement design inadequate: upgrade pavement structure and improve alignment.

### *Unpaved road upgrades*

- Traffic demand exceeds design parameters: upgrade road from unpaved to paved.

### *Road improvements*

- These are normally short to medium term interventions to improve both safety and level of service along the road or at intersections and usually include one or more of the following improvements:
    - Provision of service roads;
    - Provision of turning lanes and stop line capacity;
    - Provision of walkways;
    - Provision of cycleways;
    - Provision of bus lanes;
    - Provision of lay-bys or viewpoints on scenic roads; and
    - Upgrading of intersection control, e.g. stop street to traffic signal control, or changing ramp configurations to improve traffic flow.

### *New works*

There are two drivers for new works, namely:

- Completing the road network, i.e., missing road links; and
- As an enabler for future growth and development.

The Branch identifies new regional infrastructure required to support growth and development through community liaison such as the municipal integrated development planning (IDP) process, which receives both community and political support. Projects such as new road links, link capacity upgrades, safety improvements, etc., are selected based on their alignment with medium- to long-term priorities such as those described in the Provincial Strategic Goals, Provincial Spatial Development Framework and the envisaged Road System Management Strategy.

To further refine the scope for each project and to verify its feasibility, specialist service providers are appointed to assist the Transport Infrastructure Branch with the planning process by conducting a feasibility study that examines the travel demand and benefits generated by future growth and development, in comparison to the expected costs and performance.

Various road policies and objectives, such as public transport first, improve safety, reduced congestion, improved accessibility, reduced travel time, etc., inform the road class and design standards applied. A lifecycle benefit-cost analysis is undertaken in HDM-4 to optimise the proposed alternatives. Alternatives that derive economic benefits less than the social discount rate are disregarded. The outcome is the identification of a preferred road network intervention, which is technically feasible, economically viable, and which has minimal environmental impacts.

Feasible projects are prioritised by Branch management and combined into a programme for input to the Road Investment Programme.

### 5.7.3 Framework for development of a Demand Management Plan

The framework for the DMP is described below.

- Legal framework
    - In terms of section 27 of the National Land Transport Transition Act, 2000, (NLTTA) (Act 22 of 2000), the integrated transport plans (ITPs) of municipalities are integrated into their IDPs.
    - Future versions of the Provincial Land Transport Framework (required by section 22 of the NLTTA), must incorporate information from the ITPs, as well as inform future ITPs.
    - Constitution, PFMA, Government Immovable Asset Management Act, 2007 (GIAMA) (Act 19 of 2007), NDP, Sustainable Development Goals, National Strategic Goals, Provincial Strategic Goals;
    - Spatial Planning and Land Use Management Act, 2013, SPLUMA (Act 16 of 2013), Local Government: Municipal Systems Act, National Land Transport Act, IDPs, ITPs, Provincial Land Transport Framework (PLTF), National Land Transport Strategic Framework (NLTSF);
    - National Environmental Management: Biodiversity Act, 2004, (Act 10 of 2004), National Environmental Management Act, 1998 (NEMA) (Act 1998), Department of Mineral Resources (DMR), Department of Water Affairs and Sanitation water licence requirements, etc.

- Strategic initiatives:
    - National Spatial Development Framework (NSDF);
    - The Provincial Strategic Infrastructure Plan;
    - The Provincial Spatial Development Framework (PSDF), developed by the Department of Environmental Affairs and Development Planning;
    - The Micro Economic Development Strategy (MEDS);
    - Provincial Strategic Objectives; and
    - National and Provincial Freight Corridor Study.

- Transport Infrastructure Branch governance:
    - Strategic Goals, maintenance policies, capital investment policies, MTEF allocations, procurement management systems.

- Technical framework
    - Road System Management Strategy (to be developed) that contains:
        - Road network classification and associated LOS, geometric design standards, maintenance standards, Road Network Optimisation Model, project prioritisation methods, Asset Management System;
    - Roads Ordinance, Expropriation Act, 1975 (Act 63 of 1975), Road Traffic Act, Southern African Development Community road signs and marking, Road Access Guidelines, National Transport Master Plan (NATMAP), RISFSA, RCAM, draft TMH 22, TRH 22, etc.
    - Integrated Design Management System (IDMS), Portfolio and Project Management System to monitor measures of effectiveness: within time, on budget and to required standards that support the coordinated and integrated planning and delivery of infrastructure projects across all sectors and spheres of government to achieve the desired NDP and PSG outcomes.

    - Project procedures manual to administer, plan, design and deliver road network infrastructure and associated services.

- Institutional framework:
    - Resources to administer, plan, design and delivery road network infrastructure and associated services.

### 5.7.4 Demand Management Plan

Overall strategic development priorities, population trends, transport modes, and the informants of national travel surveys, will be included in the envisaged DMP. Requirements of the PSDF and Municipal Spatial Development Framework (MSDF), and the district ITP, emphasise the need for traffic modelling to be undertaken to assess the impact of spatial policies and future densification strategies along the road network corridors.

A province-wide transport model, the Western Cape Transport Model (WCTM), will be used to analyse the impact on the capacity of the existing road network to accommodate traffic demand from future growth and development. The future traffic demand requirements will be used to develop a Demand Management Plan, which will in turn inform the Branch's Investment Strategy for new assets. The WCTM will be used to test the impact of planned future land use scenarios and transport solutions and spatial policies to establish:

- Their impact on road capacity and access requirements;
- The need to expand the road network in support of the growth and development policies of the Western Cape;
- Any functional and operational system changes required;
- Projects that the local municipalities have identified to promote development as contained in their IDPs and ITPs;
- Candidate projects identified by dTIMS based on traffic, average maintenance costs and vehicle operating costs
- Maintenance related upgrades identified by the DREs/DMs. These are sections of the network that incur excessive maintenance costs due lack of suitable gravel materials for maintenance or remote location; and
- Public-private partnerships, where projects are co-funded by companies, private individuals, farmer forums and special needs road-user groups, enabling the projects to become economically feasible.

Note: It is important to note that appropriate standards must be applied to each upgrade. For example, unpaved roads carrying high levels of traffic would be upgraded to normal standards, whereas maintenance-related upgrades to roads carrying little traffic would be upgraded to a much lower standard, both in terms of cross-section, alignment and pavement structure. In the latter case, it is much more important to reduce maintenance costs than to achieve a high LOS.

- The identified new infrastructure is further refined into feasible projects as follows:
- The road policies and objectives, such as public transport, safety improvements, reduced congestion, improved accessibility, reduced travel time, etc., inform the road class and design standards that are required.
- Service providers are appointed to assist the Transport Infrastructure Branch with the planning process to produce a feasibility study to determine the travel demand generated by future growth and development as well as a cost estimate of the project.

- The outcome of the feasibility stage is a preferred road network intervention, which is technically feasible, economically viable and with minimal environmental impacts.
- Feasible new works projects are then included in the dTIMS analysis where they compete with other types of projects to maximise the total benefit to the network within the constraints of the MTEF Budget.

### 5.7.5 Demand prioritisation and resource allocation

In future, it is envisaged that with the implementation of the Western Cape Transport Model, the modelled outcomes from the gap analysis will determine the infrastructure needs to meet the future traffic demand, driven mainly by growth and development. These outcomes can be included in the life cycle analysis of the road network in the resource optimisation analysis in dTIMS to facilitate a more comprehensive trade-off analysis between new roads, upgrading of paved roads, safety improvements and routine maintenance in addition to rehabilitation, upgrades to unpaved roads, and periodic maintenance. The planning process for capital projects is represented diagrammatically in  as a funnel through which the pool of candidate projects flow to become scheduled programs of projects.

The transport model is used to undertake a gap analysis to determine the future road network demand in support of growth and development. A gap analysis is used to systematically determine the nature, size, and timing of the "gap" between current capacity and future needs of the road network. How the road network gap is cost effectively closed is the all-important other half of the story involving rigorous investment decision-making. A good capital investment framework process will:

- systematically address the core funding questions of "Which projects? Why? At what level? When?";
- assist the Branch in striking a rational balance between capital and operating/ maintenance requirements and between renewal and expansion demands; and
- assist the Branch to motivate the road network capital investment programme to customers and elected officials with a high level of confidence in the quality of the investment decisions.

#### *Project options analysis*

Using HDM-4, conduct a comparative analysis of potential project options. Appraise and evaluate each option to determine the optimal technical solutions:

- Minimise the cost over the lifecycle of the solution;
- Maximise the benefit-cost ratio;
- Mitigate environmental impacts by undertaking an EIA; and
- Maximise social impacts such as job creation and economic growth.

#### *Network level analysis to identify strategic priorities*

The optimisation of resources among the treatments used to preserve the current assets and the new assets will be done using dTIMS to conduct a comparative review of identified improvement projects on the road network with economic lifecycle benefit-cost evaluation, including the implications of the "do nothing" option.

- Input: Road identity data (classification, length, width, surface, capacity, etc.), classified traffic counts, travel demand, vehicle operating costs, weather conditions,

existing road condition, pavement deterioration models, maintenance strategies, technical road standards, levels of service.
- Output: Preferred alternative that is technically feasible, economically viable with minimal environmental impacts in compliance with the Constitution and the PFMA.

In terms of maximising the utility or the benefit derived over the life of an intervention, the expected road user costs are calculated over the lifecycle of the solution or asset using the road:

- Savings of VOC;
- Savings in time-costs; and
- Reduced accident costs.

Criteria: Net present value > 0 and benefit cost ratio > 1, mutually exclusive projects, internal rate of return (IRR) > discount rate (8%). Generally, test NPV > 0 for VOC only then do a sensitivity test VOC + Time and VOC +Time + Accidents. This gives an indication of the robustness of assumptions.

### 5.7.6 Current priorities for new assets

The City of Cape Town's functional area that includes the municipalities of Swartland, Drakenstein, Stellenbosch and Overstrand, plays an important role in demand management strategies as the City places a high priority on transit-oriented-development and its associate land use densification strategies to enable long-term public transport and intermodal planning. In the regional context, the demand is influenced by the Growth Potential of Towns Study and the priorities outlined in district and municipal ITPs. The transport plans of municipalities are developed during joint-planning initiatives with the nine provincial departments under the facilitation of the Department of Local Government.

In the absence of the DMP, a list of known high priority improvements, i.e. possible future projects are shown in Table 5-18. The total cost estimate is approximately R33,1 billion.

**Table 5-18: Possible future capital improvements**

| Description | Category | Cost Estimate Rand (millions) | Desired Commencement Year | Funded by Province | Notes |
|---|---|---|---|---|---|
| George Western Bypass | New Asset | 1 010 | 2024/25 | 100% | Identified in IDP for economic growth of George |
| Upgrading of MR201 Paarl to Wemmershoek | Paved Road Upgrade | 470 | 2024/25 | 85% | Required for economic growth and development in Drakenstein (Drakenstein Municipality contributes R80 millions) |
| Extension of R300 North | New Asset | 650 | 2024/25 | 100% [2] | Essential for the growth and development of Cape Town and to connect urban areas |

| Table 5-18: Possible future capital improvements | | | | | |
|---|---|---|---|---|---|
| Description | Category | Cost Estimate Rand (millions) | Desired Commencement Year | Funded by Province | Notes |
| Malmesbury bypass | New Asset | 500 | 2022/23 | 100% | Freight route linking the Saldanha Bay area to other major inter-regional transport routes |
| Relocation of TR28 to bypass Hermanus | New Asset | 210 | 2025/26 | 100% | Establish the long-term regional mobility for the Overstrand area |
| Realignment of the link between R27 (West Coast Road) and the N7 | Paved Road Upgrade | 200[1] | 2032/33 | 100% [2] | This realignment/dualling that will link to R300 North Extension, and is essential for the growth of the Northern corridor and evacuation from Koeberg Power Station |
| Dualling of MR174 Between N1 to Stellenbosch | Paved Road Upgrade | 648 | 2023/31 | 100% | Reduction of congestion during peak traffic, and for safety. |
| Extension of Berkeley Road towards Observatory | New Asset | 160[1] | 2026/27 | 40% | Essential element for the development of the Voortrekker Rd economic development corridor. 40% Subsidy to CoCT |
| N7 Northern Growth Corridor | New Asset/ Paved road Upgrades | 1 040 | 2025/26 | 100% [2] | Safety improvements (i.e. Freeway standards) and the evacuation from Koeberg Power Station |
| Wingfield Southern Growth Corridor | New Asset/ Paved road Upgrades | 11 070 | 2023/24 (various stages) | 100% [2] phased over multiple years unless DOI receive contributions from external stakeholders | One of the first mega infrastructure projects that form part of the Cape Town Freeway Integrator |
| Borchards Quarry realignment and new Interchange on N2 | New Asset/ Paved road Upgrades | 420 | 2026/27 | TBC | Part of future development planning. Various dependencies and inter-relationships. |

| Table 5-18: Possible future capital improvements | | | | | |
|---|---|---|---|---|---|
| **Description** | **Category** | **Cost Estimate Rand (millions)** | **Desired Commencement Year** | **Funded by Province** | **Notes** |
| R60 Worcester Ring Road - PHASE 1 Eastern Bypass | New Asset | 400 | 2028/29 | TBC | Road to bypass Worcester. Large R60 movement which limits splitting of access and mobility functions. |
| Extension of TR08102 - R300 North from the N1 to N7 (Phase 2) | New Asset | 864 | 2031/32 | TBC | Major metropolitan freeway link increasing access and opportunities. |
| Whale Coast Route | Paved Road Upgrade | 1 360 | 2026/27 | TBC | Overstrand development placing increased pressure on existing infrastructure. Future intervention necessary |
| Worcester Ring Road - Phase 2 | New Asset/ Paved road Upgrades | 648 | Identified | TBC | Increased development of Worcester necessitates future improvement to the surrounding road network. |
| Malmesbury Ring Road | New Asset/ Paved road Upgrades | 1 080 | Identified | TBC | Increased development of Malmesbury necessitates future improvement to the surrounding road network. |
| TR77 Dualling form Blouberg to Velddrift | Paved Road Upgrade | 6 696 | Identified | TBC | West Coast development placing increased pressure on existing infrastructure. Future intervention necessary |
| R60 Dualling from Worcester to Swellendam | Paved Road Upgrade | 5 670 | Identified | TBC | Increased traffic volumes using road as link between N1 and N2 placing increased pressure on existing infrastructure. Future intervention necessary |

1 – Cost estimate based on the latest known information as at December 2022.
2 – Unless funding is received from Budget Facility for Infrastructure as described in paragraph 7.4.2.

## 5.8 Project packaging and scheduling

### 5.8.1 Project packaging

Prior to the finalisation of projects, consideration should be given to project packaging:

- Confirmation of treatment recommendations through panel inspections, where appropriate; or more detailed engineering investigations for more complex treatments, which might move these candidates to later years due to time required for design and contractor procurement.

- Visual inspections are undertaken by panels:
    - The panel inspection for paved roads includes personnel from Planning, Design, Program and Systems Support, as well as from the regional offices.
    - The panel inspection for unpaved roads includes personnel from the Systems Support Sub directorate, the regional offices, the district municipalities, as agents of the WCG, as well as political representatives of the district municipalities.

- Compilation of viable projects, through merging of candidate projects across treatment types and years to achieve economy of scale.

- *Ad hoc* inclusion of identified work on structures.

### 5.8.2 Project scheduling

The initial scheduling of projects in the Roads Programme takes place after the final scope of each project has been approved. There are many subsequent phases of project scheduling over the full project lifecycle that covers all the stages from inception to completion of the work.

Where projects require funding in excess of the annual budget of a specific subprogramme, the budgets are adjusted (within limits) to suit the projects in question. Specific priorities identified by the Branch may also be accommodated and the funding adjusted for each subprogramme.

While the priority order in which projects should ideally be implemented is determined during the optimisation process, there are many "real-world" factors that influence the scheduling of projects within an implementation programme. The scheduling process considers all the factors exogenous to the prioritisation process that affect scheduling in the programme. The importance of each factor can vary at any time from the initial scheduling until the project has been completed:

- Availability of design and contract documentation for the project: non-performing consultants can cause delays in project design.

- Statutory processes: unexpected delays caused by, e.g., changes in legislation, expropriation, environmental and stakeholder participation processes can cause projects to be delayed. When this happens, it can cause a reprioritisation of the rest of the programme in terms of affordability, risk, etc.

- Ring-fenced budgets: Projects are prioritised in response to "use it or lose it" funding, which may not be compatible with the "real" priority of the project. The requirement is to spend the allocated budget in a specific financial year or run the risk of losing the funding.

- Strategic importance: some projects are prioritised to support the strategic initiatives of other spheres of government, such as, e.g., the Saldanha Industrial Development Zone (IDZ).

- Affordability: Projects are slotted into a programme where they can be accommodated in terms of the expected cash flow of existing financial commitments and the available funding, which, in turn is affected by other factors, namely:
    - Differences in pre-tender cost estimates versus tendered amounts awarded to contractors;
    - Sudden increases or decreases in available funding;

- Construction delays: non-performing contractors can cause delays during construction leading to the reprioritisation of other projects;

- Risk: projects are scheduled in a manner that seeks to minimise the risks of, e.g., the following:
    - Congestion caused by construction activity;
    - Shortages of materials such as bitumen;
    - Overloading the construction capacity of the local construction industry;
    - Weather, e.g., resealing projects can only be undertaken during the summer months;
    - Not spending conditional grants; and

- Social factors: it is desirable for projects to be distributed spatially to ensure that contractor development, targeted procurement and job opportunities are, as far as possible, distributed fairly.

There are several possible variations of scheduling that are listed under their separate headings below.

### Routine maintenance for roads

The routine maintenance of unpaved and paved roads includes the blading of unpaved roads, minor bridge repairs, grass cutting, road marking, traffic signs maintenance, etc.

Routine maintenance inspections are carried out weekly by the officials actively involved in these actions. The maintenance actions required are identified and are supplemented with actions required to address complaints received from the public. Routine maintenance actions are then prioritised as follows:

- First priority: actions required to safeguard the travelling public. These include repairs to road traffic signs, filling of potholes, the blading of unpaved roads, and other actions required to make the road prism safe for use; and

- Second priority: actions in the road reserve, such as grass cutting, opening up of drainage structures, rubbish removal, etc.

Funds are distributed according to technical norms such as traffic volume, road length and socio-economic factors, such as the use of the road by agriculture, tourism, etc.

Minor roads, which the Branch is not compelled to maintain, have, for many years, due to funding and logistical restrictions, received very little attention. The public, organised labour and tourism organisations see some these roads as essential. Complaints about their condition are received regularly. Where necessary, minimal expenditure is spent on maintaining minor roads if funds are available.

### Bridge maintenance

Structures and major culverts inspections has been undertaken by accredited professionals. The resulting information will be stored in the Bridge Management and Structures Management System (B&SMS).

Projects will be identified from the B&SMS and prioritised based on safety and technical requirements. Depending on the urgency of maintenance projects, funding is made available to allow the maintenance to be carried out timeously. Future developments will integrate the outputs for the B&SMS with dTIMS.

### Road safety improvements

From the accidents database, high-frequency accident locations are identified. On-site inspections of these locations are periodically undertaken, where the most urgent projects will be prioritised based on their potential impact on road safety. Where necessary, consulting engineers are appointed for detailed investigations and preparation of designs, specifications and cost estimates.

Road safety improvements are normally included in the scope of rehabilitation and upgrading projects.

### Contributions to the Cape Town MTAB

In terms of the Urban Transport Act, 1977 (Act 78 of 1977), the City of Cape Town is the core city for the Cape Town Metropolitan Area. The WCG, represented by the Branch, is part of the Metropolitan Transport Advisory Board (MTAB). From time to time, planning projects, and/or joint or special, (e.g. the 2010 Soccer World Cup), projects are undertaken, requiring part funding by the Branch. Such projects and the required funding are negotiated between the two parties.

### Contributions to municipal rehabilitation and periodic maintenance

Transfer payments are made to municipalities, including the City of Cape Town, for the rehabilitation and periodic maintenance of proclaimed municipal main roads within municipal areas. These are subsidies on expenditure payable to municipal councils that are road authorities for main roads in terms of the Roads Ordinance. Allocations are placed on a priority listing system and based on condition data. The municipalities usually provide 20% of the costs and the WCG subsidises the other 80%.

## 5.9 Changes in technology

Road-based transport is expected to remain the primary mode of transport for both passengers and freight in the Western Cape. No foreseeable changes in technology will reduce or, for that matter, increase the need for road infrastructure over the next ten years. The Branch continuously monitors new transport-related technologies that arise from time to time.

### 5.9.1 In-line crusher

The most common defect present on the network is 'stoniness fixed' (Figure 4-39) and can be as a result of an excess of oversize materials and exposed, rocky subgrade. This excess of oversize material is the consequence of poor processing of the material, where it may be hard to break down the hard, oversize material with a grid roller and crushing has not been used.

As mentioned previously, the Branch have initiated investigations in breaking down the oversize material with an in-line crusher. These investigations will include the ripping up of exposed rocky subgrades, crushing of oversized material to achieve the specified particle size using the inline crusher, supplementing the crushed material with imported gravel wearing course, blending the material and regravelling. The in-line crusher and the final product from this alternative method of construction is shown in Picture 5-3. and Picture 5-4.

Picture 5-3: In-line crusher

Picture 5-4: Processing the in-situ subgrade using an in-line crusher

A series of sites have been identified for the trial investigation and the performance of this alternative maintenance approach will be monitored and evaluated.

### 5.9.2 Pont Malgas

The Department is one of the only authorities in South Africa that still owns and operates a pont. This vessel replaces the function of a bridge near Malgas. The previous pont was more than 100 years old and pulled by hand by means of a cable over the river. It had a capacity of 10 tonnes at a time.

When the pont reached the end of its repairable life, the Department replaced it with a new vessel introducing new technologies and specifications. The new pont can transport 20 tonnes, including construction plant necessary to maintain the gravel roads nearby. The pulling of the Pont across the river by hand was replaced by a diesel driven engine. This new form of propulsion has brought about greater safety for the public. The propellers can move vertically to reduce any scouring of riverbanks in shallow waters and docking. Below is a picture of the old and new pont.

Picture 5-5: Old Pont

Picture 5-6: New Pont

# CHAPTER 6. ASSET MANAGEMENT PLANS

The figures provided in the tables under this chapter are based on the adjustment budget allocations from the financial year 2023/24, and the outer years after the MTEF were estimated by using an escalation of 7% per annum.

## 6.1 Closing the gap

### 6.1.1 Road infrastructure

The level of service that is provided has a great influence on the level of expenditure required.

In this report three scenarios were considered:

- The current trend in MTEF allocations to the Branch continues;
- An Optimised MTEF Budget is put in place, where the total transportation cost to society is minimised; and
- A desired budget, i.e. the Intervention Budget becomes possible.

Should additional funds be made available to implement the Desired Budget, it is intended to phase in the additional work over a period of 10 years. This would ensure that the capabilities and capacities of the Branch and its agents, the district municipalities, and those of private contractors are not exceeded. This phasing is reflected in the estimates of future expenditure.

Appendix K – Forward Works Programme and alignment of projects shows indicative lists of current projects for roads.

### 6.1.2 Projected 10-year budget allocations

The expected budget allocations most likely to be available for the next 10 years are shown in Table 6-1.

**Table 6-1: 10-year plan for various treatment categories**

| Treatment | Budget allocations per fiscal year (R X thousands) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2024/25 | 2025/26 | 2026/27 | 2027/28 | 2028/29 | 2029/30 | 2030/31 | 2031/32 | 2032/33 | 2033/34 |
| Resealing | 963 355 | 640 503 | 1 145 211 | 617 178 | 870 293 | 1 209 350 | 1 294 005 | 1 384 586 | 1 481 506 | 1 585 211 |
| Rehabilitation | 1 182 000 | 500 600 | 302 444 | 494 435 | 240 000 | 195 000 | 208 650 | 223 256 | 238 883 | 255 605 |
| Light Rehabilitation | - | - | - | - | - | - | - | - | - | - |
| Regravel | 160 225 | 168 240 | 176 650 | 185 485 | 194 755 | 204 490 | 218 804 | 234 121 | 250 509 | 268 045 |
| Upgrading to paved | 65 500 | 109 000 | 135 500 | 241 000 | 208 000 | 203 000 | 217 210 | 232 415 | 248 684 | 266 092 |
| Other | 2 116 460 | 2 418 763 | 2 253 761 | 2 679 581 | 2 911 642 | 2 741 923 | 2 933 858 | 3 139 228 | 3 358 974 | 3 594 102 |
| Total | 4 487 540 | 3 837 106 | 4 013 566 | 4 217 679 | 4 424 690 | 4 553 763 | 4 872 527 | 5 213 604 | 5 578 556 | 5 969 054 |
| AFR | 778 955 | 359 363 | 387 234 | 387 234 | 387 234 | 387 234 | 387 234 | 387 234 | 387 234 | 387 234 |
| PRMG | 1 059 248 | 1 106 702 | 1 157 610 | 1 157 610 | 1 157 610 | 1 157 610 | 1 157 610 | 1 157 610 | 1 157 610 | 1 157 610 |
| Overload control | 33 915 | 35 611 | 37 391 | 39 261 | 41 223 | 43 285 | 46 315 | 49 557 | 53 026 | 56 738 |

Note: All figures after 2030/31 were estimated by using an escalation of 7% per annum.

### 6.1.3 Plans for Expanded Public Works Programme and Provincial Road Maintenance Grant

The Branch will continue to contribute in creating employment through the Expanded Public Works Programme (EPWP) in conjunction with the requirements of the Provincial Road Maintenance Grant (PRMG). In terms of the Preferential Procurement Regulations, the DOI plans to develop an Empowerment Impact Assessment (EmpIA) Tool to facilitate provincial coordination and monitoring of EPWP activities amongst all implementing bodies. Prioritised PRMG projects for the MTEF budget are shown in Appendix L – Gazetted list of projects.

## 6.2 Management of Road Asset Management System

Data for the RAMS is collected systematically according to the required methods and frequency (Table 3-1 and Table 3-2), verified and stored in a State Information Technology Agency (SITA)-managed database. The various systems (RNIS, PMS, GRMS, B&SMMS, TCS, PAS, etc.) access and process the data into information that is stored on the database. This process has been going on and expanding since the first system was introduced in the 1980s. The data requirements have now stabilised and this data will continue to be collected as an essential input to the management of the road network according to best practice in asset management (refer to draft TMH 22 Asset Management (Committee of Transport Officials, 2013) and ISO55001 (International Standards Organization for Standardization, 2015)). See also paragraph 1.6.

## 6.3 Asset transfers

No transfers of assets are currently being envisaged.

## 6.4 Disposal plan

Road infrastructure has a very long life, and seldom becomes obsolete in function. Whenever sections of road become obsolete due to a replacement road being built on a changed alignment, the old road is ploughed up, and bridges and culverts demolished. The costs of these disposal actions are included in the construction costs of the replacement or new facility. The road reserve of such road sections is then de-proclaimed and returned to their original owners, or their legal successors. The value of land returned is offset from the cost of any new expropriated land.

# CHAPTER 7. FINANCIAL SUMMARY

## 7.1 Financial statements and projections

The figures provided in the tables under this chapter are based on the adjustment budget allocations from the financial year 2023/24, and the outer years after the MTEF were estimated by using an escalation of 7% per annum.

### 7.1.1 Key assumptions

The financial requirements for road infrastructure, as set out in Table 7-3 and Table 7-4 are based on detailed optimisation procedures, which are in turn based on detailed network information. The network information is, in the end, the key to the accuracy of the resulting financial requirements. The following items of information are especially important:

- Road network information;
- Road conditions;
- Traffic volumes;
- Estimates of costs for maintenance, renewals, replacements, upgrading and new facilities; and
- The LOS to be provided.

### 7.1.2 Roads infrastructure

Routine maintenance, the renewal or replacement of roads, the upgrading of roads, and the provision of new facilities do not happen in isolation. To enable these actions to take place requires programme support expenditure, planning expenditure and design expenditure.

The tables below show the expected MTEF allocation at current levels, the required funding, and the additional funding required, for the following aspects of road infrastructure:

**Enabling expenditure**, consisting of expenditure on:

- Programme support (Table 7-3A);
- Planning (Table 7-3B); and
- Design (Table 7-3C).

**Routine maintenance expenditure** (Table 7-3D).

**Renewal and replacements expenditure** (Table 7-3N) consisting of expenditures on:

- Regravelling (Table 7-3E);
- Resealing (Table 7-3F);
- Light Rehabilitation (Table 7-3G);
- Bridge maintenance (Table 7-3H);
- Rehabilitation and reconstruction of paved roads (Table 7-3I);
- Access and development projects (Table 7-3J);
- Road safety improvements (Table 7-3K);
- Contributions to the Cape Town MTAB (Table 7-3L); and
- Contributions to municipalities for rehabilitation & reconstruction (Table 7-3M).

**Upgrading and new facilities** (Table 7-3Q), consisting of expenditure on:

- Unpaved road upgrading (Table 7-3O); and
- Paved road upgrading and New facilities (Table 7-3P).

Table 7-1 below shows a summary of the funding required to achieve the Desired Budget for roads (totals for Vote 10: Programme 3: Roads). Considerable additional funding will be needed to achieve the desired level of service. The average shortfall in funding provided for roads in the Western Cape over the next 10 years is of the order of R6,2 billion per year.

**Table 7-1: Funding required to achieve the desired budget for roads (totals for Vote 10: Programme 3: Roads)**

| Financial Year | MTEF budget 2022, Rands | Desired funding, Rands | Additional funds required, Rands |
|---|---|---|---|
| 2024/25 | 4 487 540 | 12 816 532 | 8 328 992 |
| 2025/26 | 3 837 106 | 11 705 101 | 7 867 995 |
| 2026/27 | 4 013 566 | 11 095 317 | 7 081 751 |
| 2027/28 | 4 217 679 | 10 213 282 | 5 995 603 |
| 2028/29 | 4 424 690 | 10 548 984 | 6 124 294 |
| 2029/30 | 4 553 763 | 10 891 581 | 6 337 818 |
| 2030/31 | 4 872 527 | 11 342 901 | 6 470 375 |
| 2031/32 | 5 213 604 | 10 864 116 | 5 650 511 |
| 2032/33 | 5 578 556 | 10 094 175 | 4 515 619 |
| 2033/34 | 5 969 054 | 9 264 178 | 3 295 124 |

## 7.2 Overload control

The tables, as indicated below, show the expected MTEF allocation at current levels, the required funding, and the additional funding required, for the following aspects of overload control:

- Routine maintenance (Table 7-4A);
- Renewals and replacements (Table 7-4B);
- Upgrading and new facilities (Table 7-4C); and
- Operational Expenditure (Table 7-4D).

Table 7-2 shows a summary of the financial resources required if the desired budget and maintenance scenario for overload control is to be achieved. It follows from the figures shown in Table 7-2 that additional funding for overloading control will have to be provided to realise the desired level of service.

| Table 7-2: Funding required to achieve the desired budget for overload control (totals for Vote 10: Sub-programme 5.4: Overload control) | | | |
|---|---|---|---|
| **Financial Year** | **MTEF budget 2022, Rands** | **Desired funding, Rands** | **Additional funds required, Rands** |
| 2024/25 | 33 915 | 56 705 | 22 790 |
| 2025/26 | 35 611 | 59 746 | 24 135 |
| 2026/27 | 37 391 | 63 381 | 25 990 |
| 2027/28 | 39 261 | 67 238 | 27 977 |
| 2028/29 | 41 223 | 71 945 | 30 722 |
| 2029/30 | 43 285 | 76 981 | 33 696 |
| 2030/31 | 46 315 | 82 369 | 36 054 |
| 2031/32 | 49 557 | 88 134 | 38 577 |
| 2032/33 | 53 026 | 94 304 | 41 278 |
| 2033/34 | 56 738 | 100 906 | 44 168 |

It is foreseen that, in future, upgrading and new facilities for overloading control will be funded as Road Infrastructure.

The only way the additional funds required for overloading control infrastructure could be funded, would be by means of additional grants by Provincial Treasury.

## 7.3 Cash flow forecasts

The cash flow forecast, desired funding estimates and the additional funds required are provided in Table 7-3 for the road network and in Table 7-4 for overload control.

## Table 7-3: Cash flow forecasts and desired funding estimates

| Average MTEF inflation increase* | 7% | All monetary values are in currency of the year shown |
|---|---|---|

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3A | Programme support (Vote 10, Prog 3, Sub-prog 1, 4, 5) | MTEF | 261 719 | 330 834 | 348 078 | 370 122 | 389 523 | 409 913 | 438 607 | 469 309 | 502 161 | 537 312 |
| | | Desired Funding | 266 820 | 335 935 | 353 536 | 375 962 | 395 772 | 416 599 | 445 761 | 476 965 | 510 352 | 546 077 |
| | | **Additional funds required** | **5 101** | **5 101** | **5 458** | **5 840** | **6 249** | **6 686** | **7 154** | **7 655** | **8 191** | **8 764** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3B | Planning (Vote 10, Prog 3, Sub-prog 2) | MTEF | 77 842 | 98 811 | 103 600 | 113 364 | 117 261 | 122 578 | 131 158 | 140 340 | 150 163 | 160 675 |
| | | Desired Funding | 79 950 | 100 919 | 105 856 | 115 777 | 119 843 | 125 341 | 134 115 | 143 503 | 153 548 | 164 297 |
| | | **Additional funds required** | **2 108** | **2 108** | **2 256** | **2 413** | **2 582** | **2 763** | **2 957** | **3 164** | **3 385** | **3 622** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3C | Design (Vote 10, Prog 3, Sub-prog 3) | MTEF | 38 125 | 39 993 | 41 931 | 45 078 | 47 329 | 49 696 | 53 175 | 56 897 | 60 880 | 65 141 |
| | | Desired Funding | 39 775 | 41 643 | 43 697 | 46 967 | 49 350 | 51 859 | 55 489 | 59 373 | 63 529 | 67 976 |
| | | **Additional funds required** | **1 650** | **1 650** | **1 766** | **1 889** | **2 021** | **2 163** | **2 314** | **2 476** | **2 650** | **2 835** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3D | Routine maintenance | MTEF | 1 090 225 | 1 073 524 | 1 097 769 | 1 175 757 | 1 231 744 | 1 289 736 | 1 380 018 | 1 476 619 | 1 579 982 | 1 690 581 |
| | | Desired Funding | 1 495 847 | 1 279 035 | 1 337 855 | 1 405 893 | 1 474 897 | 1 517 921 | 1 624 176 | 1 737 868 | 1 859 519 | 1 989 685 |
| | | **Additional funds required** | **405 622** | **205 511** | **240 086** | **230 136** | **243 153** | **228 185** | **244 158** | **261 249** | **279 537** | **299 104** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3E | Regravelling | MTEF | 160 225 | 168 240 | 176 650 | 185 485 | 194 755 | 204 490 | 218 804 | 234 121 | 250 509 | 268 045 |
| | | Desired Funding | 384 000 | 552 000 | 345 000 | 1 098 000 | 681 000 | 1 140 000 | 1 156 000 | 564 000 | 709 000 | 629 000 |
| | | **Additional funds required** | **223 775** | **383 760** | **168 350** | **912 515** | **486 245** | **935 510** | **937 196** | **329 879** | **458 491** | **360 955** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3F | Resealing | MTEF | 963 355 | 640 503 | 1 145 211 | 617 178 | 870 293 | 1 209 350 | 1 294 005 | 1 384 586 | 1 481 506 | 1 585 211 |
| | | Desired Funding | 1 450 000 | 426 000 | 227 000 | 210 000 | 143 000 | 94 000 | 672 000 | 2 081 000 | 1 775 000 | 1 456 000 |
| | | **Additional funds required** | **486 645** | **0** | **0** | **0** | **0** | **0** | **0** | **696 414** | **293 494** | **0** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3G | Light Rehabilitation | MTEF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Desired Funding | 563 000 | 347 000 | 235 000 | 418 000 | 435 000 | 255 000 | 406 000 | 391 000 | 240 000 | 271 000 |
| | | **Additional funds required** | **563 000** | **347 000** | **235 000** | **418 000** | **435 000** | **255 000** | **406 000** | **391 000** | **240 000** | **271 000** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3H | Bridge maintenance | MTEF | 47 648 | 188 000 | 90 000 | 32 500 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Desired Funding | 179 502 | 153 484 | 160 543 | 168 707 | 176 988 | 182 151 | 194 901 | 208 544 | 223 142 | 238 762 |
| | | Additional funds required | **131 854** | **0** | **70 543** | **136 207** | **176 988** | **182 151** | **194 901** | **208 544** | **223 142** | **238 762** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3I | Rehab & reconstruction of paved roads | MTEF | 1 182 000 | 500 600 | 302 444 | 494 435 | 240 000 | 195 000 | 208 650 | 223 256 | 238 883 | 255 605 |
| | | Desired Funding | 5 530 000 | 5 320 000 | 5 660 000 | 3 385 000 | 4 020 000 | 3 436 000 | 2 995 000 | 2 175 000 | 2 238 000 | 2 255 000 |
| | | Additional funds required | **4 348 000** | **4 819 400** | **5 357 556** | **2 890 565** | **3 780 000** | **3 241 000** | **2 786 350** | **1 951 745** | **1 999 117** | **1 999 395** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3J | Access & development projects (Community Based Public Works Programme) | MTEF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Desired Funding | 22 438 | 19 186 | 20 068 | 21 088 | 22 123 | 22 769 | 24 363 | 26 068 | 27 893 | 29 845 |
| | | **Additional funds required** | **22 438** | **19 186** | **20 068** | **21 088** | **22 123** | **22 769** | **24 363** | **26 068** | **27 893** | **29 845** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3K | Road safety improvements | MTEF | 161000 | 268000 | 361 239 | 106 000 | 200 000 | 125 000 | 133 750 | 143 113 | 153 130 | 163 850 |
| | | Desired Funding | 44 875 | 38 371 | 40 136 | 42 177 | 44 247 | 45 538 | 48 725 | 52 136 | 55 786 | 59 691 |
| | | Additional funds required | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3L | Contributions: Cape Town MTAB | MTEF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Desired Funding | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Additional funds required** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3M | Contributions: Municipal rehab & reconstruction (Eqt share) | MTEF | 13 900 | 21000 | 22000 | 26 760 | 24 000 | 25 000 | 26 750 | 28 623 | 30 626 | 32 770 |
| | | Desired Funding | 22 438 | 19 186 | 20 068 | 21 088 | 22 123 | 22 769 | 24 363 | 26 068 | 27 893 | 29 845 |
| | | **Additional funds required** | **8 538** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3N | Total Construction of renewals & replacements | MTEF | 2 528 128 | 1 786 343 | 2 097 544 | 1 462 358 | 1 529 048 | 1 758 840 | 1 881 959 | 2 013 697 | 2 154 655 | 2 305 480 |
| | | Desired Funding | 7 633 252 | 6 528 226 | 6 472 814 | 4 946 061 | 5 109 481 | 4 943 226 | 5 115 352 | 5 132 816 | 5 056 713 | 4 698 143 |
| | | **Additional funds required** | **5 105 124** | **4 741 883** | **4 375 270** | **3 483 703** | **3 580 433** | **3 184 386** | **3 233 392** | **3 119 119** | **2 902 058** | **2 392 663** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3O | Gravel road upgrading | MTEF | 65 500 | 109 000 | 135 500 | 241 000 | 208 000 | 203 000 | 217 210 | 232 415 | 248 684 | 266 092 |
| | | Desired Funding | 618 000 | 570 000 | 244 000 | 1 400 000 | 1 191 000 | 1 354 000 | 1 047 000 | 237 000 | 0 | 0 |
| | | **Additional funds required** | **552 500** | **461 000** | **108 500** | **1 159 000** | **983 000** | **1 151 000** | **829 790** | **4 585** | **0** | **0** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3P | Paved road upgrading and New facilities | MTEF | 426 001 | 398 601 | 189 144 | 810 000 | 901 785 | 720 000 | 770 400 | 824 328 | 882 031 | 943 773 |
| | | Desired Funding | 2 119 888 | 2 502 342 | 2 302 560 | 1 504 622 | 1 773 640 | 2 227 635 | 2 515 009 | 2 685 590 | 2 210 513 | 1 527 000 |
| | | **Additional funds required** | **1 693 887** | **2 103 741** | **2 113 416** | **694 622** | **871 855** | **1 507 635** | **1 744 609** | **1 861 262** | **1 328 482** | **583 227** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3Q | Total upgrading and new facilities | MTEF | 491 501 | 507 601 | 324 644 | 1 051 000 | 1 109 785 | 923 000 | 987 610 | 1 056 743 | 1 130 715 | 1 209 865 |
| | | Desired Funding | 2 737 888 | 3 072 342 | 2 546 560 | 2 904 622 | 2 964 640 | 3 581 635 | 3 562 009 | 2 922 590 | 2 210 513 | 1 527 000 |
| | | **Additional funds required** | **2 246 387** | **2 564 741** | **2 221 916** | **1 853 622** | **1 854 855** | **2 658 635** | **2 574 399** | **1 865 848** | **1 079 799** | **317 135** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3R | Total Maintenance (Vote 10, Prog 3, Sub-prog 5) | MTEF | 2 261 453 | 2 070 267 | 2 509 630 | 2 010 920 | 2 296 792 | 2 703 576 | 2 892 827 | 3 095 325 | 3 311 997 | 3 543 836 |
| | | Desired Funding | 4 072 348 | 2 757 520 | 2 305 398 | 3 300 600 | 2 910 884 | 3 189 072 | 4 053 077 | 4 982 412 | 4 806 661 | 4 584 447 |
| | | **Additional funds required** | **1 810 895** | **687 253** | **0** | **1 289 680** | **614 092** | **485 496** | **1 160 250** | **1 887 087** | **1 494 664** | **1 040 610** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3S | Total Construction (Vote 10, Prog 3, Sub-prog 4) | MTEF | 1 834 501 | 1 276 201 | 988 327 | 1 651 435 | 1 549 785 | 1 243 000 | 1 330 010 | 1 423 111 | 1 522 728 | 1 629 319 |
| | | Desired Funding | 8 335 201 | 8 449 899 | 8 266 763 | 6 352 887 | 7 051 011 | 7 085 941 | 6 630 097 | 5 175 795 | 4 532 192 | 3 871 536 |
| | | **Additional funds required** | **6 500 700** | **7 173 698** | **7 278 436** | **4 701 452** | **5 501 226** | **5 842 941** | **5 300 087** | **3 752 684** | **3 009 463** | **2 242 216** |

| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Table 7-3T | Total (Vote 10, Prog 3) | MTEF | 4 487 540 | 3 837 106 | 4 013 566 | 4 217 679 | 4 424 690 | 4 553 763 | 4 872 527 | 5 213 604 | 5 578 556 | 5 969 054 |
| | | Desired Funding | 12 816 532 | 11 705 101 | 11 095 317 | 10 213 282 | 10 548 984 | 10 891 581 | 11 342 901 | 10 864 116 | 10 094 175 | 9 264 178 |
| | | **Additional funds required** | **8 328 992** | **7 867 995** | **7 081 751** | **5 995 603** | **6 124 294** | **6 337 818** | **6 470 375** | **5 650 511** | **4 515 619** | **3 295 124** |

| Table 7-4: Cash flow forecasts and desired funding estimates for overload control | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average MTEF inflation increase* | | | 7% | | All monetary values are in currency of the year shown | | | | | | | |
| | | | Current MTEF Period | | | | | | | | | |
| | | | 2024/25 (x R1000) | 2025/26 (x R1000) | 2026/27 (xR1000) | 2027/28 (xR1000) | 2028/29 (xR1000) | 2029/30 (xR1000) | 2030/31 (xR1000) | 2031/32 (xR1000) | 2032/33 (xR1000) | 2033/34 (xR1000) |
| Table 7-4A | Routine maintenance | MTEF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Desired funding | 2 923 | 3 128 | 3 347 | 3 581 | 3 832 | 4 100 | 4 387 | 4 694 | 5 023 | 5 375 |
| | | **Additional funds required** | **2 923** | **3 128** | **3 347** | **3 581** | **3 832** | **4 100** | **4 387** | **4 694** | **5 023** | **5 375** |
| Table 7-4B | Renewals and replacements | MTEF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Desired funding | 1 089 | 1 166 | 1 247 | 1 334 | 1 427 | 1 527 | 1 634 | 1 748 | 1 870 | 2 001 |
| | | **Additional funds required** | **1 089** | **1 166** | **1 247** | **1 334** | **1 427** | **1 527** | **1 634** | **1 748** | **1 870** | **2 001** |
| Table 7-4C | Upgrading and new facilities | MTEF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Desired funding | 747 | 799 | 855 | 915 | 979 | 1 048 | 1 121 | 1 199 | 1 283 | 1 373 |
| | | **Additional funds required** | **747** | **799** | **855** | **915** | **979** | **1 048** | **1 121** | **1 199** | **1 283** | **1 373** |
| Table 7-4D | Operational Expenditure | MTEF | 33 915 | 35 611 | 37 391 | 39 261 | 41 223 | 43 285 | 46 315 | 49 557 | 53 026 | 56 738 |
| | | Desired funding | 51 946 | 54 653 | 57 932 | 61 408 | 65 707 | 70 306 | 75 227 | 80 493 | 86 128 | 92 157 |
| | | **Additional funds required** | **18 031** | **19 042** | **20 541** | **22 147** | **24 484** | **27 021** | **28 912** | **30 936** | **33 102** | **35 419** |
| Table 7-4E | Total Overload Control (Vote 10, Sub-prog 5.4 | MTEF | 33 915 | 35 611 | 37 391 | 39 261 | 41 223 | 43 285 | 46 315 | 49 557 | 53 026 | 56 738 |
| | | Desired funding | 56 705 | 59 746 | 63 381 | 67 238 | 71 945 | 76 981 | 82 369 | 88 134 | 94 304 | 100 906 |
| | | **Additional funds required** | **22 790** | **24 135** | **25 990** | **27 977** | **30 722** | **33 696** | **36 054** | **38 577** | **41 278** | **44 168** |

### 7.3.1 Expenditure trends

Expenditure trends between the 2016/17 and 2022/23 financial year are shown in Figure 7-1 for the different types of sub programmes within the Transport Infrastructure Branch. No easily observable trends are apparent. However, there was a considerable increase in maintenance expenditure in 2021/22 and 2022/23.

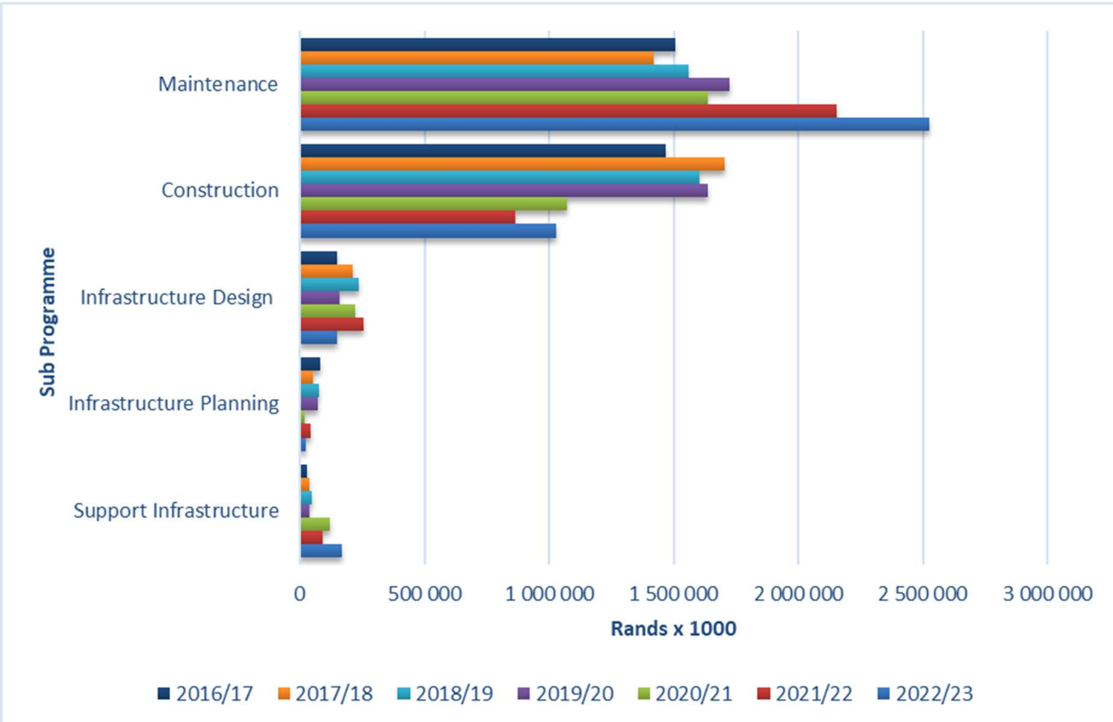



Figure 7-1: Sub programme expenditure for 2016/17 to 2022/23

## 7.4 Funding strategy

The details of the financial resources required are shown in Table 7-3 and Table 7-4. These summaries of the financial resources show the amounts required for road infrastructure and overload control infrastructure, respectively.

From Table 7-1 it follows that considerable additional funding for roads will have to be provided to realise the required LOS.

From Table 7-2 additional funding for overloading control will have to be provided to realise the required LOS in overloading control.

Although the Department generates revenue of about R2 205 million per annum (as indicated in Vote 10: Transport and Public Works published in 2023), mainly from vehicle licensing fees, these funds are paid over to Provincial Treasury for reallocation, and not utilised directly by the Branch. The scope for increasing these revenues beyond the annual inflation rate adjustments is severely limited. The licence fees of the Western Cape are already some of the highest in South Africa and complaints about these fees are received regularly. The only way the additional funding required could be obtained would be by means of additional grants from Provincial Treasury.

### 7.4.1 Proposals to supplement funding

The Branch is considering various alternate funding strategies, pending the enactment of the Western Cape Transport Infrastructure Bill. It should be noted that bringing any one of these funding strategies to fruition would require a rigorous legislative, planning and public participation process that will probably require many years to implement.

The following proposals may be considered to supplement the shortfall in funding:

- Introduction of a provincial fuel levy, km-charges, weight-distance and private/public partnership initiatives;
- The PRMG incentive and EPWP incentive grants based respectively on the year-on-year performance of the Strategic Network and job creation levels, have promise for increased funding levels, with its compulsory reporting conditions and various additional requirements such as safety assessments and condition assessment audits;
- Negotiation for a more equitable share from the nationally generated fuel levy;
- Increases in, and the standardisation of, provincial and national vehicle licensing fees;
- Increased fees for planning and way leave applications;
- Implementation of a development levy as the developer's contribution to specific infrastructure improvements concurrent with development impacts; and to "air-rights" in cases where developments overhang road reserves;
- Charging a levy on freight that should ideally be transported by rail;
- Introduction of a tax on owners in possession of undeveloped land in rural areas;
- Sharing accident environmental damage claims responsibly between road agencies and insurance companies;
- Increasing fines for overloading;
- Introducing a levy for the transportation of hazardous materials;
- Introducing provincial tolling;
- Development loans and private-public funding initiatives;
- Introducing tourism taxes on, inter alia, beds, airports and harbours; and
- Introducing a distance penalty for heavy vehicles as these users have a major detrimental impact on the road pavement.

The funding strategy thus relies on additional allocations to the Branch by Provincial Treasury.

### 7.4.2 Alternative method of funding investigated

The DoI receives around R 4,5 billion, which is mainly composed of the Provincial Road Maintenance Grant (approx. R 1,4 billion), and the Equitable Share (R 3,1 billion). The backlog on technical needs exceeds R 34 billion Rands, which amounts to an annual shortfall of over R 3,4 billion over a 10-year intervention. Thus, based on available funding and resource optimisation, the DOI spend is mainly focused on preventative maintenance and rehabilitation of ageing infrastructure.

Due to the proven preservation strategy, and the constraint it places on the programme to restrict its actions to preservation, the Branch is forced to look at alternative sources of funding for large capital expansion projects. Since 2019, the Branch actively engaged with National Treasury through its Budget Facility for Infrastructure (BFI) and the National Department of Public Works and Infrastructure through its Infrastructure South Africa (ISA) in efforts to secure funding for these projects.

Several projects were presented to the BFI and ISA of which the Wingfield Upgrade Scheme received the most interest. The implementation scheme will integrate with the Cape Town Freeway Integrator, which is focused on economic growth, development opportunity, land unlocking and job creation across the Cape Town Metropolitan Municipality. More detail on the application is available in a document entitled "Western Cape Government Department of Transport and Public Works, Road and Transport Management Branch - The Cape Town Freeway Integrator" (available on request).

The Department is still awaiting a formal response and guaranteed funding statement from either BFI or ISA.

# CHAPTER 8. ORGANISATIONAL AND SUPPORT PLAN STRUCTURE

## 8.1 Introduction

Implementing an asset management approach is a change that leads organisations to question traditional ways of thinking and working. This can include reviews of organisational structures, roles and responsibilities, and contractual relationships. This can make the introduction of asset management thinking and practices a challenging experience for people, be it senior management roles, staff delivering asset management activities, or working in the supply chain. Effective leadership is therefore crucial for building an organisation with an appropriate culture which supports the delivery of good asset management (Institute of Asset Management, 2015b).

The subjects of organisation and people are highly interdependent and exert strong influences on an organisation's ability to adopt and embed asset management successfully. It is necessary to invest time and effort in them to produce the performance and behaviours that will support successful delivery of the asset management strategy and objectives. They are important for delivering the level of business integration that characterises more mature asset management capability (Institute of Asset Management, 2015b).

Organisation and people enablers are listed in Table 8-1 below (Institute of Asset Management, 2015b). Each enabler should be assessed, and the gap determined before implementation of a plan to address shortcomings. Each enabler is discussed in more in the paragraphs that follow.

**Table 8-1: Organisation and people enablers**

| Organisation and people enablers | Description of the enabler |
|---|---|
| Procurement and supply chain management | The processes used by an organisation to ensure that all outsourced asset management activities are aligned with the asset management objectives of the organisation and to monitor these activities against these objectives |
| Asset management leadership | The leadership of an organisation required to promote a whole life asset management approach to deliver the organisational and asset management objectives of the organisation |
| Organisational structure | The structure of an organisation in terms of its ability to deliver the organisational and asset management objectives |
| Organisational culture | The culture of an organisation in terms of its ability to deliver the organisational and asset management objectives |
| Competence management | The processes used by an organisation to systematically develop and maintain an adequate supply of competent and motivated people to fulfil its asset management objectives including arrangements by managing competence in the boardroom and the workplace |

## 8.2 Procurement and supply chain management

Research has indicated that organisations benefit from using their supply chains strategically and encouraging their key suppliers to participate in their whole-life value approach. Organisations with more mature asset management cultures fully align their asset management objectives and strategy and the resourcing strategy is then developed from this. The most mature organisations approach managing their supply chains as they would any other critical asset.

Procurement and supply chain management are managed in the Department, but outside the Branch. The current good relationship between the Branch and the Chief Directorate: Supply Chain Management enables the alignment of procurement and supply chain management with the Branch's asset management objectives and strategy.

## 8.3 Asset management leadership

Asset management leadership is crucial in an organisation aspiring to deliver effective asset management. This leadership sets the direction and priorities for the development of the asset management capabilities necessary to deliver on the organisation's overall objectives. Leaders set direction, challenge the status quo, innovate and drive the definition, development and implementation of improved procedures and systems. All leaders must excel in the following (Institute of Asset Management, 2015b):

- Give direction to the organisation. In the context of asset management this means that leaders must promote a whole life approach to asset management so that society can realise maximum value from its assets, consistent with business risk and performance;
- Articulate their vision clearly and communicate it in a persuasive and practical way, using a variety of approaches, while being simultaneously demanding and supportive;
- Make "difficult" decisions in the face of ambiguity, where difficult decisions may be simple or complex;
- Inspire staff to contribute to achieving the organisation's goals; and
- Provide stakeholders with confidence about the direction being taken and the benefits that will be achieved.

The degree to which the current and future leadership of the Branch excels at these practices will determine how successful the Branch will be in practising good asset management and achieving its asset management objectives.

## 8.4 Organisational structure

### 8.4.1 Historic structures

The macro structure of the Transport Infrastructure Branch responsible for roads have changed multiple times in the past, with the timeline stretching back to when the Branch was a full Department. The most recent macro structure that was in place from 2012 to March 2020 is shown in Figure 8-1.

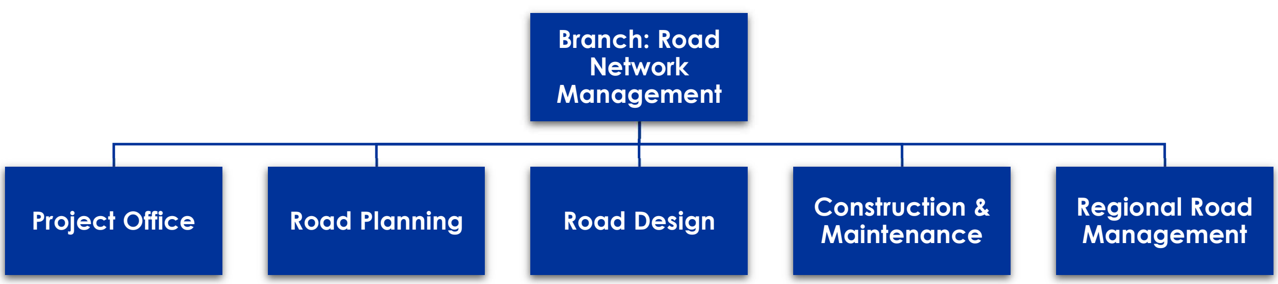


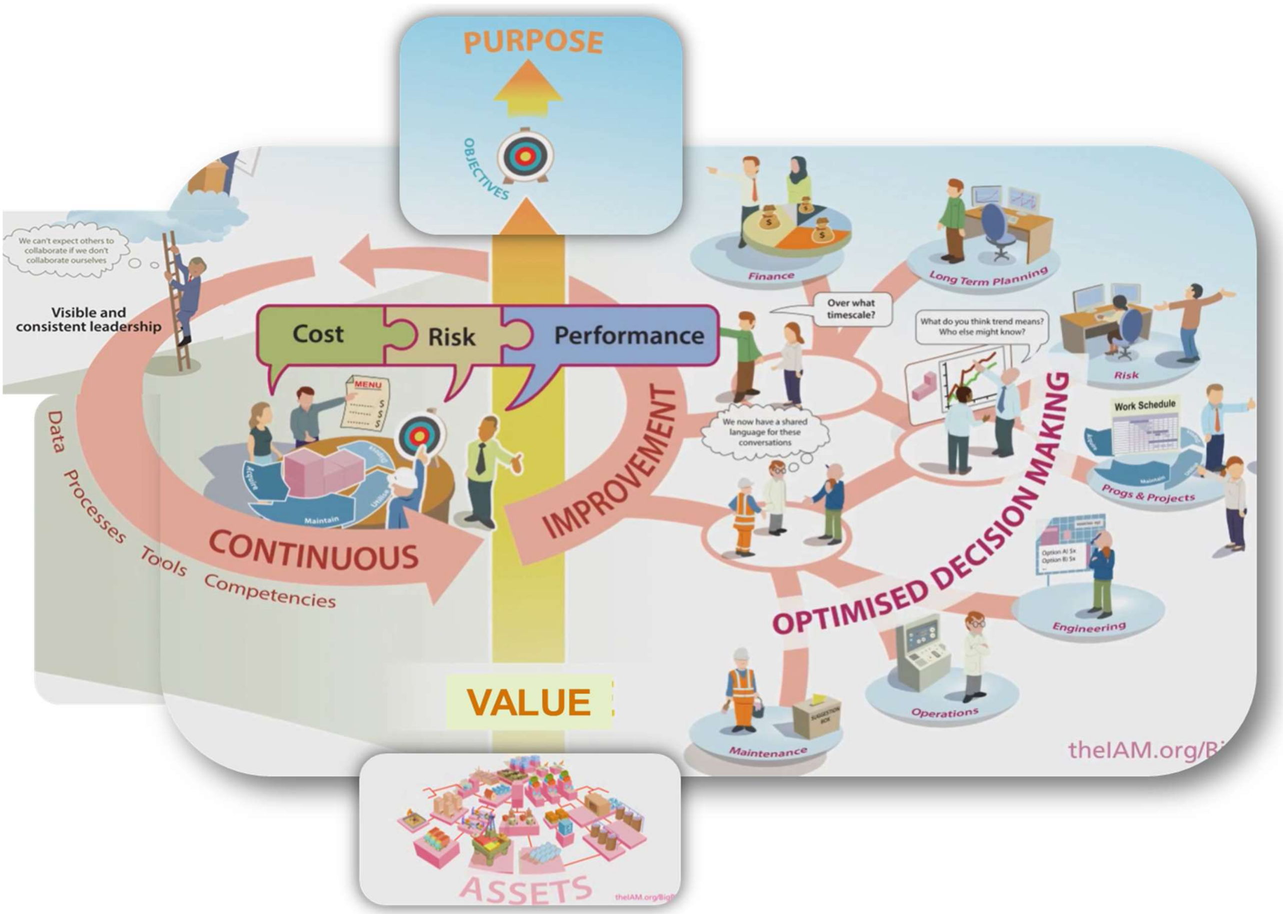

Figure 8-1: Macro-organogram of the branch until 31 March 2020

### 8.4.2 Aligning organisational structure

In the last few years, the Branch worked towards aligning the organisational structure with asset management objectives, as this is a key factor in determining an appropriate structure. The revision to this historic structure to meet the requirements of the Branch in terms of its organisational and asset management objectives has been thoroughly pursued during the last few years. This includes the determination of a suitable structure and adequate numbers of posts on appropriate levels. In order to achieve this, many authoritative documents were consulted, some of which are listed below:

- SANS 55001:2015 - Asset Management (International Standards Organization for Standardization, 2015);
- Asset Management – an anatomy (Institute of Asset Management, 2015b);
- The Asset Management Landscape (Global Forum on Maintenance and Asset Management, 2014);
- Organisation and people (Institute of Asset Management, 2015d);
- Asset Management – whole-life management of physical assets (Lloyd, 2010); and
- Draft Guide to the Road System Manager for the Western Cape (Henderson, 2015).

The IAM concept for an organisation implementing best practice in asset management is the basis on which the new structure is based is shown in Figure 8-2.




Copyright Institute of Asset Management

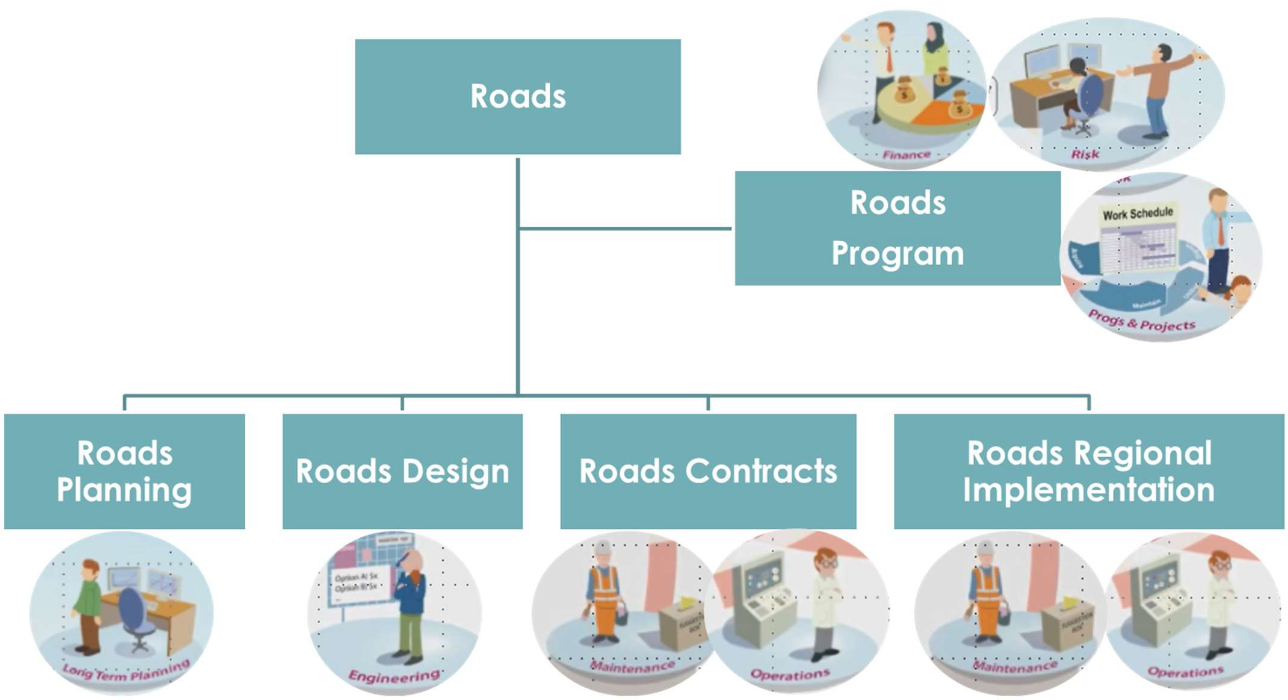
Figure 8-2: IAM concept for an organisation whose business is asset management

## 8.4.3 Triggers for change

There is no single organisational structure and culture that applies to all organisations, or is best suited to good asset management (Institute of Asset Management, 2015d). It follows that the Branch needed to understand the historic structure and decide what needed to change for it to successfully meet its objectives. The major triggers for change are as follows:

- A high risk that the management and delivery of projects and programmes will not achieve the desired outcomes with the current structure and staffing. The current structure lacks a component that has accountability for the coordination and management of the portfolio of assets, programmes and projects from inception to final completion.
- Whether the Branch is structured to promote integrated asset management rather than silos. The current structure does not support integrated asset management very well, resulting in a culture of working in silos.
- The need to implement new business processes that support asset management. The IAM concept organisation, presented in Figure 8-2, puts the whole organisation together in a "big picture".

The concepts represented in the "big picture" organisation have been translated into a structure that will help facilitate asset management in the Branch. An organogram illustrating how the newly implemented structure relates to the "big picture" organisation is shown in Figure 8-3.




Copyright IAM - clipart is an extract from the IAM Big Picture
Figure 8-3: High level organogram to facilitate asset management

### 8.4.4 Factors influencing the design of the structure

#### ***Integrated asset management***

The key requirement of the newly implemented structure is to promote integrated asset management, as opposed to silos.

#### ***Line of sight***

The new implemented structure connects a clear line of sight from top management to staff working on the ground from policy and strategy, to operational plans, to work execution. This can ensure that the Branch's activities are aligned to the top-level objectives with the cultural goal of understanding how everybody contributes to achieving success. Organisational structure is a key enabler of line of sight and should facilitate effective communications and feedback in all directions with internal and external staff and stakeholders. Asset management-related roles should have clear profiles or job descriptions identifying the contributions they make to the delivery of asset management objectives and how their work affects others (Institute of Asset Management, 2015d).

#### ***The value chain***

The asset management value chain is a chain of activities that take place within organisational components (Porter, 2008). Products pass through all activities of the chain, in order, and in each activity the product gains some value. The chain of activities gives the product more added value than the sum of the added values of all the activities. Each of the Branch's components has a role in adding value to the products and the activities should be grouped logically together to facilitate value creation. It is the process of integrating these activities in the Branch's components that truly creates the value chain. All these activities are built on a foundation of programme management that facilitate asset management and programme management as shown in Figure 8-4.

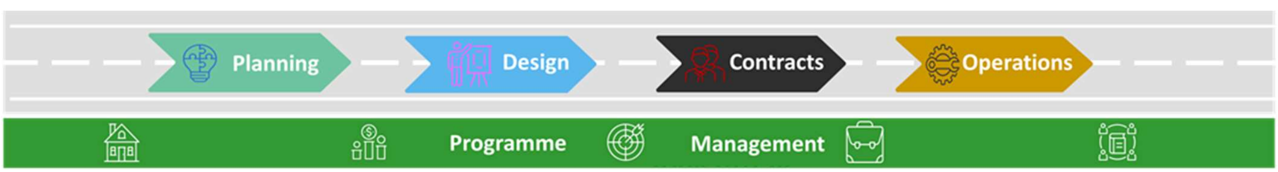



Figure 8-4: High level organogram flow to facilitate value asset management

#### ***Decision making on strategic, tactical and operational levels***

There is a need to group functions logically with respect to their level and impact on decision making in terms of asset management (Figure 8-5). There is a need to split functions that span strategic to operational level decision making.

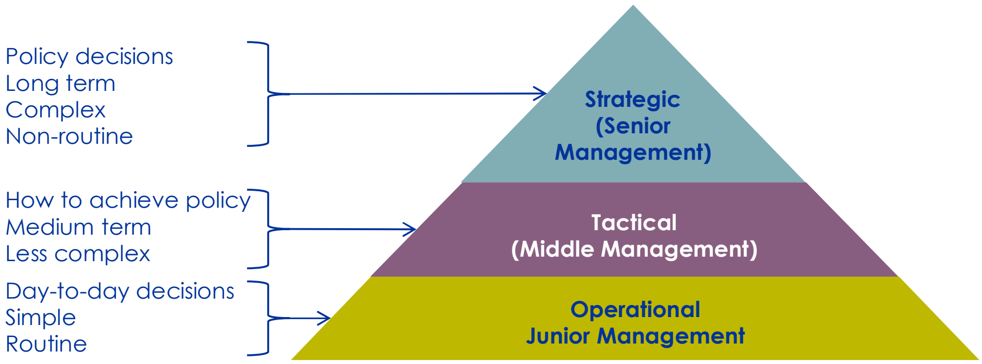



Figure 8-5: Decision making at different levels

### *Sustainability and continuity*

There is an imperative to maintain sustainability and continuity in the Branch. A high risk of losing sustainability and continuity is neither economically nor politically acceptable as the consequences for the Western Cape road network and economy are very negative in the mid- and long-term.

The structure should facilitate the establishment of a "critical mass" of professional and technical people in their disciplines and asset management, especially for those disciplines that are in demand and supply is limited. For the Branch, this means all types of civil engineers and many technologists. A critical mass of professional and technical people will assist in building and retaining institutional memory for sustainability in terms of asset management. Staffing of the proposed structure is based on minimum operational requirements due to current economic conditions and the filling all positions is therefore critical. This applies especially to middle management and lower management staff in order to retain continuity, both for short term absences of top and middle management, and for long-term succession planning for top management.

### *The role of teams*

Multi-disciplinary asset management teams are essential for unifying asset management activities across the Branch and driving progress across boundaries. They provide a way of overcoming fragmented thinking and attitudes and developing holistic approaches, decision making and practices. The effect of asset management can be seen as a wider shift into a new mode of knowledge production which is replacing or reforming established institutions, disciplines, practices and policies (Lloyd, 2010)(pp138-157).

### 8.4.5 2020 Organisational structure to date

The 2020 organisational structure, with the macro structure shown in Figure 8-6 was approved by the Executive Authority and implementation has commenced.


Figure 8-6: New organisational structure for the Transport Infrastructure Branch

In 2023 the Department restructured to the Department of Infrastructure and the Branch was renamed to Transport Infrastructure. The new organisational structure, that has only changed in name from the 2020 structure, with the micro-structure is provided in Appendix R.

### 8.4.6 Outsourcing and agreements with local authorities

Due to the current economic conditions and reasons of cost-effectiveness, the specialised and cyclical nature of work undertaken by the Branch will continue to operate on a co-sourced resource model in which internal capacity is augmented with contracted expertise from consulting engineers, contractors and district municipalities.

## 8.5 Branch culture

One of the most important elements of asset management is the role of culture. It is the foundation of good asset management, and a key ingredient of its success (Institute of Asset Management, 2015b). Culture refers to a long-lived set of values, beliefs, attitudes and assumptions which affect behaviour and performance over the longer term (Institute of Asset Management, 2015d). A simple definition is: "the way things are done around here".

Building an organisation with a healthy culture is a significant part of effective leadership and the organisational structure can have a major influence on the culture of the organisation and vice versa. Creating an appropriate culture is integral to achieving the level of integration between functions that good asset management requires (Institute of Asset Management, 2015b).

To enhance the culture and the connection between staff and the end vision, the Department have embarked on a campaign for "Shaping the future, Better together". Figure 8-7 shows some of the campaign themes developed by the DOI, focused on roads.

The approach is focused on creating a unifying rally cry that will work across all level of the Department in order to galvanise it with shared, single minded aspiration that will help motivate the Department's personnel. No matter the role, function or skill set, each and every person connected to the DoI plays a critical role in making the Western Cape a state-of-the-art and well function place for all to live and work, and the Transport Infrastructure Branch is no different.

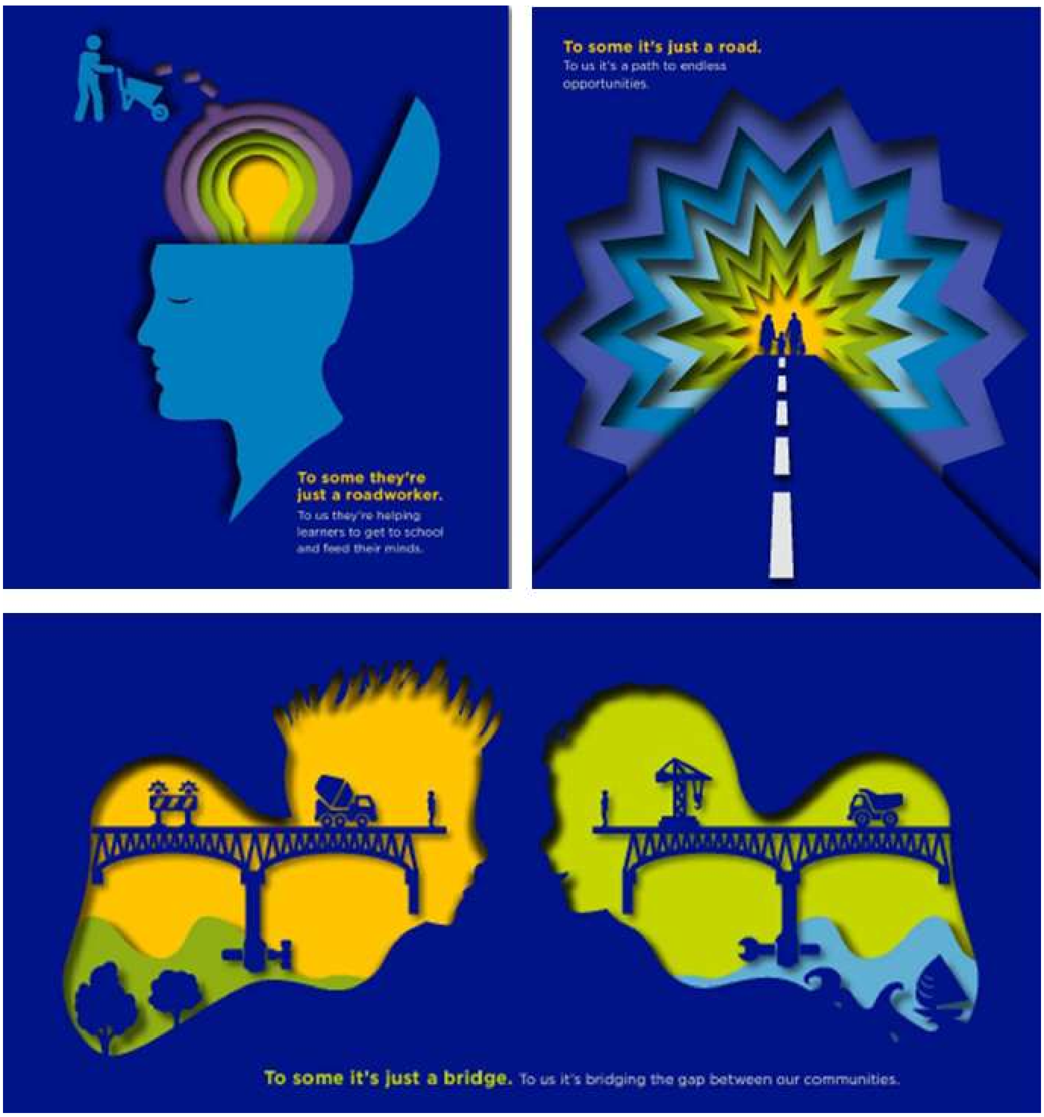



Figure 8-7: Shaping the future, better together campaign focused on roads

This approach has been complemented with a full roll out plan and the establishment of a new manifesto for the Department, as shown in Figure 8-8. It is noted how the road staff is thread through the Branch, from engineers, maintenance workers and road workers.

**MANIFESTO**

As a department we **honour our obligation** to serve all the people of this province, no matter who they are.

Because to us, a bricklayer doesn't just lay bricks, they **shape** the foundations for schools and hospitals.
A healthcare facility doesn't only help people who are sick, it helps **shape** healthy and fit communities by restoring their dignity and prosperity.
And a road worker doesn't just build roads, they **shape** pathways that lead to endless **opportunity**.

Together, let's **connect**, **recycle**, **renew**, **sustain** and **prosper**
And when you see our state-of-the-art health facilities,
brand new schools, **greener technology**, **efficient**, **safer** roads and transport systems, remember that they are there because of you.

And no matter if you are an engineer, an architect, a cleaner, an accountant, a maintenance worker, or a traffic officer, you're helping to **redress the past** and take our province into the **future**.

Through **mutual respect** and **ethical behaviour** we can and will shape our province into a **dignified society**, one which we can all be **proud** of.

The Department of Transport and Public Works.
**Shaping the future. BETTER Together.**

Western Cape Government

Figure 8-8: New manifesto for the department's campaign

## 8.6 Competence management

Competence management is "The processes used by an organisation to systematically develop and maintain an adequate supply of competent and motivated people to fulfil its asset management objectives including arrangements by managing competence in the boardroom and the workplace" (Institute of Asset Management, 2015d).

People "do" asset management and therefore people, and their knowledge, competence, motivation and teamwork can make the biggest difference to good or poor asset management, otherwise known as an "asset management culture".

It is inevitable that people coming to the discipline of asset management have already demonstrated competence in other professions, such as engineering or finance, and may have significant specialist expertise in a field such as maintenance or auditing. Determining what competences are needed to complete the development of an individual is important, and can be acquired through the following avenues:

- asset management training courses developed by various organisations, including free e-learning courses;
- publications and on-line resources, some of which are available from the IAM;
- asset management conferences; and
- working on projects/ initiatives which will enable development of asset management knowledge in specific areas (Institute of Asset Management, 2015b).

The Branch continue to support their staff by Membership to the Institute of Asset Management and are currently in process to also register at The Southern African Asset Management Association (SAAMA), that aims to promote the interests of asset management and maintenance, as well as to uplift the role of asset management and maintenance practitioners in Southern Africa, to enhance our international perspective with a regional view.

### 8.6.1 39 subjects defining asset management

The 39 subjects describe the body of asset management knowledge as a whole, The 39 subjects are aligned with the Asset Management Landscape version 2 (Global Forum on Maintenance and Asset Management, 2014), published by the Global Forum on Maintenance and Asset Management (GMFAM), which was developed by the global asset management community to define the scope of the discipline.

The 39 asset management subjects (Figure 8-9) are linked to 6 subject groups, which in turn are reflected in the conceptual model (Figure 8-9) in a structured way.

These 39 subjects are intended to describe the complete scope of asset management. Therefore, any person who intends to become demonstrably competent or expert in this field will need to know enough of the complete breadth of all the subjects in addition to any deep and detailed expert knowledge in any one of them. Although the 39 subjects are described individually, they should be not considered as discrete subjects. There is interrelationship between the subjects and the contribution they make as a whole to an organisation's asset management capabilities (Institute of Asset Management, 2015b).

### 8.6.2 Competences Framework

The IAM has developed a competences framework that describes what people working in asset management should be able to do and indicates what they ought to know and understand. It is a tool that organisations, managers and individuals can use in numerous ways including in training needs analysis, recruitment and selection, career planning, continuing professional development and workforce management.

The framework contains a single set of generic competence requirements that are applicable to all organisations and sectors where business performance relies on optimising the delivery and performance of physical assets. The framework describes what people involved in the management of physical assets should be able to do and the knowledge and understanding needed to underpin this. Its structure is compatible with that of other leading competence frameworks and its contents reflect the principles and support the requirements of BSI PAS 55:2008 (British Standards Institute 2008), the precursor to ISO55000 (International Standards Organisation 2014). The Framework consists of two documents:

- Part 1 sets out asset management competence requirements and
- Part 2 contains guidance on how to use the framework.

The framework defines a key purpose for people working in asset management and the 6 roles needed to achieve this. Each role is broken down into a small number of competence units, such as "Develop the Asset Management Policy". There are 27 units in total. Each unit is then subdivided into a small set of elements of competence such as "Assess policy options using appropriate decision criteria".

To adapt the competences framework to the Branch's specific needs, a decision on which of the units are applicable to various roles within the Branch would need to be taken. In addition, the development of performance criteria is needed for each element and the knowledge and understanding requirements will also need to be tailored to the Branch's circumstances.


Figure 8-9: 6 subject groups and 39 subjects

### *Using the Competences Framework*

The Competencies Framework assists with:

- Writing or reviewing job descriptions;
- Planning recruitment;
- Defining selection criteria;
- Identifying individual learning and development needs;
- Managing individual and team performance;
- Career planning; and
- Performance review.

Part 2 of the framework contains guidance on how the Framework can be used to combine these and other processes in a systematic approach to managing the competence of the asset management workforce in the Branch. A copy of the Framework has been obtained from the IAM and can provide a valuable resource for the Branch for managing the competence of its staff.

### 8.6.3 Gap analysis of asset management competences

A gap analysis of the asset management competences of current Branch staff in the subset of subjects relevant to the Branch has not yet been done. Very few of these subjects are covered at under-graduate level in civil engineering. Most subjects will require additional study to fill the gap between the current knowledge of and expertise in the relevant subjects listed in Figure 8-9 and the level required to be competent practitioners of asset management.

## 8.7 Human resources

### 8.7.1 Current status

The newly approved posts within the 2020 approved structure will not be filled at once, and as of December 2023 the status of the establishment is as shown in Figure 8-10 and Figure 8-11.

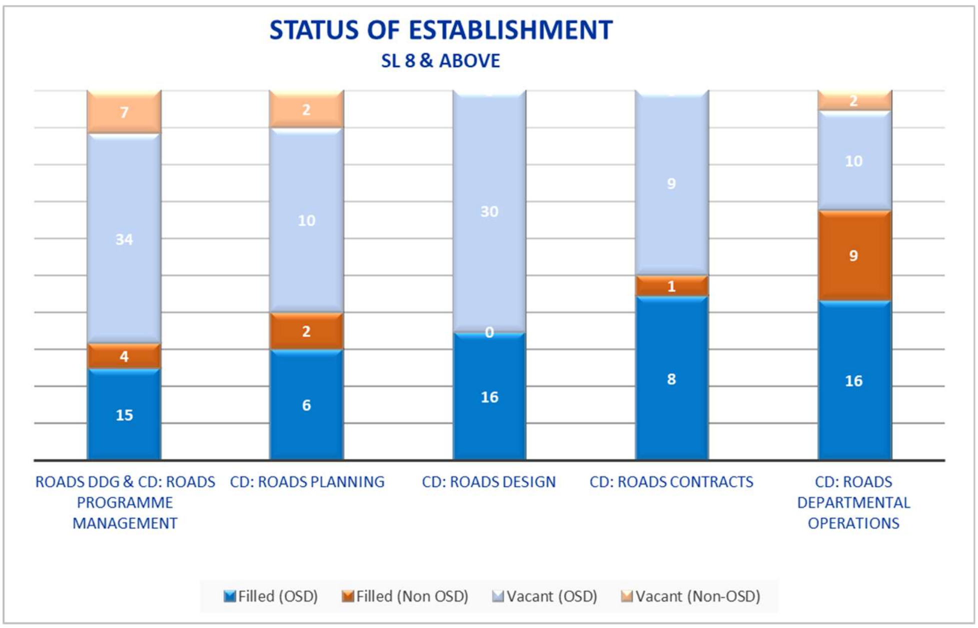



Figure 8-10: Branch establishment status for OSD and SMS Staff (2023)

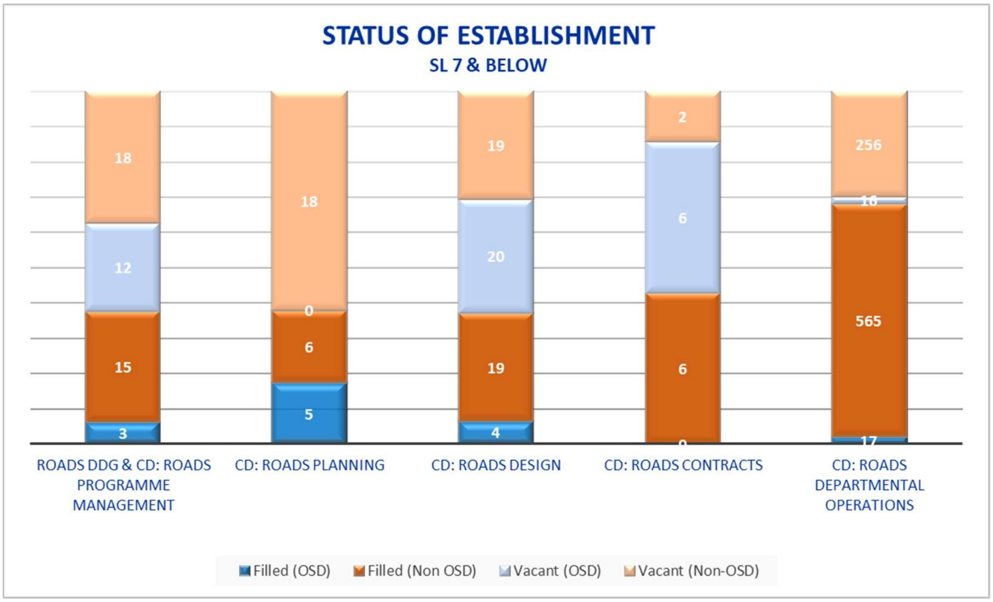



Figure 8-11: Branch establishment status for Non OSD and SMS Staff (2023)

There is a significant vacancy rate across Senior Management, Middle Management Professional Engineers, Technical Professionals, GISc staff, Environmentalist, Artisan positions and Road workers. The new vacant posts were recently frozen in the Western Cape and this have also already had an impact in the process of filling the above posts. The current Occupation Specific staffing status within the New Branch per post is summarised Table 8-2.

**Table 8-2: Current personnel within the Branch as filled at January 2023 against the approved structure**

| Sub-Programme | Positions / Services | | Training in Various Fields | | |
|---|---|---|---|---|---|
| | Filled | Total Posts | In Training | Year started monitoring for this report | Successful** |
| Artisans | 17 | 29 | 7 | 2021 | 16 |
| Environmental staff | 0 | 5 | 0 | - | 0 |
| GISc | 3 | 6 | 0 | 2021 | 1 |
| Technicians | 24 | 72 | 7 | 2010 | 12 |
| Technologist | 9 | 50 | 7 | | |
| Engineers | 35 | 64 | 20 | | 35 |
| Professional Management staff (SMS) | 2 | 10 | 7 | 2021 | 0 |

** All staff that have been on the program at some stage are tracked, as far as possible to establish if the program had a long-term effect in having them professionally registered even if they have moved to industry at time of registration. Or only started with the branch as a Mature candidate.

The shortage of staff, in production levels continues to make it difficult for this Branch to undertake its tasks and to attain employment equity targets. In 2005, the Branch developed a comprehensive recruitment and training program for engineers, and technicians that facilitate the registration of professionals that have assisted in filing of professional posts, which was a major challenge that has transpired in previous years. More on the success of this program in Chapter 10.

As good as this training program has proven to be, filling the age gap with people who have more than 10 years' experience in production engineering can only be achieved by external recruitment. The new Branch continues with the work that was identified as crucial to ensure a sustainable feed of technical staff.

Figure 8-12 shows the age profile for Engineers, and Artisans. The very low numbers of staff that are between 40-60, is clearly illustrated. The current situation, causing focus to train younger staff to limit the vacuum at management level when current senior staff retire. Several people have been employed on 1-year contracts or multi-year contracts, to assist with the knowledge transfer. This is a huge risk for the Branch as staff recruitment is proven to be exceptionally difficult, in the age-gap (see Chapter 11 for further discussion on this topic).

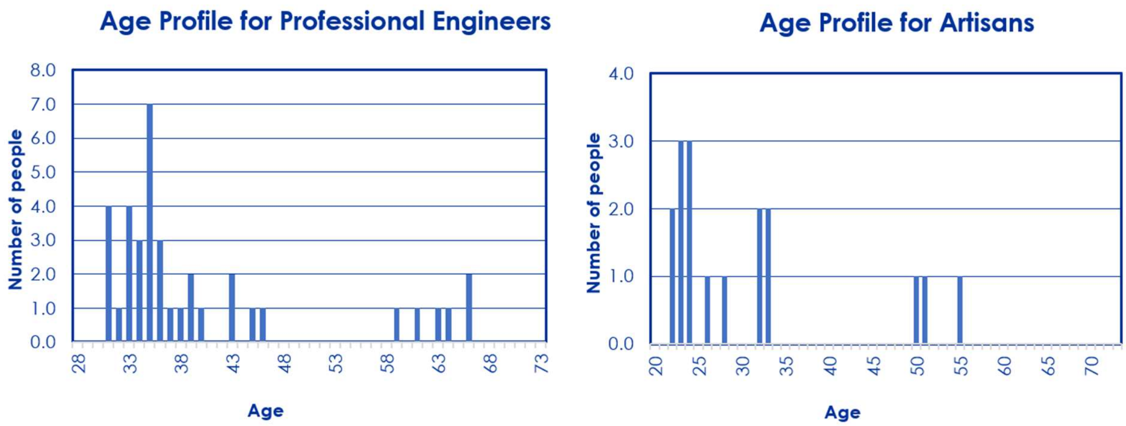



Figure 8-12: Age profile of engineering staff including management (2023)

### 8.7.2 Public Service framework for the employment of professional staff

The following Public Service documents were referred to in connection with this paragraph and paragraphs 8.7.3, 8.7.4 and 8.7.5:

- Department of Public Service and Administration Circular 5 of 2009: Implementation of the Occupational Specific Dispensation (OSD) for engineers and related occupations;
- GPSSBC [General Public Service Sector Bargaining Council] Resolution no. 5 of 2009: Agreement on the implementation of Occupational Specific Dispensation (OSD) for Engineering Technicians, etc.;
- GPSSBC Resolution no. 9 of 2009: Agreement on the implementation of an occupational dispensation for Engineers.;
- Department of Public Service and Administration letter dated 11/3/2013: "Interpretation of GPSSBC Resolutions 3, 4, 5, 6, 8 and 9 of 2009 read together with the determination under DPSA Circular 5 of 2009: Occupational Specific Dispensation (OSD) for engineers and related occupations";
- Department of Public Service and Administration Public Service Regulations 2016; and
- Department of Public Service and Administration Directive on Compulsory Capacity Development, Mandatory Training Days and Minimum entry requirements for SMS dated April 2016.

### 8.7.3 Constraints on the employment of professional staff

A constraint is something imposed on the Branch that restricts the options it can consider. Constraints on the employment of engineers, technologists and technicians are described below.

- The limited pool of available competent engineers, technologists and technicians with experience in the planning, design and delivery of road projects and programmes. This situation has been documented by Allyson Lawless (Lawless, 2005).
- The recruitment process for new staff is extremely long, taking many months, even up to a year, by which time candidates may no longer be available or interested in taking up positions in the Branch.
- The Occupational Specific Dispensation for Engineers and Related Professions and Occupations (OSD) notch progression of 2 years is a constraint on competitive salaries for highly competent professionals.
- The Occupational Specific Dispensation for Engineers and Related Professions and Occupations (OSD) does not include the management stream envisaged in 2009. Even though all Senior Management of the Transport Infrastructure Branch needs to be Professionally registered with ECSA, causing disparities between positions.
- The reluctance of many professional engineers and technologists and technicians to work for a provincial government as a result of the track record of under-performance in many provincial departments in South Africa, including those responsible for roads, as well as a culture that can be incompatible with professional values. Although these two factors are not perceived to be major issues in the Western Cape, many competent engineers, technologists and technicians, might well view employment in a provincial government roads department to be a less attractive career.; and
- The lack of annual salary increases and performance bonuses in the foreseeable future.

### 8.7.4 Barriers preventing employment of professional staff

A barrier is something that exists in the Branch that will prevent change occurring. Barriers preventing employment of engineers in the Branch are described below.

- As professional registration is not a requirement for many potential candidates working currently in the private sector, many experienced engineers cannot be offered a competitive salary in the Branch. Consequently, there is a very limited pool of engineers to which the Branch can offer competitive salaries. This is exacerbated by the interpretation of recruitment and selection that the new DPSA Regulations do not allow matching a salary of a person being recruited from the private sector in a Chief Engineer or Control Post. Also, the OSD does not consider pre-registration experience for engineers at production level. These barriers, in conjunction with the constraint on the number of suitable candidates, creates a significant risk that no potential candidates will be employed.

Barriers preventing employment of artisans in the Branch are described below.

- As Artisans at the Transport Infrastructure Branch must maintain the equipment of the Mechanical Services, which includes multiple specialised equipment. The OSD does not consider the nature and value linked to this specialised equipment and the advance technical skill needed to maintain the equipment causing the only advancement or promotion to be in the management environment. These barriers, in conjunction with the constraint on the number of suitable candidates, creates a significant risk that no suitably experienced artisans will be employed.

### 8.7.5 Barriers to progression (engineers)

- Professional engineers are required to manage the Branch. However, they must be employed on the administrative leg for management posts as the Engineering Management leg of OSD as described in the 2009 resolution for Engineers has not been activated. There is currently no means to place them higher on the OSD salary scale. This has the perverse result that a person's salary is reduced when, e.g., a person is promoted from an OSD position, such as Chief Engineer, to Director in order to manage an engineering component.
- The Compulsory Capacity Development, Mandatory Training Days and Minimum entry requirements for SMS does not load an extra training quantity on the Unit but, also aids in the barriers to progression, from Chief Engineers to Chief Director as the entry requirement of 5 years Senior management, cannot be obtained, in the OSD environment. This while Chief Engineers earn equal that of Directors. Deputy Director General needs 8 years of which 3 must be in the Public sector senior management, adding an additional Barrier to management of a Professional team.

### 8.7.6 External resources

To supplement its internal capacity, the Branch is heavily dependent on the appointment of consulting engineers to investigate, design and supervise projects. The five district municipalities act as agents of the WCG for the maintenance of main, divisional and minor roads.

## 8.8 Financial implications

The costs associated with the RAMP can be divided into 5 components, namely:

- infrastructure management systems implementation and upgrading to maintain technical excellence and information technology standards;
- data acquisition and verification;
- data processing;
- economic analysis and reporting; and
- RAMP preparation and updating.

The costing of these components involves internal staff costs, external vendors and consultants. A cost estimate is based on 2022/23 RAMP and is provided in Table 8-3.

<table>
<tr><th colspan="4">Table 8-3: Estimated cost of the RAMP</th></tr>
<tr><th>Activity</th><th>Cost of external provider<br>2021 Rands (millions)</th><th>Cost of staff<br>2021 Rands (millions)</th><th>Total Cost<br>2020 Rands (millions)</th></tr>
<tr><td>1. Management systems operational cost</td><td>52,6</td><td>3,3</td><td>55,9</td></tr>
<tr><td>2. Data acquisition and verification</td><td>19,3</td><td rowspan="3">Included in item 1 above</td><td>19,3</td></tr>
<tr><td>3. Data processing</td><td>Included in item 1 above</td><td>Included in item 1 above</td></tr>
<tr><td>4. Economic analysis and reporting</td><td>0,8</td><td>0,8</td></tr>
<tr><td>5. RAMP preparation and updating</td><td>0,6</td><td>5,0</td><td>5,6</td></tr>
<tr><td>Totals</td><td>73,3</td><td>8,3</td><td>81,6</td></tr>
</table>

## 8.9 Overview of Asset Management Systems and Processes

As part of the asset management planning, the Branch has initiated a new efficiency system to assist the Transport Infrastructure Branch in the planning, design and contract management of implementing efficiency systems in terms of asset portfolio and project management.

A gap analysis on the current project, asset management and information systems were initiated in September 2018.

This exercise will form part of the System Support Services review of key asset management systems and the development of a new efficiency process system.

# CHAPTER 9. PLAN IMPROVEMENT AND MONITORING

## 9.1 Performance measures

The network condition performance measures, discussed in paragraph 3.1, are used to monitor the performance of the Plan. The key performance indicators are:

- the condition of the paved road network (see Figure 4-5);
- the condition of the seals on paved roads (see Figure 4-47);
- the condition of the gravel road network (see Figure 4-9); and
- the thickness of gravel on the gravel road network (see Figure 4-54).

The trend in these indicators over time is indicative of the success or otherwise of the plan in respect of road infrastructure. Additional measures (key performance indicators – KPIs) are being developed for national use.

The future trend in the percentage of heavy vehicles that are legally loaded will indicate the success or otherwise of the plan in respect of overloading control.

## 9.2 Improvement programme

The weaknesses of the RAMP will be assessed every year and improvements will be made in future editions of the RAMP as soon as possible.

### 9.2.1 Improving the accuracy of the plan

The new RAMP guideline will enable the Branch to improve the accuracy of, and confidence in, the RAMP.

#### *Systems improvements*

Future new systems that will assist in improving the RAMP are:

- a new efficiency system, to assist the Transport Infrastructure Branch in the planning, design and contract management in terms of project processes; and
- a new estimating and unit rate system to provide improved cost estimates for Branch projects that are based on historical rates sourced from completed projects.

In addition, ongoing improvements are being made:

- Bridge Management System to assist with the collection of inventories, information data and condition of bridge and structures
- a maintenance management system (ROPE) to assist with the tactical level management of routine maintenance;
- PQMS modules; and
- updates to several systems to avoid technical obsolescence.

In addition, the following initiatives are planned:

- Regularly reviewing norms and standards to ensure that best practices and innovative solutions are followed;

- the promotion of cooperative governance through forums to encourage better adherence to Western Cape design standards; and
- installing and using more electronic surveillance equipment to target real overloading transgressors, without inconveniencing law-abiding operators of heavy vehicles.

It is envisaged that the RAMS Coto committee will be established to manage variables for target setting and improvement evaluation.

### 9.2.2 Monitoring and review procedures and reporting

***Monitoring and review procedures***

Performance measures are provided by the Branch's systems and monthly reports are generated. A review is done every year as part of the requirements for the Branch's Annual Performance Plan and is reported in the Department's Annual Report.

No external audit of the data in the information data bases is planned at present, mainly because this would be a major undertaking, duplicating the current internal quality assurance that verifies all the data, with very little or no expected benefit (The current internal process makes use of internal staff and capacity consultants, to ensure accuracy.

This plan will be updated every year to reflect changes in budget allocations. Road condition information is updated continually in such a manner that enough new information is available to rerun the dTIMS analyses at least once every two years. Therefore, it may only be possible to base the revised Desired Funding on dTIMS analyses every second year.

## 9.3 Strategic Network

Table 9-1 provides the implementation plan based on the 2023/24 adjustment budget for the projects on the strategic network for the 2024/25 financial year.

**Table 9-1: Implementation plan for the strategic road network for 2024/25**

| Project Name | IDMS Stage | Road Number | Total Length | Estimated Budget 2024/25 (R x '000) |
|---|---|---|---|---|
| C1105: Periodic Maintenance of TR9/2 - Du Toitskloof Pass | Works | TR00902 | 21,04 | 90 700 |
| C1147: Periodic Maintenance of MR552, MR546, DR2220 - Lutzville | Works | MR00552 | 24,28 | 2 300 |
| C0749.02: Reconstruction and Periodic Maintenance of MR191 - Paarl to Franschhoek | Design Documentation | MR00191 | 22,90 | 150 000 |
| C1183: Periodic Maintenance of TR33/5 - Klaarstroom to Beaufort West | Works | TR03305 | 110,00 | 7 200 |
| C1125: Periodic Maintenance on TR83/1, TR83/2, TR31/5 and MR365 - Riversdale/Ladismith Area | Works | TR03105 | 0,48 | 80 000 |
| C1141: Periodic Maintenance of TR03103, MR00295, MR00294, DR01356 and OP06046 - Montagu | Works | TR03103 | 20,70 | 28 000 |

| Table 9-1: Implementation plan for the strategic road network for 2024/25 | | | | |
|---|---|---|---|---|
| **Project Name** | **IDMS Stage** | **Road Number** | **Total Length** | **Estimated Budget 2024/25 (R x '000)** |
| C1145: Periodic Maintenance of DR01123, TR02501 and MR00174 - Drakenstein Municipality | Works | MR00174 TR02501 | 19,66 | 50 000 |
| C0914: Rehabilitation of MR168 - Annandale Road to Polkadraai | Works | MR00168 | 4,38 | 126 000 |
| C1154: Periodic Maintenance of TR03302 - Hartenbos to Oudtshoorn | Works | TR03302 | 50,00 | 115 100 |
| C1025.10: Periodic Maintenance of TR11/1 – Wingfield and Bosmansdam | Works | TR01101 | 2,00 | 1 800 |
| C1213: Periodic Maintenance of TR16/8 and TR16/9 – Northern Cape Boarder and Murraysburg | Works | TR01608 TR01609 | 46.06 | 45 000 |
| C1000: Upgrade of TR28/2 - Stanford to Gansbaai | Works | TR02802 | 19,22 | 220 000 |
| C0838.06: Rehabilitation and Reseal of various sections on MR269 - Sandbaai to Caledon | Works | MR00269 | 17,74 | 32 500 |
| C1101: Reconstruction of TR1/1 km 19.36 to km 24.55 between George and Oudtshoorn | Design Documentation | TR00101 | 5,19 | 90 000 |
| C1116.01: Periodic Maintenance on TR22/2, TR22/1 and MR316 - Ceres to Touwsrivier | Works | TR02201 TR02202 | 86,44 | 76 200 |
| C1104: Periodic Maintenance on TR33/4 - De Rust to Klaarstroom, and TR34/2 - Klaarstroom to Prince Albert | Works | TR03304 TR03402 | 36,55 | 3 300 |
| C1143: Periodic Maintenance of TR32/1, TR31/3, TR65/1, DR1354, DR1352, OP6074, OP6072 and OP6069 - Swellendam | Works | TR03103 TR03201 TR06501 | 59,91 | 2 000 |
| C1038.02: Upgrade of TR11/1 - Van Schoorsdrift Interchange | Design Documentation | TR01101 | 0,11 | 30 000 |
| C0964.02: Upgrade of TR33/1 - Beach Road Boulevard West to Garret Street | Works | TR03301 | 9,56 | 170 700 |
| C1047.04: The widening of Bridge No. 2221 over the Maalgate River at 15.1km on TR2/9 | Works | TR00209 | 0,08 | 1 000 |
| C1025.01: Upgrade of Refinery Interchange on TR11/1 | Works | TR01101 | 0,11 | 2 000 |
| C1102.01: The Upgrade of MR201 - N1 to Kliprug Road | Works | MR00201 | 3,75 | 48 000 |
| C1271.01: Emergency repairs on TR16/2 Vanrhyns Pass | Works | TR01602 | 5,51 | 27 500 |
| C1270.04: Emergency repairs on TR27/1 – Clarence Drive | Works | MR00269 | 17,00 | 10 000 |

| Table 9-1: Implementation plan for the strategic road network for 2024/25 | | | | |
|---|---|---|---|---|
| **Project Name** | **IDMS Stage** | **Road Number** | **Total Length** | **Estimated Budget 2024/25 (R x '000)** |
| C1270.06: Emergency repairs on MR191 – Franschhoek Pass | Works | MR00191 | 32,38 | 5 000 |
| C838.07: Emergency repairs on MR269 – Hemel en Aarde | Concept and Viability | MR00269 | 3,60 | 5 000 |
| | | | **572,59** | **1 419 300** |

# CHAPTER 10.JOB CREATION AND SKILLS DEVELOPMENT

## 10.1 Expanded Public Works Programme

### 10.1.1 Approach

The revised strategy for EPWP is focused on improvements in the following areas:

- the number of work opportunities created;
- informal training;
- formal training; and
- a greater focus on maintenance to ensure sustainability of work training opportunities.

A systematic analysis of the above areas has resulted in the following recommendations:

- Communication and coordination between various authorities and Branches should be improved.
- The Branch prioritise greater utilisation of longer (15 to 24 month) contracts in the routine road maintenance area as it is easier to implement and more sustainable.

The following approach to the expansion of the job creation has been adopted:

- A renewed focus will be put on maintenance activities to increase the number of work opportunities, the duration of employment, and the opportunities for training.
- The duration of routine road maintenance contracts will be indevoured to be increased to a minimum of 24 months.
- Contract documentation will have specific provisions for Construction Industry Development Board (CIDB)-registered subcontractor development.
- Training will be done with officials on the methodology of labour-intensive approaches to construction and maintenance.

A refinement of PRMG requirements and the identification and prioritisation of projects based on the five S'Hamba Sonke pillars, i.e. labour intensity, improved access, asset management, safe roads and increased investment will be required.

### 10.1.2 Job creation commitments for 2024/25

The national benchmarks for each sector are set by the National Department of Public Works and Infrastructure, which is also the custodian of the national reporting platform. The Branch's performance targets to support economic growth and empowerment through road-based transport infrastructure investment are shown below:

- Work opportunities: 4 500;
- Number of youths employed: 2 400;
- Number of women employed: 1 200; and
- Number of persons with disabilities employed: 5.

The planned deliverables (i.e. work opportunities) based on the Branch's 2023/24 programme is shown in the job creation estimates (Appendix M – Job creation estimates).

## 10.1.3 EPWP/PRMG national site visits

During each delivery cycle, the national Department of Transport requests the identification of two pilot projects for a national visit. Construction sites were selected during the 2023/24 financial cycle for their combined contribution to meeting the PRMG (S'Hamba Sonke) principles (listed in paragraph 10.1.1). The following sites were inspected by National Department of Transport in November 2023:

- C1025.10: The Periodic Maintenance of Trunk Road 11/1 (Route N7) from Wingfield Interchange (km 0.00) to Bosmansdam Road Interchange (km 2.00); and
- C1125: Periodic Maintenance of TR83/1, TR83/2 and MR365 - Riversdale to Ladismith Statistics regarding developmental training

The attached detailed spreadsheet (Appendix N – Contractor development training) indicates that there were over 81 opportunities to indirect contractors in the 2022/23 financial year.

Based on 2023/24 budget project-categorisation, the summary forecasts are projected for 2024/25 and are shown in Table 10-1 and the details in Table 10-2.

**Table 10-1: Summary forecast of PRMG projects January 2024**

| Type of Activity | No of Project | Estimated Budget 2024/25 (R x '000) |
|---|---|---|
| Periodic Maintenance | 18 | R 791 500 |
| Rehabilitation | 3 | R 286 000 |
| Safety | 1 | R 160 000 |
| Routine Maintenance | 1 | R 33 000 |
| **Grand Total** | **23** | **R 1 270 500** |

**Table 10-2: Details of PRMG training projects January 2024**

| No. of Projects | Type of Activity | IDMS Stage | Estimated Budget 2024/25 (R x '000) | *SMMEs SMME Contract Value (R x '000) | *SMMEs No. |
|---|---|---|---|---|---|
| 18 | **Periodic Maintenance - Total** | | **699 000** | | **62** |
| | C1088.01: Periodic Maintenance on MR267 - Stanford to (N2) Riviersonderend | Works | 1 800 | 270 | 1 |
| | C1102.02: The Upgrade of DR1413 From Km 6.59 To Km 7.94 Near Wellington | Works | 1 300 | 195 | 1 |
| | C1103: Periodic Maintenance on TR2/12 from Kurland to Eastern Cape Border (Bloukrans Pass) | Handover | 3 000 | 450 | 1 |
| | C1104: Periodic Maintenance on TR33/4 - De Rust to Klaarstroom, and TR34/2 - Klaarstroom to Prince Albert | Handover | 3 300 | 495 | 1 |
| | C1105: Periodic Maintenance of TR9/2 - Du Toitskloof Pass | Works | 90 700 | 13 605 | 6 |
| | C1116.01: Periodic Maintenance of TR22/1, TR22/2 and – Wolseley to Touwsrivier | Works | 76 200 | 11 430 | 6 |
| | C1125: Periodic Maintenance on TR83/1, TR83/2, TR31/5 and MR365 - Riversdale/Ladismith Area | Works | 80 000 | 12 000 | 6 |

| Table 10-2: Details of PRMG training projects January 2024 | | | | | |
|---|---|---|---|---|---|
| No. of Projects | Type of Activity | IDMS Stage | Estimated Budget 2024/25 (R x '000) | *SMMEs | |
| | | | | SMME Contract Value (R x '000) | No. |
| | C1141: Periodic Maintenance of TR03103, MR00295, MR00294, DR01356 and OP06046 - Montagu | Works | 28 000 | 4 200 | 4 |
| | C1143: Periodic Maintenance of TR32/1, TR31/3, TR65/1, DR1354, DR1352, OP6074, OP6072 and OP6069 - Swellendam | Works | 2 000 | 300 | 1 |
| | C1147: Periodic Maintenance of MR552, MR546, DR2220 - Lutzville | Works | 2 300 | 345 | 1 |
| | C1154: Periodic Maintenance of TR03302 - Hartenbos to Oudtshoorn | Design Documentation | 115 100 | 17 265 | 6 |
| | C1183: Periodic Maintenance of TR33/5 - Klaarstroom to Beaufort West | Works | 7 200 | 1 080 | 1 |
| | C1203: Periodic Maintenance of TR03002, TR03101, DR01347, DR01377, DR01379 and DR01400 | Design Documentation | 85 000 | 12 750 | 6 |
| | C1205: Periodic Maintenance of MR00291 | Works | 31 000 | 4 650 | 4 |
| | C1213: Periodic Maintenance of TR16/8 and TR16/9 – Northern Cape Boarder and Murraysburg | Works | 45 000 | 6 750 | 4 |
| | C1214: Periodic Maintenance of MR00331 between Still Bay and Groot-Jongensfontein | Works | 1 600 | 240 | 1 |
| | C1216: The Periodic Maintenance of MR310, DR1458 and DR1487 between Ceres and Op Die Berg | Works | 185 000 | 27 750 | 8 |
| | C1230: The Periodic Maintenance of TR85/1, TR21/2, MR559 and OP7643 within the Saldanha Bay Area | Works | 33 000 | 4 950 | 4 |
| 3 | **Rehabilitation - Total** | | **127 000** | | **16** |
| | C0914: Rehabilitation of MR168 between Annandale Road and Polkadraai | Works | 126 000 | 18 900 | 6 |
| | C802.05: Rehab MR533 between St Helena Bay (km 13,19) and Stompneus Bay (km 23,08) | Works | 108 000 | 16 200 | 6 |
| | C1008: Rehab MR533 between St Helena Bay (km 13,19) and Stompneus Bay (km 23,08) | Works | 52 000 | 7 800 | 4 |
| 1 | **Safety project - Total** | | **160 000** | | **8** |
| | C1038.02: Safety Improvement N7 Potsdam Melkbos Van Schoorsdrif I/C, Km 0.2. | Design Documentation | 160 000 | 24 000 | 8 |
| 1 | **Routine Maintenance - Total** | | **33 000** | | **4** |
| | C1212.01: Routine Road Maintenance | Works | 33 000 | 4 950 | 4 |

## 10.2 Number of jobs created

The number of jobs created per programme since 1 April 2017 is shown in Table 10-3.

| Table 10-3: Jobs created per programme since 1 April 2017 | | | | | | |
|---|---|---|---|---|---|---|
| **Work Opportunities** | **2017/18** | **2018/19** | **2019/20** | **2020/21** | **2021/22** | **2022/23** |
| Work Opportunities | 4 257 | 5 119 | 5 890 | 4 000 | 1 444 | 3 195 |
| Work Opportunities (Women) | 1 206 | 1 512 | 1 690 | 1 114 | 390 | 1 008 |
| Work Opportunities (Youth) | 2 526 | 3 170 | 3 416 | 2 247 | 767 | 1 834 |

The job creation estimates for 2023/24 are provided in Appendix M – Job creation estimates.

## 10.3 Skills development for graduates

In response to the shortage of staff in the Branch, particularly in the professional and technical positions, the Branch is conducting a comprehensive Engineer and Technician Recruitment and Training Programme, which facilitates the training and registration of civil engineering professionals. This programme supports the Departmental Skills Development Strategy (Western Cape Government: Transport and Public Works, 2005) that was finalised in 2005.

The purpose of the candidate development programme is to provide newly graduated technicians, technologists and engineers exiting from the Masahki'Sizwe Bursary Programme with a high standard of workplace experience to allow them to register as professionals with the Engineering Council of South Africa (ECSA) in the shortest period of time, and also to retain as many of these graduates to fill vacant posts in the Branch.

The workplace experience provided is designed to incorporate exposure to all phases of the project lifecycle i.e., conception, design, construction and maintenance. The development programme therefore includes deployment to civil engineering construction companies and consulting engineering companies. Candidates are also deployed in the Design, Planning and Construction Directorates within the Branch and, in certain cases, to DRE offices.

The professional development programme has expanded to include mechanical engineers and GIS professionals as from 2020.

Table 10-4 provides a summary of the graduates taken into the programme since its inception in 2010. The revised statistics as shown in Table 10-4 includes graduates that obtained their professional registration after leaving the Professional Development Programme.

**Table 10-4: Summary of graduates since inception in 2010**

| Year | Intake | | | | Completion | | | Current Number |
|---|---|---|---|---|---|---|---|---|
| | Category | | PDI | | Departures | Registration | | |
| | Engineers | Technician/ Technologist | Male | Female | | Pr. Eng. | Pr Techni & Pr Tech | |
| 2010 | 7 | 2 | 4 | 5 | 0 | 0 | 0 | 9 |
| 2011 | 8 | 0 | 5 | 1 | 0 | 0 | 0 | 17 |
| 2012 | 5 | 1 | 3 | 1 | 0 | 0 | 0 | 23 |
| 2013 | 3 | 1 | 2 | 1 | 0 | 0 | 0 | 27 |
| 2014 | 1 | 1 | 1 | 0 | 4 | 0 | 0 | 25 |
| 2015 | 6 | 2 | 3 | 2 | 8 | 2 (2) | 1 | 22 |
| 2016 | 3 | 4 | 2 | 3 | 2 | 5 (3) | 0 | 22 |
| 2017 | 5 | 5 | 4 | 4 | 0 | 3 (1) | 2 | 27 |
| 2018 | 4 | 6 | 5 | 4 | 2 | 0 | 0 | 35 |
| 2019 | 0 | 3 | 0 | 3 | 3 | 3 (3) | 1 | 31 |
| 2020 | 9 | 6 | 4 | 6 | 2 | 4 | 5 | 35 |
| 2021 | 7 | 2 | 0 | 6 | 2 | 3 | 1 | 38 |
| 2022 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 34 |
| 2023 | 6 | 4 | 3 | 4 | 4 | 6 | 3 | 32 |
| **TOTAL** | **65** | **37** | **36** | **40** | **29** | **27 (9)** | **14** | **TOTAL** |
| | **102** | | **76** | | | **41 (9)** | | |
| | | | | | **70** | | | |

* Amounts in parenthesis are graduates that obtained their professional registration after departing the Branch.

The practical skills developed during the workplace training include:

- Planning and design: Investigation and problem resolution:
  - Geometric design;
  - Hydraulics and hydrology;
  - Pavement design;
  - Structural design of bridges and culverts;
  - Traffic engineering and traffic modelling;
  - Pavement engineering and materials; and
  - Procurement documentation.
- Site supervision: Acting as assistant resident engineers, the graduates gain experience in materials testing, quality control, contract documentation, measurement and payment certification.
- Routine maintenance: Where deployed to the DRE offices, participants gain experience in route inspections, unpaved and paved road assessments, and supervision of routine road maintenance and flood damage repairs.
- Construction experience:
  - Measurement and costing;
  - Site administration and contract planning and programming;
  - Site survey and setting out;
  - Quality assurance;

    - Occupational health and safety;
    - Construction methods and management of:
        - Road surfacing – asphalt and seals;
        - Road surface maintenance – milling and recycling;
        - Traffic accommodation;
        - Underground services;
        - Earthworks – bulk and half-width construction on rehabilitation projects;
        - Layer works including subbase and basecourse; and
        - Concrete works – culverts, head and wing walls, as well as bridge construction.

Up to the end of January 2023, 50 candidates have achieved professional registration with ECSA – 37 engineers and 12 technologists/technicians and 1 GIS professional.

## 10.4 Contractor development

Contractor training spreadsheet containing current contractor development statistics are provided in Appendix N – Contractor development training. This spreadsheet aligns with the reporting requirements from National Department of Transport and the PRMG framework.

### 10.7.1 Contractor Development Programme Policy Framework

The Contract Development Policy was approved on 31 March 2016 and has the following outline:

- CIDB Grade 1 – 3:
    - training based on business, management, administrative and financial capacity; and
    - focuses on dedicated works on a more local and regional level;
- CIDB Grades 3 – 5
    - based on indirect targeting (dedicated subcontracting work);
    - focuses on technical capacity and service delivery;
    - is based on a needs analysis;
    - incorporates mentorship via accredited bodies and from the main contractor; and
    - includes performance evaluation and monitoring to ensure growth and compliance.
- CIDB Grades 5 – 6:
    - based on direct targeting via routine road maintenance and other mechanisms;
    - is limited, and further training is based on a need analysis;
    - incorporates mentorship and coaching; and
    - includes performance evaluation and monitoring to ensure growth and compliance.

# CHAPTER 11. STRENGTHS-WEAKNESSES-OPPORTUNITIES-THREATS (SWOT) AND RISK ANALYSIS

## 11.1 SWOT analysis

An analysis of the strengths, weaknesses, opportunities and threats (SWOT) relevant to the Branch is shown in Table 11-1.

**Table 11-1: SWOT analysis of the branch**

| Issue | Strengths | Weaknesses | Opportunities | Threats |
|---|---|---|---|---|
| Asset management | Programme and project management capability, enables effective management of the organization | In many instances, project priorities are not explicitly defined, and projects are not explicitly associated with strategic objectives | Improvements in the optimization of expenditure to achieve "value-for-money"<br><br>Improvements in the alignment between projects and strategy | Not optimising the full scope of the work undertaken by the Branch |
| Asset Information systems | Good systems for monitoring network performance and prioritising projects | The lack of:<br>• Electronic maintenance management system for surfaced roads<br>• Unit rate and estimating system<br>• Dedicated Asset information management systems staff<br>• The scope of assets in dTIMS is not comprehensive | Acquire new systems<br>Business processes improvements | Governance of asset information is inadequate, leading to a lack of credibility in the information provided and possible poor decisions based on inaccurate information |

| Table 11-1: SWOT analysis of the branch | | | | |
|---|---|---|---|---|
| **Issue** | **Strengths** | **Weaknesses** | **Opportunities** | **Threats** |
| Staffing | Dedicated, capable senior management team and professionals | Key professional and administration positions remain vacant | Recession may make it easier to recruit and retain professional staff<br><br>New professional staff may reduce the dependence on consultants | Uncompetitive remuneration levels at professional level makes it difficult to attract and retain professional staff<br><br>The large number of vacant posts undermines the ability of the Branch to manage its assets, thereby undermining the economy of the Western Cape |
| Funding | | Single source of funding for reducing the backlog | | Under-funding of the Branch increases the backlog causing the road network to deteriorate to a point where it cannot be economically repaired or maintained<br><br>Possible expenditure impacts on the Branch's assets |
| Organisational structure | The in-house expertise available for re-organising the structure to support good asset management | Limited amount of current staff to fill the new posts in structure to support of asset management | New posts and positions in structure to support asset management | The long duration of filling the new posts due to funding and recruitment processes. |

## 11.2 Risk register

The RAMP's risk register was updated with the information obtained from the Department's Strategic Objectives / Programme Risks Report Q3 2019/20. The legend is shown in Table 11-2. Risk is rated according to its level shown for its impact and likelihood.

Table 11-2: Legend for impact and likelihood

| Impact | | | |
|---|---|---|---|
| **Low** | **Moderate** | **High** | **Extreme** |
| Negative outcomes or missed opportunities that are likely to have a negligible impact on the ability to meet objectives.<br>Event will be controlled through normal management processes. | Negative outcomes or missed opportunities that are likely to have a relatively moderate impact on the ability to meet objectives.<br>Event resulting in breakdown of core business process activity. | Negative outcomes or missed opportunities that are likely to have a relatively substantial impact on the ability to meet objectives.<br>Event resulting in breakdown of core business process. | Negative outcomes or missed opportunities that are of critical importance to the achievement of the objectives.<br>Critical event resulting in breakdown of core business service. |
| **Likelihood** | | | |
| **Unlikely** | **Moderate** | **Likely** | **Almost Certain** |
| Highly unlikely that the adverse event/ opportunity will occur (0 – 20% likelihood of occurring). The adverse event/ opportunity occurs infrequently and is unlikely to occur in the next 5 years. | Unlikely but there is a slight possibility that the adverse event/ opportunity will occur (21 - 50% likelihood of occurring).<br>There is an above average chance that the adverse event/ opportunity will occur at least once in the next 36 – 60 months. | Likely that the adverse event/ opportunity will occur (51 – 80% likelihood of occurring).<br>History of occurrence internally or at similar institution. It is likely to occur in the next 12 – 36 months. | Adverse event/ opportunity will occur (more than 80% likelihood of occurring).<br>It is likely to occur more than once in the next 12 months. |

The risk register created is shown in Table 11-3 on the next page.

| Table 11-3: Risk register | | | |
|---|---|---|---|
| **Risk issue** | **Impact on service delivery** | **Risk likeli-hood** | **Mitigation measures** |
| **Risks related to institutional issues** | | | |
| Governance of asset information is inadequate | High | Almost Certain | IT Steer committee created, which will address this issue – control addresses the risk |
| Organisational sustainability in terms of the effect of stringent OSD requirements that creates difficulties in attracting and retaining professional staff and the extended duration of organisational development negatively affects programme performance and the ability to deliver on its objectives | High | Almost Certain | • Lobby DPSA for a review of OSD requirements<br>• Creation of salary dispensation for engineers (OSD), which could result in more attractive packages for professionals<br>• Annual intake of graduates<br>• Engineer and technical practical training programme (Roads Professional Development Programme – PDP) was introduced and registered with the relevant professional associations<br>• Establishment of a professional development committee to coordinate the Roads PDP<br>• Exposing current staff to further professional development opportunities (e.g. conferences, seminars, workshops and forums)<br>• Head-hunting and succession planning as well as up skilling of current graduate candidate engineers and technicians for vacant posts and as contract managers in our regions<br>• More in-house work is undertaken in order to provide development opportunities to assist with up skilling and training of staff<br>• New Organisational structure will result in more appropriate posts and salary levels<br>• Providing retention and succession planning-incentives and strategies.<br>• Retaining the services of professionals after reaching retirement age<br>• controls partially address the risk |
| Organisational sustainability in terms of the limited new appointments due to cost of employment (CoE) being capped | High | Almost Certain | Lobby to fund unfunded posts– controls partially addresses the risk |
| Continued under-funding of the Branch leads to an inability to maintain the provincial road network to an optimal standard which could lead to a gradual | Extreme | Almost Certain | • Motivate for increased roads budget using details in the Road Asset Management Plan |

| Table 11-3: Risk register | | | |
|---|---|---|---|
| **Risk issue** | **Impact on service delivery** | **Risk likeli-hood** | **Mitigation measures** |
| collapse of the provincial road network, jeopardising the safety of road users and the reliability of the road infrastructure | | | • Apply optimised budget and projects to achieve lowest cost for maintaining the network<br>• Improve project selection by optimising maintenance strategies via multi-criteria models (built management systems) that inform decision-making<br>• Controls partially address the risk |
| Inability to complete economic projects which could result in the Programme utilising equitable share funds which could result in the increase of the maintenance backlog and limit economic infrastructure growth. Asset Finance Reserve (AFR) fund being reduced and/or terminated | Extreme | Almost Certain | • Lobbied for funding through the Asset Finance Reserve Fund. As a result of this, Treasury allocated additional funding in the 3rd year of the MTEF<br>• This has then completely mitigated the issue Road Asset Management Plan (RAMP) of the Western Cape (issued annually) is used to motivate for increased roads budget |
| Opportunity to create jobs is constrained which negatively affects the government's broader objectives such as job creation, economic development and social equity | High | Almost certain | • The PRMG from National Department of Transport is a major vehicle for the Branch to address job creation<br>• Ensure focused attention is given to the broader socio-economic objectives and include policy implementation (i.e. Develop a Labour-Intensive Construction Framework)<br>• Routine road maintenance contracts are being restructured to make them more EPWP-compliant and expanded to enhance job opportunities.<br>• Focus on doing more routine maintenance on contract to increase temporary work opportunities |
| Onerous approval processes of borrow pits by the Department of Mineral Resources (DMR), which may affect the Branch's ability to deliver on objectives | Extreme | Likely | • Further discussions with DMR (also through consultants) regarding changes, implementations and priorities<br>• Continuous engagement with stakeholders to set business processes in place<br>• Controls partially address the risk |
| Lack of internal expertise in environmental assessment | Extreme | Likely | • Outsourcing the functions<br>• Controls partially address the risk |
| Staff and outsourced resources are exposed to dangerous (high risk) working areas in fulfilling their normal duties | Extreme | Likely | • Full time employed OHS officials periodically performs site visits<br>• Contracted employees to improve construction methods and procedures and train staff |

| Table 11-3: Risk register | | | |
|---|---|---|---|
| **Risk issue** | **Impact on service delivery** | **Risk likeli-hood** | **Mitigation measures** |
| | | | • Continuous awareness to staff on working conditions<br>• Additional security is hired for contractors after review and approval<br>• Team communication via radio connectivity to inform team of safety alerts<br>• Utilisation of traffic safety teams for management of safety concerns in construction works<br>• Business Continuity plan in place |
| Suboptimal use of funds due to the maintenance works and new assets not being fully optimised | High | Almost Certain | • Implement demand management plan for new projects based on Western Cape Transport Model predictions<br>• Accelerate the optimisation of the full scope of works through incorporation in dTIMS<br>• Creation and implementation of a comprehensive maintenance management system – control addresses the risk |
| Strategy for maintenance and upgrading of gravel roads not finalised | High | Almost Certain | Review and finalise the strategy for upgrading and maintenance of gravel roads |
| Deteriorating trend of the condition of the road network to below acceptable levels of service | High | Almost Certain | Concentrate on reducing the deterioration by addressing drainage and resealing – controls partially address the risk |
| Traffic demand on the network leading to congestion in the Cape Metropolitan Area | High | Almost Certain | Plan and fund increase in road space where appropriate – controls partially address the risk |
| Effects of climate change inducing extreme weather conditions and consequential damage through flooding and the effect of extreme heat on asphalt pavement layers | High | Almost Certain | • Concentrate on reducing the effects of extreme weather by addressing drainage and reseal – controls partially addresses the risk<br>• Use bitumen binders that tolerate higher temperatures – controls partially address the risk |
| Scarcity of gravel for maintaining unpaved roads creating a high demand for upgrading to paved standards | High | Almost Certain | Reduce the demand for gravel by:<br>• Applying best practice for regravelling and blading maintenance<br>• Establish the optimum number of borrow pit for maintenance and regravelling and thereby reducing the demand to upgrade gravel roads<br>• Controls partially address the risk |

| Table 11-3: Risk register | | | |
|---|---|---|---|
| **Risk issue** | **Impact on service delivery** | **Risk likeli-hood** | **Mitigation measures** |
| Scarcity of base aggregates for paved roads | Moderate | Almost Certain | Recycle base wherever possible and use of alternative technology - controls partially addresses the risk |
| Scarcity of water for compaction | Moderate | Almost Certain | Explore the use of sea and mineralised water – controls partially address the risk |
| Variable quality of bitumen available for seals and asphalt | Moderate | Moderate | Monitor the quality of bitumen – controls partially address the risk |

## 11.3 Findings and conclusions

There are many high risks relating to the institutional issues, resources and infrastructure assets. The ability of the Branch to effectively mitigate many of the risks is limited and can only be partially addressed. The cumulative effects of not being able to deal with these risks effectively over the last 20 years has led to a situation where the Branch's staff and funding resources have reached a fragile state.

In conclusion, the future demands, complexity and turbulence in managing the road infrastructure assets are expected to increase and there is a high probability that situations will arise that test the Branch's ability to adequately manage the road network in its mission to effective support economic growth.

# CHAPTER 12. CONCLUSIONS AND RECOMMENDATIONS

## 12.1 Conclusions

The following was concluded:

- The Branch has provided detailed analysis of the needs of the network and determined the minimum funding required for a sustainable network that will provide the levels of service required to support the economy of the Western Cape.
- An annual average Intervention Budget of R 9.5 billion is required over the next ten years. This indicates an annual average budget shortfall of R 5.4 billion over the next 10 years.
- The immediate filling of posts and sourcing of staff within the new organogram micro-structure to minimise the impact on service delivery.
- The Branch's asset management systems provide excellent support for effective management.

## 12.2 Recommendations

The Branch should focus on the following issues to address the preservation of the network as effectively as possible for the available MTEF budget:

- Expand the scope of work that is optimised in the Branch's resource allocation system (dTIMS).
- Review the levels of service targets on the network where appropriate, bearing in mind that road users and the economy will pay the price in the form of excess user costs.
- Ensure the most appropriate design and delivery solutions incorporating proven new technologies are consistently chosen and implemented to appropriate standards.
- Improve the effectiveness and efficiency of high priority preservation and maintenance activities to reduce the rate of deterioration of the network.
- Minimise overhead costs.
- Construct additional weighbridges to deter overloading, where cost effective.
- Implement measures to identify and propose treatments on bridges and other structures from the asset information collected, including their asset value.

With respect to enabling the Branch, it is recommended that:

- The immediate filling of posts and sourcing of staff within the new organogram micro-structure to minimise the impact on service delivery.
- Utilise the asset management maturity assessment in accordance to TMH 22 (Committee of Transport Officials, 2013), to assist the Branch in identifying gaps and creating action plans for improving asset management; and
- System improvements are implemented to close identified gaps.

# CHAPTER 13. REFERENCES


AASHTO. (2002). *Transportation asset management guide.* Washington DC: American Association of State Highway and Transportation Officials.

Aurecon. (2013). *HDM-4 Calibration study for the Western Cape Government.* Pretoria: Western Cape Government.

Austroads. (2009). *Guide to Asset Management Part 1: Introduction to Asset Management.* Sydney: Austroads.

Austroads. (2009). *Guide to Asset Management Part 3: Asset Strategies.* Sydney: Austroads.

British Standards Institute. (2008). Publically Available Standard 55: 2008. *Publically Available Standard 55: 2008*. British Standards Institute.

Climate Adaption Platform. (2017). *Workshop Booklet - 11 January 2017.* Washington DC: Climate Adaption Platform.

Committee of State Road Authorities. (1990). *TRH 20: The structural design, construction and maintenance of unpaved roads (draft).* Pretoria: Department of Transport.

Committee of State Road Authorities. (1992). *TMH 9: Pavement Management Systems: Standard Visual Assessment Manual for Flexible Pavements.* Pretoria: Department of Transport.

Committee of State Road Authorities. (1994). *TRH 22: Pavement Management Systems.* Pretoria: Department of Transport.

Committee of State Road Authorities. (1996). *TRH 4: Structural design for flexible pavements for interurban and rural roads.* Pretoria: Department of Transport.

Committee of Transport Officials. (2012). *TRH 26: South African Road Classification and Access Management Manual.* Pretoria: SANRAL.

Committee of Transport Officials. (2013). *TMH 22: Road asset management manual (draft).* Pretoria: SANRAL.

Committee of Transport Officials. (2015). *TRH 9: Manual for Visual Assessment of Road Pavements, Part E: Unpaved Roads (draft).* Pretoria: SANRAL.

Committee of Transport Officials. (2016). *TMH 13 Automated Road Condition Assessments Part A: General (draft).* Pretoria: South African National Roads Agency.

Department of Environmental Affairs. (2013). *Long-Term Adaptation Scenarios Flagship Research Programme for South Africa: Climate Trends and Scenarios for South Africa.* Pretoria: Department of Environmental Affairs. Retrieved from https://www.sanbi.org/sites/default/files/documents/documents/

Department of Infrastructure. (2023, March 8). *Annual Performance Plan for the fiscal year 1 April 2023 to 31 March 2024.* Retrieved July 17, 2017, from Western Cape Government: https://www.westerncape.gov.za/tpw/sites/tpw.westerncape.gov.za/files/atoms/files/Department%20of%20Infrastructure%20APP%20final%20compressed%20web%20version.pdf

Department of Infrastructure. (2023, March 8). *Strategic Plan 2023/24 – 2027/28.* Retrieved July 17, 2017, from Western Cape Government: https://www.westerncape.gov.za/tpw/sites/tpw.westerncape.gov.za/files/atoms/files/Department%20of%20Infrastructure%20SP%20final%20compressed%20web%20version.pdf

Department of Transport. (2006). *Road Infrastructure Strategic Framework for South Africa.* Pretoria: Department of Transport.

Department of Transport. (2017). *Draft White Paper on Roads Policy for South Africa.* Petoria.

ESCAP. (2020). *The Impact and Policy Responses for COVID-19 in Asia and the Pacific.*

Global Forum on Maintenance and Asset Management. (2014). *The Asset Management Landscape Second Edition.* Global Forum on Maintenance and Asset Management.

Henderson, M. (2015). *Guide to a Road System Manager for the Western Cape (draft).* Cape Town.

Institute of Asset Management. (2004). *PAS 55-1: Asset Management, Part 1: Specification for the opimized management of physical infrastructure assets.* British Standards Institute.

Institute of Asset Management. (2015a). *Asset information, strategy, standards and data management.* Institute of Asset Managment.

Institute of Asset Management. (2015b). *Asset Management - an anatomy V2.* Institute of Asset Management.

Institute of Asset Management. (2015c). *Life Cycle Value Realisation Version 1.1.* Bristol: Institute of Asset Management.

Institute of Asset Management. (2015d). *Organisation and people Version 1.* Briston: Institute of Asset Mananagement.

International Standards Organization for Standardization. (2015). *SANS ISO 55001:2015 (Ed.1) Asset management - Management systems - Requirements.* Pretoria: South African Bureau of Standards.

Lawless, A. (2005). *Numbers and Needs : Addressing imbalances in the civil engineering profession.* Johannesburg: SAICE.

Lloyd, C. (2010). *Asset management - whole-life management of physical asset.* London: Thomas Telford Ltd.

Page-Green, D. P. (1996). *An assessment of deterioration models for Gravel Road Management Systems.* Pretoria: CSIR.

Parliament of the Republic of South Africa. (1998). *National Environmental Management Act107 of 1998.* Pretoria: Government Printer.

Parliament of the Republic of South Africa. (2002). *Mineral and Petroleum Resources Development Act 28 of 2002.* Pretoria: Government Printer.

Porter, M. (2008). *Competitive Advantage: Creating and Sustaining Superior Performance.* New York: Simon and Schuster.

Roads Traffic Management Corporation. (2012). *Revision of the South African Road Safety Audit Manual Volume 4*. Pretoria.

Roberts. (2020, May 28). *Developing Organization Resilience through Asset Management to Respond to COVID-19.* Retrieved from The Institute of Asset Management : https://theiam.org/news/developing-organization-resilience-through-asset-management-to-respond-to-covid-19/

Robertson, N. (2004). A classification of road investment decision support systems: practical applications', International conference on managing pavement assets. *Proceedings of the 6th International Conference on managing pavement assets.* Brisbane: FHWA.

South African Reserve Bank;. (2023, November). *South African Reserve Bank*. Retrieved from Current Market Rates: https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/current-market-rates

South African Road Agency SOC Ltd. (2016). Performance Indicators. *Performance Indicators*. Pretoria: South African Road Agency SOC Ltd.

Stats SA. (2023). *Construction Material Price Indices.* Pretoria: Stats SA.

TMR. (2010). *The Interim Guide to the RSM Framework within Transport and Main Roads.* Brisbane: Queensland Department of Transport and Main Roads.

Western Cape Government. (2013). *Growth potential study 2013.*

Western Cape Government. (2014). *Growth potential of towns in the Western Cape.* Retrieved 2017, from Western Cape Government: https://www.westerncape.gov.za/eadp/sites/default/files/news/files/2013-10-15/2013-growth-potential-study-of-towns-report_0.pdf

Western Cape Government. (2014). *Western Cape Provincial Spatial Development Framework.* Retrieved 2017, from https://www.westerncape.gov.za/eadp/content/2014-provincial-spatial-development-framework-psdf

Western Cape Government: Transport and Public Works. (2005). *Departmental Skills Development Strategy (draft).* Cape Town: Western Cape Government: Transport and Public Works.

**Contact Person**

Email: **infrastructure@westerncape.gov.za**

**Tel:** +27 21 483 5400

**Department of Infrastructure**

**Transport Infrastructure**

**Chief Directorate: Road Programme Management**

**Acting Chief Director and Specialist Engineer: Melanie K Hofmeyr**

www.westerncape.gov.za

Western Cape Government

Western Cape Government

Department of Infrastructure

Transport Infrastructure

# Road Asset Management Plan

Volume 2 of 2: Appendices

of 2024/25 to 2033/34

# Table of Contents

# Appendices

Appendices Appendix A – Road Asset Management Policy to Appendix Q – Organisational Structure are contained in this section.

# Appendix A – Road Asset Management Policy

## 1. Background

Asset management is defined as the systematic and coordinated activities and practices through which the Branch optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life for the purpose of achieving corporate objectives.

### 1.1. International Asset Management Standard

International asset management specifications highlight the importance of corporate asset management policies as part of an integrated suite within an Asset Management System. The contents of this policy should conform to the direction and intent of the SANS 55000 Asset Management. SANS 55001:2015 specifies that an organisation shall establish an asset management policy that:

a) is appropriate to the purpose of the organisation;
b) provides a framework for setting asset management objectives;
c) includes a commitment to satisfy applicable requirements;
d) includes a commitment to continual improvement of the asset management systems.

The asset management policy shall:

- be consistent with the organisation plans;
- be consistent with other relevant organisational policies;
- be appropriate to the nature and scale of the organisation's assets and operations;
- be available as documents information;
- be communicated within the organisation;
- be available to stakeholders;
- be implemented and be periodically reviewed and, if required, updated.

### 1.2. Legislative requirements

This policy will align the Branch with international best practice and conform to the requirements of the following Acts:

- Constitution of the Republic of South Africa, (Act 108 of 1996).
- The Constitution of the Western Cape, 1998 (Act 1 of 1998).
- Public Finance Management Act, 1999 (Act 1 of 1999 as amended by Act 29 of 1999) and Regulations.
- Public Service Act, 1994 (Act 103 of 1994) and Regulations, 2001 and 2016.
- Western Cape Land Administration Act, 1998 (Act 6 of 1998). National Land Transport Act, 2009 (Act 5 of 2009) and Regulations.
- National Road Traffic Act, 1996 (Act 93 of 1996).
- Cape Roads Ordinance, 1976 (Ord, 19 of 1976).
- Advertising Along Roads and Ribbon Development Act, 1940 (Act 21 of 1940).
- Road Transportation Act, 1977 (Act 74 of 1977).
- Road Safety Act, 1972 (Act 9 of 1972).

- Road Accident Fund Act, 1972 (Act 9 of 1972).
- Road Traffic Management Corporation Act No 20 of 1999.
- Administrative Adjudication of Road Traffic Offences Act No 46 of 1998.
- Infrastructure Development Act No 23 2014.
- Provincial Infrastructure Delivery Management Framework as approved by the Provincial Executive Council.
- Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended by Acts 181 of 1993 and 66 of 1995 and Regulations.
- National Environmental Management Act, 1998 (Act 107 of 1998) and regulations.
- Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) and regulations.
- Western Cape Road Traffic Act, 1998 (Act 12 of 1998).
- Western Cape Toll Roads Act, 1999 (Act 11 of 1999), and the Policy drawn up in terms of Section 16(1) of the Act.
- Preferential Procurement Policy Framework Act, 2000 (Act 5 of 2000) and its regulations.
- Construction Regulation R1010 of 2003 with specific reference to compliance to occupational health and safety within the construction industry.
- Construction Industry Development Board Act 2000 (Act 38 of 2000) with specific reference to the regulation of the construction industry and its 2004 Regulations with specific reference to the registering of contractors and projects.
- Building Industry Bargaining Council Legislation Act 2003 (Act No 25769 of 2003) with specific reference to the protection of employees in the construction industry.
- Local Government: Municipal Systems Act, 1999 (Act 32 of 1999).
- Local Government: Municipal Structures Act, 1998 (Act 117 of 1998).
- Division of Revenue Act, 2007 (Act 1 of 2007 and subsequent Acts).
- Government Immovable Asset Management Act, 2007 (Act 19 of 2007).
- Expropriation Act, 1975 (Act 63 of 1975).
- Western Cape Transport Infrastructure Act, 2013 (Act 1 of 2013).
- Spatial Land Use Management Act, 2013, (Act 16 of 2013) and regulations.
- The Land-use Planning Ordinance Act, 1985 (No 15 of 1985).
- The Western Cape Land-use Planning Act, 2014.
- The Mine Health and Safety Act, 1996 (No 29 of 1996).

# 2. Scope

This policy covers the physical assets that comprise the WCG-owned transport infrastructure network and the asset information assets including data, processes and information systems.

The Branch’s asset classes covered by this policy include:

- Roads – including earthworks, pavements and surfaces
- Road structures – including bridges (concrete, timber, steel; deck unit, girder/beam, box girder), tunnels, major culverts (box culvert, arch, slab deck, pipe) minor culverts, gantries and tunnels

- Road reserve assets – guard rails, signage, fences, kilometre markers, traffic signals and their controls, intelligent transport systems, etc.
- Non-motorised transport infrastructure – foot paths, etc.
- Information assets that are enablers of asset management.

Asset classes not covered by this policy include:

- Buildings, plant and current assets
- Human resources
- Financial resources

Although human factors such as leadership, motivation and culture are not directly addressed within the scope of this policy, they are critical enablers to successfully achieving optimised and sustainable asset management and require due consideration.

# 3. Objectives

The objectives of this policy are to set the direction and framework required for road-related asset sustainability, including:

- Meeting legislative requirements for asset management; and
- Ensuring effective resourcing to support asset management.

# 4. Policy Statement

The Road Network Management Branch (the Branch) of the Department of Transport and Public Works, WCG, will manage the WCG roads assets sustainably over the long term.

The Branch has a strategic role in leading a safe and accessible road transport system that contributes to economic development and enhances the quality of life for all people of the Western Cape. Long-term sustainable asset management is essential to fulfilling this role and delivering cost-effective transport infrastructure and services.

This policy outlines the Branch's approach to asset management and demonstrates how transport investments will be maximised to ensure Western Cape residents receive value-for-money. It will support the Western Cape Government's strategic goals for creating opportunities for growth and jobs, enable a resilient, sustainable, quality and inclusive living environment and embed good governance and integrated service delivery through partnerships and spatial alignment by prioritising investments that facilitate growth and improved productivity. It will foster opportunities for regional development through stakeholder collaboration.

# 5. Policy Implementation Plan

The Branch aims to meet its policy objectives in terms of:

- Legislative requirements for asset management by
  - Striving to meet excellence in accordance with the draft TMH 22 template (Committee of Transport Officials 2013), which was based on the draft of ISO 55001:2014 Asset management - Management systems – Requirements, which has been adopted without change as SANS 55001:2015 (South African National Standard 2015).

    - Ensure that the WCG road-related assets are managed in a sustainable manner, with appropriate Levels of Service that balance the needs of customers and the environment within available funding and consistent with the Department's risk framework.
    - Safeguard the WCG road-related assets and employees by implementing effective asset management strategies and providing the necessary financial resources for those assets
    - Maximise value-for-money, considering the full costs of providing, holding, using, maintaining and disposing of assets throughout their lifecycle
    - Optimise the solutions through improved management and economies of scale
    - Demonstrate transparent and responsible asset management processes that align with established best practice.
- To ensure effective resourcing by
    - Ensure resources required and operational capabilities are identified and responsibility for asset management is allocated.
    - Assign clear responsibilities and accountabilities for the stewardship and control of the Branch's road-related assets and the associated reporting responsibilities.

# 6. Approval

This policy has been approved by Head of Branch.

**DATE:** 29/3/2018

# 7. References

References include, but are not limited to:


- Asset Management, SANS 55001:2015: 2014 Edition 1 – Asset Management, SABS, Pretoria, 2014
- Draft TMH 22: Road Asset Management Manual, COTO, SANRAL, Pretoria, 2013
- Roads Ordinance 19 of 1976, Western Cape Government
- Public Finance Management Act, 1 of 2009
- Government Immovable Asset Management Act, 2007 (Act No. 19 of 2007)

# Appendix B – Declaration

## Preparation of the Road Asset Management Plan

This RAMP was updated by a team comprising of staff and consultants:

- A November Pr. Eng. BSc Eng. (Hons) (UCT)
- W Moolman Pr. Eng. (SU)
- J Neethling Pr. Eng. M.Eng. (SU)
- M Hofmeyr Pr. Eng. M.Eng. (SU)
- C Papadouris M.Eng. (UP)
- M van Wyngaardt Pr. Eng. B. Eng. (Industrial) Hons (Industrial) (UP)

The completion of this RAMP is attributed to the foundation set by the authors of the preceded RAMPs.

The following technical consultants assisted in the collection of specific data sets that were required in the compilation of the RAMP:

**Table B.1: The names of the officials and technical consultants that collected each of the data sets**

| Data set | Name of collecting official or technical consultant | |
|---|---|---|
| Visual evaluation of paved road network | NEXTEC | Cape Winelands & CoCT |
| | MPAMOT | Overberg |
| | Hatch Africa | Garden Route |
| | Gibb | Central Karoo |
| | Mariswe | West Coast |
| | Zutari | Quality Control |
| Visual evaluation of unpaved road network | AECOM | Cape Winelands |
| | NAKO | Overberg |
| | Royal HaskoningDHV | Garden Route |
| | IX Engineers | Central Karoo |
| | JG Afrika | West Coast |
| | MPAMOT | Quality Control |
| Mechanical measurements – longitudinal and transverse profiles, surface texture | Specialised Road Technologies | |
| Mechanical measurements – Falling Weight Deflectometer deflection measurements | Specialised Road Technologies | |
| Road Inventory and Lesser and Major Culvers Data collection | NEXTEC (EOH) | Cape Winelands & CoCT |
| | BVi | Overberg |
| | SMEC | Garden Route |
| | Element | Central Karoo |
| | JG Afrika | West Coast |

| Table B.1: The names of the officials and technical consultants that collected each of the data sets | |
|---|---|
| **Data set** | **Name of collecting official or technical consultant** |
| Visual evaluation of structures and bridges on the road network | MPAMOT |
| | Bergstan |
| | WSP |
| | Nadeson |
| | Ingerop South Africa |
| | Nako |
| | Mariswe |
| | SNA |
| | SMEC |
| | Royal HaskoningDHV |
| | JG Afrika |
| | IX Engineers |
| | HHO Africa |
| | Hatch Africa |
| | Gibb |
| | BVi |
| | Zutari |
| | Aecom |
| | Element |

## Age of asset data

In the provided below the year of the data collection and extent of data collected is shown. The age of the data are as follows.

- Visual assessment data for paved and unpaved roads age is current with 100% of the 2022 managed network having data available.
- Longitudinal and transverse profiles, surface texture measurement is 2 years old (i.e. collection in 2022). 99% of the 2022 managed network has data.
- Falling Weight Deflectometer deflection measurements is 2 years old. 96% of the 2022 managed network has data.
- Bridge visuals assessments was completed in 2020.

| Table B.2: The extent data collected and year of collection | | | |
|---|---|---|---|
| **Data set** | **Road Class** | **Length/Number of structures** | **Year of Data Collection** |
| Visual evaluation of paved road network | 1 | 237.69 | 2022 |
| | 2 | 2934.14 | 2022 |
| | 3 | 3014.87 | 2022 |
| | 4 | 1221.49 | 2022 |
| | 5 | 45.15 | 2022 |
| Visual evaluation of unpaved road network | 1 | 0 | 2022 |
| | 2 | 131.24 | 2022 |
| | 3 | 1722.43 | 2022 |
| | 4 | 8165.23 | 2022 |
| | 5 | 325.16 | 2022 |
| Mechanical measurements – longitudinal and transverse profiles, surface texture | 1 | 237.73 | 2022 |
| | 2 | 2 933.64 | 2022 |
| | 3 | 3 010.36 | 2022 |
| | 4 | 1 188.92 | 2022 |
| | 5 | 45.13 | 2022 |
| Mechanical measurements – Falling Weight Deflectometer deflection measurements | Total Length | 7159.05 | 2022 |
| Visual evaluation of structures and bridges on the road network | Bridge | 785 | 2020 |
| | Bridge - Arch | 16 | 2020 |
| | Bridge Cellular | 59 | 2020 |
| | Culvert Major | 1 768 | 2020 |
| | Retaining Wall | 79 | 2020 |
| | Sign Gantry | 30 | 2020 |

## Declarations

The Branch declares:

- that the "Road Asset Management Policy" provided in Appendix A was approved on 29 March 2018.
- The Branch is implementing within a Level II RAMS for the road and structure assets.
- that the completeness and the maximum age of data in each of the data sets comply with draft TMH 22 (Committee of Transport Officials, 2013) (inventory data, asset condition data (visual and surveillance), asset usage data, asset valuation data) unless otherwise indicated.
- that the Road Network Management System at https://rnis.westerncape.gov.za is the Branch's register of assets. The inventory is kept up to date as funds allow.
- that the road classification in terms of TRH 26 (Committee of Transport Officials, 2012) was completed.

Act **Deputy Director General: Roads Branch**

**Date:** 29/01/24

# Appendix C – Gap Analysis of Asset Management Maturity

## Road asset management level and scope of assets included

The current road asset management levels being practised by the Branch are listed in Table C.1 and Table C.2. The coloured blocks indicate the approximate level of maturity. This maturity assessment is based on the framework in draft TMH 22: Road asset management manual (draft) (Committee of Transport Officials 2013), described below:

**Initiative** – At this stage the people in the organisation are aware of potential asset management benefits and the need for consistent and good quality data. Certain individuals will take initiative to start applying the Road Asset Management System (RAMS) and start to make improvements to see how it can be adapted to meet the developing needs of the organisation. The sustainability of the RAMS will often rely on heroic efforts of individuals.

**Proficient** – at this level, the RAMS can be described as embedded within the organisation and is a competent system with everyone having faith in the quality of the data and the related processes and outputs. The system will be able to be used to respond to most questions in respect of road asset inventory, condition, value and the probable quantum of funding required for maintaining the assets to required conditions.

**Advanced** – in this stage the RAMS will be used and improved regularly, and all data collection and analysis systems will be regarded as routine within the organisation and among all staff. A RAMS of this stage of maturity can be used to directly influence the road authority's programme and work methods and to provide guidelines for maintenance standards, designs and procurement and specifications.

**Excellence** – at this stage all RAMS policies, process and procedures will routinely be improved to respond to ever more challenging questions at increasing levels of detail, to improve the outputs wherever these are inaccurate, and to ensure a high level of successful and cost-effective performance for all money that is invested in the assets.

**Limitations:** The survey of the road asset management maturity was prepared by an external assessor in February 2019.

| Table C.1: Road asset management levels being practised by the Branch as at March 2019 | | | | |
|---|---|---|---|---|
| **Section** | **Initiative - Level 1** | **Proficient - Level 2** | **Advanced - Level 3** | **Excellence - Level 4** |
| **Policy** | Expectations set in vision and mission statements | Defined policy statements for service levels and minimum conditions | Regular review of achievements and adjustment of policy statements to reflect intent together with short-term objectives and related action plans | Policy statements and strategies integrated into all business processes and regular review |
| **Inventory** | Detailed listing of all roads | Integrated GIS and road and bridge inventory together with engineering details of each link | Road asset divided into components with different expected useful life together with construction details | Inventory seamlessly integrated with planned roads, asset register, all acquisition data, and related information material to performance |
| **Valuation** | Valuations per km or $m^2$ of each road type | Valuations per $m^2$ of road type adjusted for expected useful life | Valuation per component adjusted with estimates of remaining useful life and estimates of unit costs. | Valuation per component reliably adjusted for remaining useful life and unit costs based on detailed statistics of current construction costs |
| **Condition and usage** | Visual evaluations of condition of each road. Traffic counts at selected positions | Detailed, objective visual evaluations of each road with some instrument measurements. Traffic counts cover entire road network regularly | Integrated visual and instrument evaluations taken at the minimum frequencies defined in Chapter 3. Traffic count histories to reliably project future volumes | Reliable and credible condition and usage data that is used to accurately determine excess user costs and predict future excess user costs and related risks |
| **Decision support** | Judgement of future condition and departmental priorities | Decisions based on reliable strategies and rankings based on condition and importance | Optimisation used to adapt strategies and improve returns on rehabilitation expenditure | Optimisation based on reliable performance predictions and linked to confirmation of performance based on history |
| **Management plans** | Minimal information on planned service levels and future expenditure forecasts | Impacts of plans shown in terms of future service levels with basic information on expenditure forecasting | Plans demonstrate achievement of objectives and likely service levels subject to budget constraints | Fully integrated with customer expectations of service levels and comprehensive risk analysis and trade-offs related to budget constraints |
| **Feedback loop** | Anecdotal feedback of performance of actions | Performance of actions measured as part of ongoing condition evaluation and linked to strategy | Specifically, planned activities implemented to assess performance and risk and to feed into prediction models and tactics | Regular measured performance of all actions integrated into prediction models and planned actions |

| Table C.2: Structures assets: bridges, large culverts, retaining walls at March 2019 | | | | |
|---|---|---|---|---|
| **Section** | **Initiative - Level 1** | **Proficient - Level 2** | **Advanced - Level 3** | **Excellence - Level 4** |
| **Policy** | Expectations set in vision and mission statements | Defined policy statements for service levels and minimum conditions | Regular review of achievements and adjustment of policy statements to reflect intent together with short-term objectives and related action plans | Policy statements and strategies integrated into all business processes and regularly reviewed |
| **Inventory** | Detailed listing of all structures | Integrated GIS and road and bridge inventory together with engineering details of each link | Structures assets divided into components with different expected useful lives together with construction details | Inventory seamlessly integrated with planned roads, asset register, all acquisition data and related information material to performance |
| **Valuation** | Valuations per structure | Valuations structure adjusted for expected useful life | Valuation per component adjusted with estimates of remaining useful life and estimates of unit costs | Valuation per component reliably adjusted for remaining useful life and unit costs based on detailed statistics of current construction costs |
| **Condition and usage** | Visual evaluations of condition of each bridge, large culvert and retaining wall | Detailed, objective visual evaluations of each bridge, large culvert and retaining wall with some instrument measurements | Integrated visual and instrument evaluations taken at the minimum frequencies defined in Chapter 3 | Reliable and credible condition and usage data to predict risks |
| **Decision support** | Judgement of future condition and departmental priorities | Decisions based on reliable strategies and rankings based on condition and importance | Optimisation used to adapt strategies and improve returns on rehabilitation expenditure | Optimisation based on reliable performance predictions and linked to confirmation of performance based on history |
| **Management plans** | Minimal information on planned service levels and future expenditure forecasts | Impacts of plans shown in terms of future service levels with basic information on expenditure forecasting | Plans demonstrate achievement of objectives and likely service levels subject to budget constraints | Fully integrated with customer expectations of service levels and comprehensive risk analysis and trade-offs related to budget constraints |
| **Feedback loop** | Anecdotal feedback of performance of actions | Performance of actions measured as part of ongoing condition evaluation and linked to strategy | Specifically, planned activities implemented to assess performance and risk and to feed into prediction models and tactics | Regular measured performance of all actions integrated into prediction models and planned actions |

The self-evaluation assessment in the above tables provides a complete overview of the asset management maturity within the Branch. This assessment indicate that the Branch is implementing within a Level II RAMS for the roads and structure assets. Gaps within the sections named “valuation” and “management plans” for these assets needs improvement for the Branch to fully operate on a Level II RAMS. The Branch will first aim to complete the work required for a Level II RAMS before taking the necessary incremental steps to commence and develop within implementing Level III and higher RAMS for these assets.

# Appendix D – Strategic asset management systems

The following major monitoring and reporting information technology systems as shown diagrammatically in Figure 1-8, in Book 1 of the RAMP is described below:

### Road Network Information System

RNIS purpose: to manage the road network information of the WCG and to make this information available to the various subsystems within the Branch. The information in the database is updated by periodic surveys of roadside element data as well as various other sources. This system is designed to eliminate the need for the duplication of data and forms the core of the ongoing effort to achieve integration between the various systems of the Branch.

Output: it provides all the reference data required by other systems.

### Traffic Counting System

TCS purpose: to provide a repository of traffic counts, analyse the data and provide reports.

Output: The PMS, GRMS, DSC and other systems access the traffic counts in the TCS. It also provides reports on traffic information to other stakeholders.

### Pavement Management System

Purpose:

- Keep an in-depth inventory of pavement structures, etc.
- Keep track of how the network is performing through regular surveillance of:
    - Visual condition;
    - Roughness and rutting;
    - Structural capacity; and
    - Surface texture.

Output: the data for the economic analysis. Reports on the condition of each road on the network and information regarding the state of roads for the compilation of the annual report.

### Deighton Total Infrastructure Management System

Purpose: dTIMS optimises the overall performance of the road network over time in accordance with policy objectives and within budgetary constraints by:

- A lifecycle benefit cost economic analysis to optimise the treatments over the lifecycle of the roads for the combined paved and unpaved networks including:
    - Upgrades to paved roads;
    - Rehabilitation of paved roads;
    - Resealing of paved roads;
    - Regravelling of unpaved roads;
    - Upgrades of unpaved roads to paved standards;
    - Bridges and major culverts;
    - Safety upgrades; and

Output: information on the optimal resource allocation, i.e. the optimal split of funds between treatments, such as rehabilitation, resealing, upgrading to paved standards, unpaved road maintenance. An optimised list of rehabilitation and resealing projects for the paved road network.

### Highway Development and Management Model

HDM-4 purpose: detailed analysis of the economic feasibility of projects in accordance with policy objectives including:

- New roads;
- Upgrading of paved roads;
- Upgrading of unpaved roads to paved standards;
- Safety projects; and
- Rehabilitation options.

It is envisaged that the benefits and costs of these projects will be input to dTIMS for network optimisation of all projects.

### Gravel Road Management System

GRMS purpose: to:

- Keep an inventory of gravel wearing course and subgrade properties
- Keep track of how the network is performing through regular surveillance of visual condition
- Identify and prioritise unpaved roads maintenance projects.

Output: reports on the condition of each unpaved road on the network; information regarding the state of roads for the compilation of the annual report.

### Bridge and Structures Management System (B&SMS)

B&SMS purpose: to record the information on the condition and required maintenance on the about all bridges and major culverts on provincial roads.

Output: A prioritised list of bridges and major culverts needing maintenance, rehabilitation or replacement.

### Integrated Provincial Accident System (IPAS)

IPAS purpose:

- To capture accident information from the accident report forms;
- To transfer accident information into a provincial accident database that will contain all accident information for the urban and rural networks of the Western Cape.

Output: Provide various reports on accidents and the spatial representation of accidents

### Geographical Information System (GIS)

GIS purpose: to provide the Branch with a tool for creating maps from queries of all Roads Infrastructure databases and provide spatial analysis capability.

Outputs: projects in relation to dTIMS priorities; intervention types; routine maintenance activities; distribution of materials sources; overlapping activities.

# Appendix E – Tactical and Operational systems

The following major tactical and operational systems as shown diagrammatically in Figure 1-8, in Book 1 of the RAMP is described below:

### Integrated Maintenance Management System (IMMS)

IMMS purpose: to keep track of the expenditure at the Regional Offices, the Central Workshop in Bellville and the district municipalities (DMs) which act as agents for the WCG. This information is reconciled with the Basic Accounting System, BAS. This system provides a central database of the information contained in the Maintenance Management Systems as operated by the Regional Offices, District Municipalities and the Bellville Central Workshop.

Output: a database of unit costs and project costs for various maintenance and construction activities.

### Gravel Roads Maintenance Management System – under development

GROMAMAS purpose: to support the scheduling, scoping, materials selection and design, risk register, process and acceptance control and project review for regravelling and to optimise the blading maintenance of the unpaved roads network.

Output: project progress, project scope, specifications and design plans, material sources and mix designs, risks and mitigation measures, quality information, actual costs, and blading programmes.

### Plant and Equipment Management System

PEMS purpose: to keep and process information relevant to the road construction plant and equipment owned by the Branch for maintenance purposes.

Output: Maintenance and repair costs, utilisation and other logged data are currently transferred from the Maintenance Management System (MMS).

### Regional Operations Activity Plan (ROAP) – under development

The current system of local maintenance planning situated in the districts, which is manual and not integrated with the Branch's electronic information systems, will be enhanced by the implementation of ROAP, an electronic tactical and operations level maintenance management system for the Branch. This new system will assist with the operations and maintenance decision making for individual assets that are not currently covered by the strategic-level systems, e.g., RNIS, PMS, and GRMS. It will also provide vital feedback of information to the strategic-level systems that will enhance decision making on the scope of rehabilitation and periodic maintenance projects.

ROAP purpose: to provide a comprehensive view of all operational work (including routine, periodic and rehabilitation and upgrading) and support the management of operations by the identification of defects, scheduling and packaging of routine maintenance activities across District Roads Engineer (DRE), DM and contract maintenance for current expenditure and the scoping of work, work packaging, and scheduling of capital projects, including borrow pits.

Output:

- Operational (including maintenance) works programme and work instructions; and
- History of all routine maintenance, including pavement-related routine maintenance for consideration during the decision-making process for the scoping of rehabilitation and periodic maintenance projects at both strategic and tactical levels.

### Portfolio, Program and Project Management System (Rational Portfolio Management – RPM)

RPM purpose: to assist in the management of the Branch's portfolio of projects and programmes.

Output:

- MTEF implementation plans for the planning, design and construction of projects in the project portfolio;
- Measurement of actual performance/estimation of future performance for each indicator in the Annual Performance Plan for each financial year;
- Actual cash flow/ estimated future cash flow per project, programme and financial year;
- Management and operational reports;
- Inputs to financial statements; and
- Framework for the governance of projects in terms of the Project Procedures Manual.

### Materials Information Management System

MIMS purpose: provide the repository for all information relevant to material sources and support the process of application for legalisation of these sources from the Department of Mineral Resources, and the reporting done by the Environmental Control Officer during the mining phase.

Output: information on available sources of gravel; reports on the management of borrow pits.

### Pavement Quality Management System (PQMS)

PQMS purpose: Quality assurance during all road construction processes, such as:

- Managing the testing of road building materials in the laboratory and storage of the results;
- Planning and design of seals;
- Pavement design;
- Design of asphalt and cemented layers;
- Acceptance control for all layerworks on construction sites (ABACUS);
- Control during the construction of seals (SealPro); and
- As-built database for all for decision-making on future paved road maintenance projects.

Output:

- Quality data;
- As-built data;

- Information for strategic analysis of performance of the network in terms of the quality of construction and the materials used; and
- Data for analysis by the PMS.

### Seal Planning and Design System (SPADS) – In development

This is a module of the PQMS.

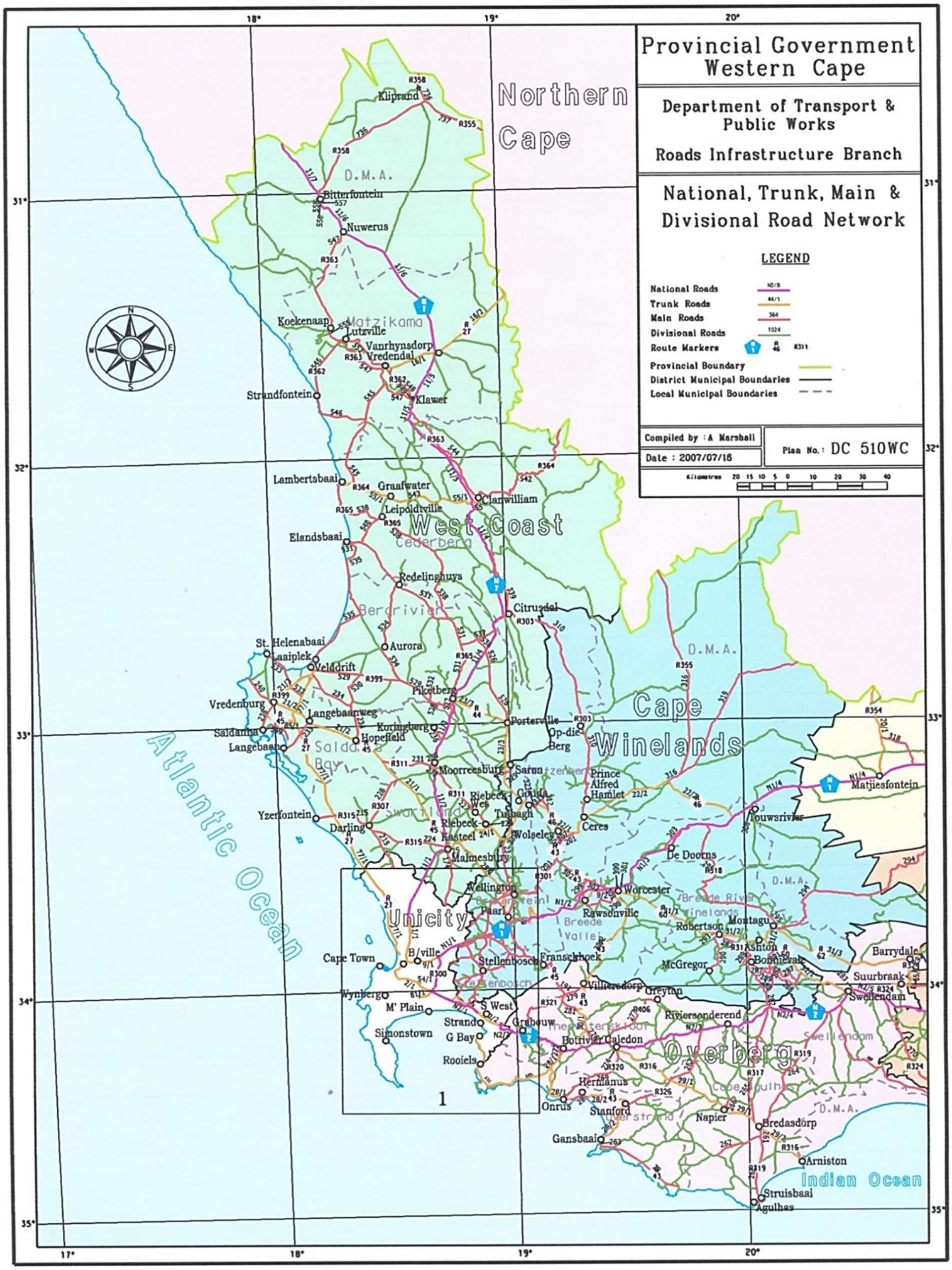
SPADS purpose: to provide the software platform for managing the planning and design of seals in the Western Cape in order to achieve predictable and consistent planning and seal design outputs, both within the Branch and from consulting engineers, while allowing future improvements and innovations.

Output:

- Planned seal types and where they will be applied;
- Report for tender documentation;
- Uniform sections for the seal design; and
- A design reports.

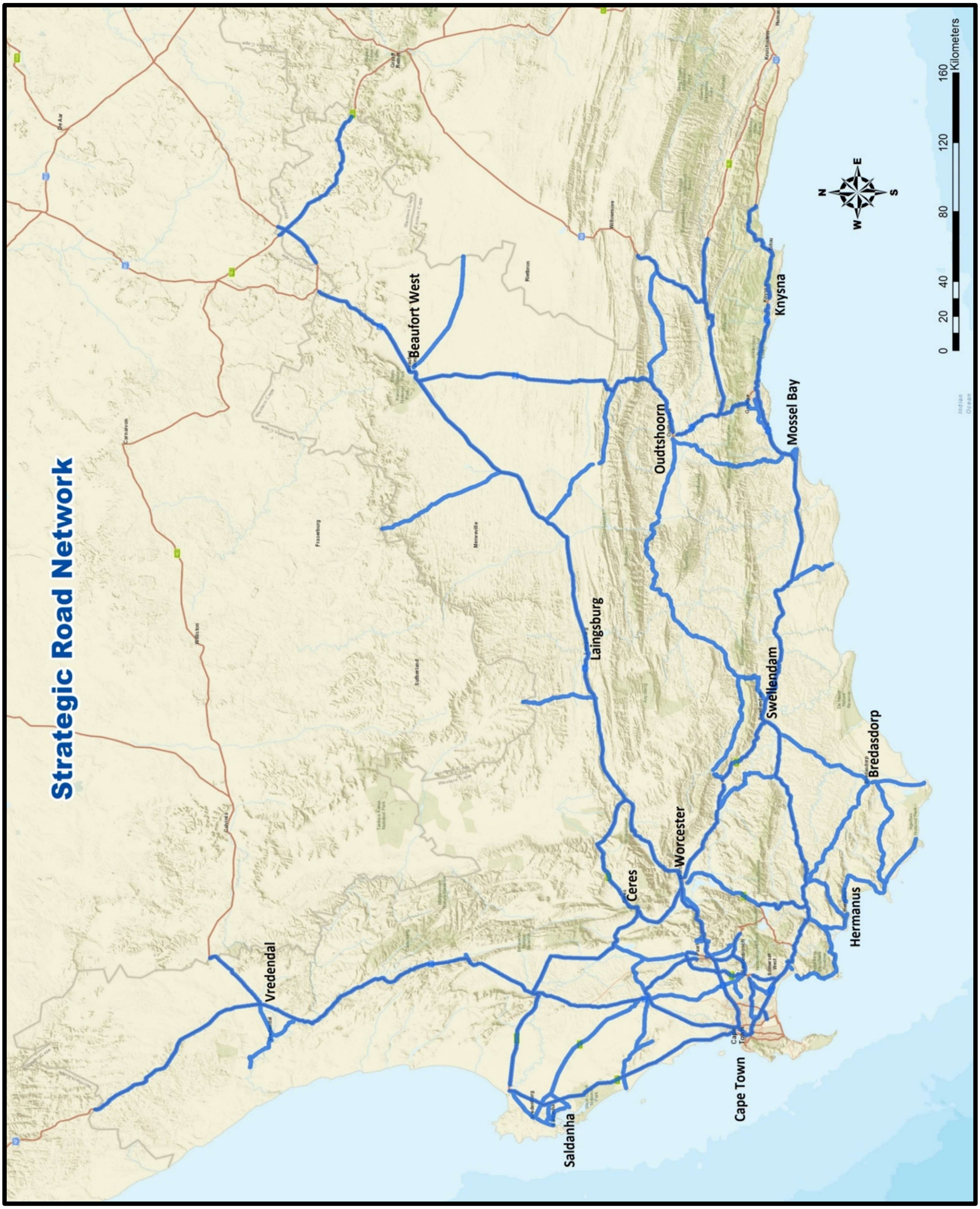
# Appendix F – Maps of the road network

Maps obtained in Appendix D were obtained in November 2022.




Provincial Government - Western Cape
Department of Transport & Public Works
Roads Infrastructure Branch
National, Trunk, Main & Divisional Road Network
LEGEND
National Roads
Trunk Roads
Main Roads
Divisional Roads
Route Markers
Provincial Boundary
District Municipal Boundaries
Local Municipal Boundaries
Compiled by : A Marshall
Date : 2007/07/16
Plan No. :
DC 510WC
Northern Cape
Eastern Cape
Central Karoo
Eden
Beaufort West
Merweville
Leeuw Gamka
Bitter Water
Prince Albert Road
Prince Albert
Laingsburg
Klaarstroom
Cango Caves
De Rust
Ladismith
Calitzdorp
Oudtshoorn
Uniondale
Van Wyksdorp
Brandrivier
Herbertsdale
Heidelberg
Riversdale
Albertinia
Mossel Bay
George
Sedgefield
Knysna
Plettenbergbaai
Gouritsmond
Stilbaai
Witsand
Cape Infanta
Murraysburg
Groot Brakrivier
Klein Brakriver
Indian Ocean
INSET 2

## *The Strategic Road Network*



# Appendix G – Development of a new objective function

The Branch is currently developing an "augmented" area-under-the-benefit-curve (AAUC) objective function, to support the current Life-Cycle-Benefit-Cost-Analysis (LCBCA) in addressing the Branch's two strategic objectives:

1. Sustainable asset preservation.
2. Economic growth through road-based transport infrastructure investment.

The area-under-the-condition-curve (AUC) approach has a shortcoming with respect to the Branch's second strategic objective of supporting sustainable economic growth (Western Cape Government 2015). The AUC objective function considers the economic benefits relative to costs incurred for each treatment alternative per road section but does not consider the broader economic context of where the road segment is located relative to other competing road segments. Refer to Figure E-1that illustrates the AUC pictorially.

.

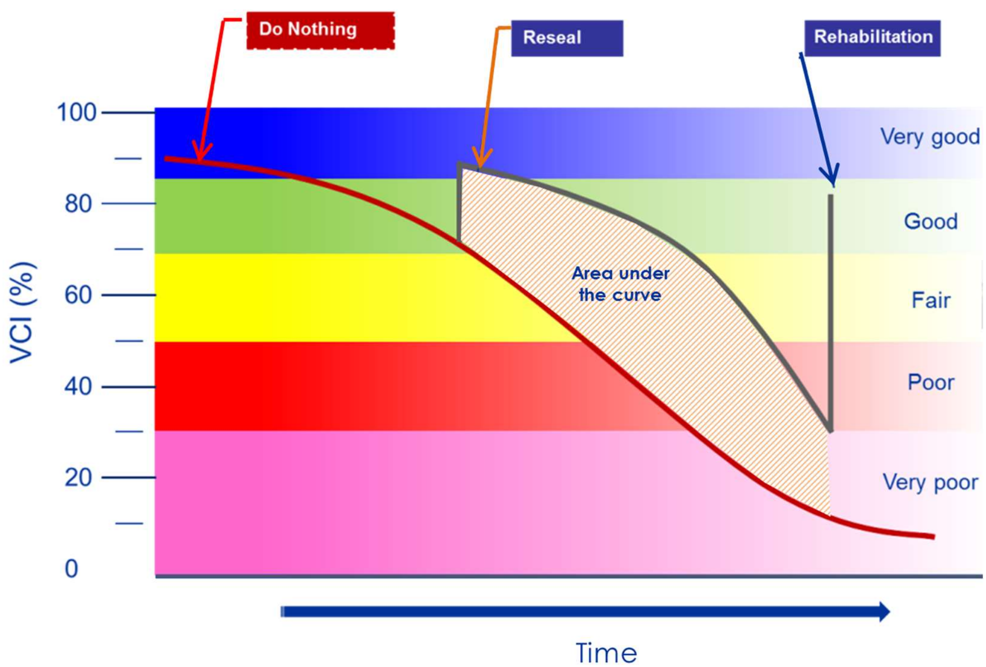



Figure E-1: Illustration of area-under-the-condition curve

The Branch further requires that resource allocation with respect to the road network should be aligned and responsive to the WCG planning themes that are captured in the Provincial Spatial Development Framework (Western Cape Government 2014) and related Growth Potential Study (Western Cape Government, 2013). The Branch plans to introduce consideration with respect to the economically equitable allocation of resources during the resource optimisation of the network management process.

Economic consideration can be introduced through augmenting the weighting parameter of the AUC objective function. The premise of this approach is that the road network, in conjunction with other sets of public and private infrastructure, serves to "host" economic activity in a region.

Following on from this assumption, the specific economic weight that each road, road section, or road segment hosts, can be calculated. The economic weight of a road in a specific area is proportioned according to its contribution in terms of vehicle-kilometre (annual average daily traffic [AADT]-km) of the segment in question to that of the total network in the region. The implicit assumption is that a truck and a passenger vehicle carry equivalent economic weight.

Such economic weight per road segment reflects the underlying distribution of activity in an area and between areas. Within the Western Cape, the economic weight could be determined at either local or district municipality level. The premise of the approach introduces equity consideration in the resource allocation process (Porras, Han and Zhang 2014). The proposed approach further shares similarities with the Economic Network Plan approach which matches the economic need, from land use, to the economic flows resulting on the road network (Maughan 2013).

Augmenting the objective function introduces two sources of variation:

- Introduction of vehicle-kilometres enables competition between road links of different lengths and traffic volumes. A short segment with high traffic is competing for investment on the same basis of comparison with a longer segment which hosts lower traffic volumes. The effect is that road sections are weighted by the extent that they perform in hosting the economy. Introducing this step is required as road segment lengths vary considerably.
- Introduction of economic weight of different sub-areas that constitute the area under consideration allows for the reflection of the underlying distribution of actual economic activity. It allows for the equitable allocation of resources according to the quantum of economy hosted.

The nature of the objective function does not change. It remains the sum over the analysis period of changes in the condition, multiplied by a weighting parameter. The weighting parameter itself is augmented to better reflect the underlying economic characteristics. The basis of this weighting parameter remains the level of traffic on the road segment.

The effect of the change of weighting parameter is the re-ranking of priority, irrespective of the benefit part of the function. Given the changes in condition, the benefit part of the equation remains constant.

The approach allows for the alignment and responsiveness of pavement network management with respect to the social and economic development policy. Differential economic growth rates could be assigned to sub-areas where development and growth are anticipated or encouraged in the planning and evaluation timeframe. Such integrated planning would serve to unlock network constraints in timely fashion and support economic growth and development.

### Procedure

For each intervention strategy (treatment), the benefit calculated for each year in the analysis period, is weighted by the economic number based on the gross domestic product and not only traffic (AADT). This benefit is then totalled for the analysis period. The "benefit" is the area between the two curves, weighted by the "economic weight". Any repair strategy (consisting of one or more successive treatments) that improves the condition of the road segment would thus result in a positive area above the "do-nothing" curve. During the optimisation analysis, the incremental benefit of alternative intervention strategies with increasing costs is measured in terms of the AUC curve.

The AAUC objective function is calculated by summing the present value of the difference between the condition index resulting from the intervention strategy (a combination of intervention activities over the analysis period) and the condition index for the do-nothing alternative, for each year in the analysis period. The AAUC curve benefit calculations are weighted by the "economic weight".

The equation to calculate this benefit for an intervention strategy on a road segment is:

$$Benefit = \sum\nolimits_{\forall j,i} \left\{ \left( \frac{AADT_j \times km_j}{\sum_{\forall j} AADT_j \times km_j} \right) Econ_j \right\} (IS_{Cond} - DN_{Cond})$$

Where:

*Benefit* = Benefit of an Intervention Strategy for a road segment

*AADTj* = AADT on the road segment j

$km_j$ = Length of road segment j

$Econ_i$ = Size of economy in terms of the gross domestic product in sub-area i

*j* = Road segment

*i* = Sub-area in the evaluation area

$IS_{Cond}$ = Condition of the road segment for the Intervention Strategy in year n

$DN_{Cond}$ = Condition of the road segment for the Do-Nothing Strategy in year n

***Limitation:*** the degree of granularity achieved is at the level of a local municipality and not at road level.

> This aspect needs further investigation to determine if the granularity can be improved to road level.

***Assumption:*** a heavy vehicle and a passenger vehicle carry equivalent economic weight.

> This aspect needs to be researched further to find out whether it is possible to determine the economic value of heavy vehicles and passenger vehicles on any road in order to refine the quantifiable economic value hosted by every road in the network. The economic value of the light vehicle traffic is not expected to have a large variation, but the economic value of the heavy vehicles could vary considerably, depending on the value of the goods being transported.

The approach could also be expanded to allow for vehicle-passenger-kilometres, introducing social consideration through average occupancy levels. This would introduce more variation only if occupancy levels differ significantly between the sub-areas constituting the area under evaluation.

### Evaluation

The Branch plans to review the effect of the AAUC objective function by comparing results with those yielded by the objective function used in the 2019/20 analysis. Any major changes to the LCBCA will only be done upon a multiple year comparison which is documented in a report and presented to the Branch for approval.

# Appendix H - Benchmarking

Benchmarking is a valuable tool to measure the current performance of assets, to provide an effective mechanism to predict the impact of investments on these assets and to provide the custodians of assets with goals to pursue, thereby ensuring continuous performance of such assets.

Two performance indicators are currently used in South Africa to describe the overall condition of a road network. These are:

- Average visual condition index (VCI) weighted for the length of each road segment, and
- Network condition number (NCN) weighted for both the length and the condition of each road segment.

For benchmarking, the averaged network VCI is not suitable because the effect of poorer roads could be concealed by a similar proportion of good to very good roads. On the other hand, the NCN has a high sensitivity for changes and occurrence of roads in the poor to very poor condition categories, thus making it a suitable performance indicator (PI) for use when determining benchmarking for road networks.

Benchmarking for surfaced and unsurfaced road networks will also differ because the level of functionality, such as roughness, that is expected and achievable is different. Traffic on the road network, and therefore road users that are affected by road condition also plays a role in determining realistic goals. No guidelines are currently adopted for South Africa, but an observation of the Department of Transport in the document *Road Infrastructure Strategic Framework for South Africa*, July 2005 reads as follows:

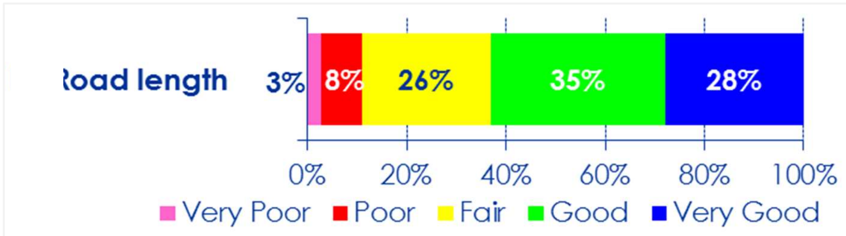
*"Internationally the benchmark of road quality is that no more than 5 to 10 per cent of the road networks be in a poor to very poor state (according to the VCI key performance indicator) for a limited period before remedial action is executed. It is recommended that this benchmark be interrogated in the South African context and a decision be made on an appropriate benchmark for the road network."*

A further benchmark to pursue is to ensure the need for preventive maintenance can be accomplished. Preventive maintenance, such as the resealing of surfaced roads, is a cost-effective intervention measure with considerable long-term preservation effects. The opportunity for such preventive measures exists typically with surfaced roads in the fair condition category before they deteriorate to a state where expensive rehabilitation intervention remains the only alternative. This benchmarking measure is therefore to limit the proportion of fair roads and thereby retarding their deterioration to a poor condition. Note that this does not mean that roads in good and very good condition do not qualify for preventive maintenance treatments.

In order to choose suitable benchmarking values for the Branch, the 2013 condition data of the surfaced and unsurfaced road networks were investigated and compared to international standards for poor and very poor roads, and other opinions in the industry.

## The current condition of the surfaced road network

The 2013 VCI for WCG's surfaced roads is 72% and the 2013 NCN is 66%. The proportions of the surfaced road network in the five condition categories are shown in the graph below.

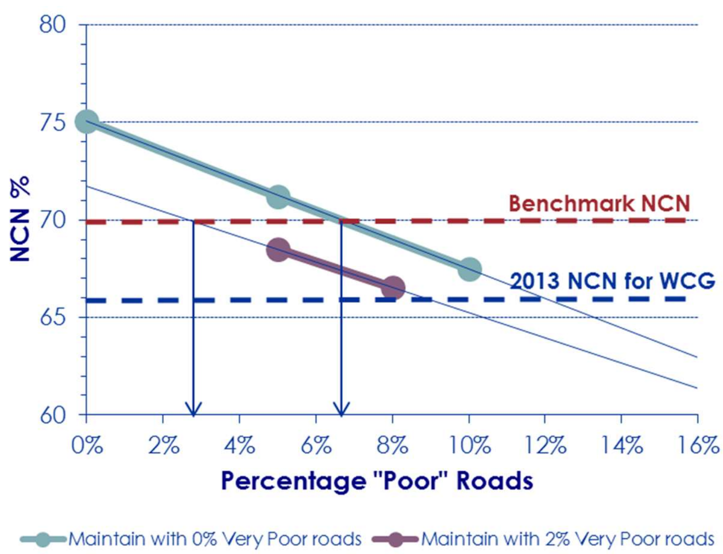



## Benchmarking of the surfaced road network

The 2013 condition data of the WCG was used to determine benchmarks for surfaced roads. A combination of condition distribution scenarios was investigated to derive at a benchmark NCN and distribution ceiling values for VCI. These are as follows:

- Very Poor roads - two scenarios were investigated:
  - No very poor roads, and
  - 2% very poor roads.
- Poor roads – A variety of proportions ranging between 0% and 10% of surfaced roads in this condition category.
- The above proportions are therefore adhering to the international benchmarking for road condition keeping no more than 5 to 10 per cent of roads in the poor to very poor category.
- Fair roads – this proportion was kept at 26% thus adhering to a benchmark where approximately 25% of surfaced roads should be in a fair condition and ensuring the need for resealing does not escalate beyond an achievable/realistic level.

The figure below shows the condition impact graphs generated from the 2013 condition data and for the combination of condition scenarios described above.



Condition impact graphs for paved roads

Reading from the graph, a benchmark NCN of 70% was selected as a sensible PI, thus ensuring the condition of surfaced roads remains between the following threshold scenarios:

**Scenario with no very poor roads**

- Less than 7% Poor roads and
- Less than 25% Fair roads

**Scenario allowing a maximum of 2% very poor roads**

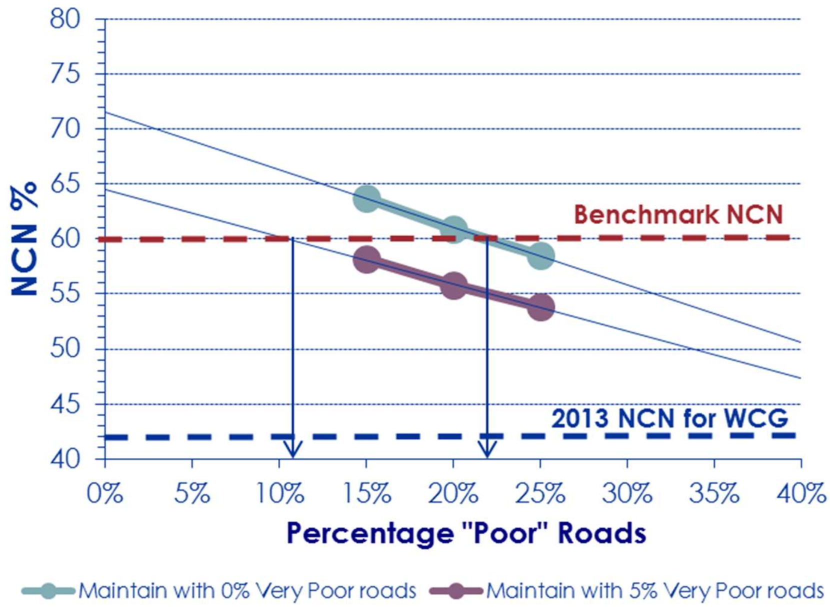
- Less than 3% Poor roads and
- Less than 25% Fair roads

## Benchmarking of the unsurfaced road network

As for surfaced roads, the most recent condition data of unsurfaced roads was used for benchmarking the condition of unsurfaced roads. A combination of condition distribution scenarios was investigated to derive at a benchmark NCN and distribution ceilings for VCI. These are as follows:

- Very Poor roads - two scenarios were investigated:
    - No very poor roads, and
    - 5% very poor roads.
- Poor roads – proportions ranging between 15% and 25% of unsurfaced roads in this condition category.
- The above proportions are much higher than the international benchmarking of 5 to 10 per cent, but due to the current state of unsurfaced roads in the Western Cape and South Africa, a realistic benchmark is proposed in the short-term. The benchmark was investigated for a proportion of poor to very poor roads of no more than 20 to 30 per cent. This benchmark could be revised once guidelines are provided for the maintenance of unsurfaced roads according to functional class and for the environmental difficulties in finding appropriate burrow pits for supply of gravel wearing course material.
- The higher ceiling for poor /very poor roads is also a result of the trade-off between maintenance funding and the magnitude of road users affected by the investment. The traffic on unsurfaced roads constitutes only 4% of all vehicle-km driven on the Western Cape's provincial roads.
- Fair roads – this proportion was kept at 32% thus assuming plus-minus one third of the unsurfaced road network would remain in a fair condition.

The figure below shows the condition impact graphs generated from the most recent condition data and for the combination of condition scenarios described above.




Condition impact graphs for unpaved roads

***Condition impact graphs for unsurfaced roads***

Reading from the graph, a benchmark NCN of 60% was selected as a sensible PI, thus ensuring the condition of unsurfaced roads remains between the following threshold scenarios:

**Scenario with no very poor roads**

- Less than 22% Poor roads and
- Maintain the proportion of Fair roads at one-third of the unsurfaced road length

**Scenario allowing a maximum of 5% very poor roads**

- Less than 10% Poor roads and
- Maintain the proportion of Fair roads at one-third of the unsurfaced road length

# Appendix I – Calibration factors for modelling performance

Table I.1 shows the calibration factors for HDM-4 models (HDM-4 Calibration study for Western Cape Government, 02 July 2013) compared to the factors from previous years. These factors are derived from the continuous monitoring of specific pavement performance monitoring sections in the Western Cape Province.

The calibration factors influence the performance models as follows:

- Crack initiation: The period starting at the most recent re/surfacing up to the time when the first signs of cracks are visible.
- Crack progression: The rate at which cracks progress from the time of crack initiation and onwards.
- Ravelling initiation: The period starting at the most recent re/surfacing up to the time when the first signs of ravelling (aggregate loss) are visible.
- Ravelling progression: The rate at which ravelling progress from the time of ravelling initiation and onwards.
- Pothole progression: The rate at which potholes progress from the time of pothole initiation and onwards.
- Roughness progression: The rate at which roughness progresses (deteriorates).
- Rut depth progression: The rate at which rut depth progresses (deteriorates).

**Table I.1: Pavement performance calibration factors for paved roads for HDM-4 models**

| Distress parameter | | Seal type | Recommended calibration factor |
|---|---|---|---|
| Time to all crack initiation (ICA) | $K_{cia}$ | Sand seals (SS) and Diluted emulsions (DE) | 0,7 |
| | | Cape seals (S19) | 0,7 |
| | | Latex modified seals (L13G) | 0,7 |
| | | Conventional seals and all other seals not mentioned above | 1,2 |
| | | Asphalt surfaces | 2,5 |
| Time to wide crack initiation (ICW) | $K_{ciw}$ | All types | 1,0 |
| All crack progression (ACA) | $K_{cpa}$ | All types, but Cape Seals | 0,12 |
| | | Cape Seals | An alternative model is recommended where all cracking develop to 20% in the first year after crack initiation, thereafter a 10% increase in all cracking annually. |
| Wide crack progression (ACW) | $K_{cpw}$ | All types | 0,14 |
| Time to ravelling initiation (IRV) | $K_{vi}$ | Diluted emulsions | 0,7 |
| | | Cape seals | 1,3 |
| | | Conventional seals and all other seals not mentioned above | 1,0 |
| | | Asphalt surfaces | 1,7 |

| Table I.1: Pavement performance calibration factors for paved roads for HDM-4 models | | | |
|---|---|---|---|
| **Distress parameter** | | **Seal type** | **Recommended calibration factor** |
| Ravelling progression (ARV) | $K_{vp}$ | All types | 1,0 |
| Pothole initiation (IPT) | $K_{pi}$ | All types | 1,0 |
| Pothole progression (NPT) | $K_{pp}$ | All types | 1,0 |
| Rutting initial densification (RDO) | $K_{rid}$ | All types | 1,0 |
| Rutting progression (RDST) | $K_{rst}$ | All types | 3,1 |
| Roughness progression (RI) | $K_{gs}$ | All types | 1,0 |
| Roughness progression (RI) | $K_{gm}$ | All types | 2,8 |

The Branch continues to collect information on calibration factors for HDM-4 models from the continuous monitoring of specific pavement performance monitoring sections in the Western Cape Province.

# Appendix J – Standards and Specifications

- The Geometric Design Manual of the Provincial Administration: Western Cape
- TRH 17: Geometric Design of Rural Roads, 1984.
- South African Road Safety Manual
- Road Access Guidelines, Transport Infrastructure Branch, as amended from time to time.
- 'Handleiding vir padboumetodes', PGWC, as amended from time to time.
- Materials Manual: Provincial Administration of the Western Cape, as amended from time to time.
- Maintenance Manual – Provincial Administration of the Cape of Good Hope, July 1986.
- TRH 14: Guidelines for road construction materials
- Draft TRH3: Surfacing seals for rural and urban roads
- TMH1: Standard methods of testing road construction materials
- TMH5: Sampling methods for road construction materials
- TRH9: Construction of road embankments
- TRH10: The design of road embankments
- Draft TRH15: Sub-surface drainage for roads
- Draft TRH18: The investigation, design, construction and maintenance of road cuttings.
- SADC Road Traffic Signs Manual
- TMH7: Code of practice for the design of highway bridges, and culverts in South Africa, parts 1 to 3.
- Bridge Design Manual: Provincial Administration Western Cape
- TRH25: Guidelines for the Hydraulic design and maintenance of river crossings
- General conditions of contract for State Road Authorities (CSAICE) 2004.
- Standard specifications: COLTO (1998)
- Project procedures manual, Volumes 1 to 3. PGWC As amended.
- K21 (revised) Identification and improvement of hazardous locations. CSIR. 1991.
- TRH20: The structural design, construction and maintenance of unpaved roads. 1990.
- Guidelines for the provision and maintenance of unpaved roads in the Western Cape, 2005.
- Draft TRH 4: Structural design of flexible pavements for interurban and rural roads. 1996
- TRH 12: Flexible pavement rehabilitation investigation and design. 1997.
- Draft TRH 3: Surfacing seals for rural and urban roads. 1998.

# Appendix K – Forward Works Program and alignment of projects

## *Optimised delivery schedule per financial year*

The report shows the dTIMS Candidate Projects in terms of delivering on the identified dTIMS priorities per financial year.

**Key:**

Priority A: Recommended Treatment now if funds are available

Priority B: Recommended Treatment next year

Priority C: Recommended Treatment in the future

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2024 | Priority A | LightRehab | DR01241 | 0.00 | 0.40 | 0.40 |
| 2024 | Priority A | Rehabilitation | DR01277 | 0.00 | 2.70 | 2.70 |
| 2024 | Priority A | LightRehab | DR01325 | 0.24 | 0.35 | 0.11 |
| 2024 | Priority A | Reseal | DR01352 | 0.00 | 2.01 | 2.01 |
| 2024 | Priority A | Reseal | DR01354 | 2.68 | 3.70 | 1.02 |
| 2024 | Priority A | Reseal | DR01525 | 20.00 | 21.00 | 1.00 |
| 2024 | Priority A | Rehabilitation | DR01525 | 21.00 | 21.20 | 0.20 |
| 2024 | Priority A | Reseal | DR01525 | 21.20 | 24.28 | 3.08 |
| 2024 | Priority A | Reseal | DR01529 | 12.49 | 14.85 | 2.36 |
| 2024 | Priority A | Reseal | DR01532 | 0.00 | 17.16 | 17.16 |
| 2024 | Priority A | Reseal | DR01788 | 0.00 | 1.46 | 1.46 |
| 2024 | Priority A | Reseal | DR02220 | 0.00 | 3.57 | 3.57 |
| 2024 | Priority A | LightRehab | MR00027 | 31.72 | 34.25 | 2.53 |
| 2024 | Priority A | LightRehab | MR00027 | 75.20 | 76.31 | 1.11 |
| 2024 | Priority A | Reseal | MR00103 | 11.36 | 14.00 | 2.64 |
| 2024 | Priority A | Reseal | MR00103 | 14.00 | 16.00 | 2.00 |
| 2024 | Priority A | Reseal | MR00106 | 18.00 | 22.00 | 4.00 |
| 2024 | Priority A | Reseal | MR00106 | 22.00 | 23.46 | 1.46 |
| 2024 | Priority A | Reseal | MR00106 | 14.61 | 18.00 | 3.39 |
| 2024 | Priority A | Reseal | MR00106 | 18.00 | 20.00 | 2.00 |
| 2024 | Priority A | Reseal | MR00106 | 20.00 | 23.46 | 3.46 |
| 2024 | Priority A | LightRehab | MR00114 | 0.00 | 1.60 | 1.60 |
| 2024 | Priority A | Reseal | MR00115 | 0.00 | 10.00 | 10.00 |
| 2024 | Priority A | LightRehab | MR00122 | 23.02 | 24.65 | 1.63 |
| 2024 | Priority A | Reseal | MR00128 | 1.30 | 2.88 | 1.58 |
| 2024 | Priority A | LightRehab | MR00133 | 6.60 | 8.76 | 2.16 |
| 2024 | Priority A | LightRehab | MR00159 | 0.00 | 2.00 | 2.00 |
| 2024 | Priority A | Reseal | MR00159 | 4.00 | 9.36 | 5.36 |
| 2024 | Priority A | Reseal | MR00165 | 0.00 | 9.13 | 9.13 |
| 2024 | Priority A | Rehabilitation | MR00172 | 0.00 | 0.05 | 0.05 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2024 | Priority A | Reseal | MR00172 | 0.05 | 1.25 | 1.20 |
| 2024 | Priority A | Reseal | MR00172 | 8.00 | 10.00 | 2.00 |
| 2024 | Priority A | Reseal | MR00174 | 50.00 | 58.49 | 8.49 |
| 2024 | Priority A | Reseal | MR00175 | 0.00 | 0.56 | 0.56 |
| 2024 | Priority A | LightRehab | MR00177 | 30.15 | 32.35 | 2.20 |
| 2024 | Priority A | Reseal | MR00177 | 4.53 | 8.17 | 3.64 |
| 2024 | Priority A | Reseal | MR00187 | 1.54 | 4.72 | 3.18 |
| 2024 | Priority A | Reseal | MR00189 | 33.69 | 35.55 | 1.86 |
| 2024 | Priority A | LightRehab | MR00189 | 39.41 | 40.05 | 0.64 |
| 2024 | Priority A | Reseal | MR00199 | 3.67 | 13.90 | 10.23 |
| 2024 | Priority A | Reseal | MR00200 | 2.00 | 6.00 | 4.00 |
| 2024 | Priority A | Reseal | MR00201 | 56.92 | 58.34 | 1.42 |
| 2024 | Priority A | LightRehab | MR00201 | 54.61 | 56.20 | 1.59 |
| 2024 | Priority A | Reseal | MR00215 | 69.34 | 69.85 | 0.51 |
| 2024 | Priority A | Reseal | MR00227 | 0.00 | 32.16 | 32.16 |
| 2024 | Priority A | Reseal | MR00267 | 0.34 | 50.58 | 50.24 |
| 2024 | Priority A | Reseal | MR00301 | 0.65 | 3.34 | 2.69 |
| 2024 | Priority A | LightRehab | MR00301 | 5.07 | 6.61 | 1.54 |
| 2024 | Priority A | Reseal | MR00331 | 1.43 | 10.57 | 9.14 |
| 2024 | Priority A | Reseal | MR00337 | 0.60 | 15.65 | 15.05 |
| 2024 | Priority A | Reseal | MR00337 | 33.21 | 48.95 | 15.74 |
| 2024 | Priority A | LightRehab | MR00338 | 0.00 | 1.11 | 1.11 |
| 2024 | Priority A | Reseal | MR00344 | 0.00 | 6.30 | 6.30 |
| 2024 | Priority A | Reseal | MR00344 | 6.81 | 14.84 | 8.03 |
| 2024 | Priority A | Reseal | MR00546 | 37.45 | 54.54 | 17.09 |
| 2024 | Priority A | Reseal | MR00552 | 0.00 | 20.00 | 20.00 |
| 2024 | Priority A | Reseal | MR00552 | 23.00 | 24.28 | 1.28 |
| 2024 | Priority A | Reseal | OP06069 | 0.00 | 0.24 | 0.24 |
| 2024 | Priority A | Reseal | OP06072 | 0.42 | 0.66 | 0.24 |
| 2024 | Priority A | Reseal | OP06072 | 2.82 | 3.36 | 0.54 |
| 2024 | Priority A | Reseal | OP06074 | 0.00 | 0.45 | 0.45 |
| 2024 | Priority A | Rehabilitation | OP07220 | 0.00 | 1.49 | 1.49 |
| 2024 | Priority A | LightRehab | TR00209 | 24.06 | 26.44 | 2.38 |
| 2024 | Priority A | LightRehab | TR00209 | 26.44 | 27.10 | 0.66 |
| 2024 | Priority A | LightRehab | TR00209 | 25.36 | 26.43 | 1.07 |
| 2024 | Priority A | Reseal | TR00209 | 26.43 | 26.89 | 0.46 |
| 2024 | Priority A | LightRehab | TR00210 | 0.00 | 0.52 | 0.52 |
| 2024 | Priority A | Reseal | TR00210 | 59.15 | 59.98 | 0.83 |
| 2024 | Priority A | Reseal | TR00212 | 14.14 | 37.25 | 23.11 |
| 2024 | Priority A | Reseal | TR01101 | 0.00 | 2.00 | 2.00 |
| 2024 | Priority A | Reseal | TR01101 | 0.00 | 2.00 | 2.00 |
| 2024 | Priority A | Reseal | TR01601 | 2.00 | 6.00 | 4.00 |
| 2024 | Priority A | Rehabilitation | TR01602 | 34.65 | 40.16 | 5.51 |
| 2024 | Priority A | LightRehab | TR02201 | 36.88 | 37.03 | 0.15 |
| 2024 | Priority A | Reseal | TR02201 | 36.00 | 36.05 | 0.05 |
| 2024 | Priority A | LightRehab | TR03001 | 32.11 | 33.03 | 0.92 |
| 2024 | Priority A | Reseal | TR03101 | 45.18 | 45.67 | 0.49 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2024 | Priority A | Reseal | TR03103 | 47.00 | 61.49 | 14.49 |
| 2024 | Priority A | Reseal | TR03201 | 31.20 | 44.00 | 12.80 |
| 2024 | Priority A | Rehabilitation | TR03302 | 75.09 | 75.35 | 0.26 |
| 2024 | Priority A | Reseal | TR03304 | 0.00 | 28.45 | 28.45 |
| 2024 | Priority A | LightRehab | TR03304 | 28.45 | 28.50 | 0.05 |
| 2024 | Priority A | Reseal | TR03305 | 0.00 | 110.00 | 110.00 |
| 2024 | Priority A | LightRehab | TR03305 | 110.00 | 110.05 | 0.05 |
| 2024 | Priority A | Reseal | TR03402 | 3.19 | 39.30 | 36.11 |
| 2024 | Priority A | Reseal | TR03402 | 39.30 | 47.40 | 8.10 |
| 2024 | Priority A | Reseal | TR05501 | 0.83 | 2.00 | 1.17 |
| 2024 | Priority A | Reseal | TR06501 | 0.00 | 32.62 | 32.62 |
| 2024 | Priority A | Reseal | TR07502 | 0.48 | 1.07 | 0.59 |
| 2025 | Priority B | Rehabilitation | DR01079 | 0.00 | 0.24 | 0.24 |
| 2025 | Priority B | Reseal | DR01090 | 0.00 | 6.73 | 6.73 |
| 2025 | Priority B | Rehabilitation | DR01098 | 8.79 | 14.24 | 5.45 |
| 2025 | Priority B | LightRehab | DR01101 | 0.00 | 6.00 | 6.00 |
| 2025 | Priority B | LightRehab | DR01103 | 1.65 | 1.86 | 0.21 |
| 2025 | Priority B | Reseal | DR01123 | 0.00 | 12.25 | 12.25 |
| 2025 | Priority B | Reseal | DR01134 | 0.00 | 4.00 | 4.00 |
| 2025 | Priority B | Reseal | DR01214 | 2.00 | 4.00 | 2.00 |
| 2025 | Priority B | Reseal | DR01285 | 2.00 | 4.00 | 2.00 |
| 2025 | Priority B | Reseal | DR01287 | 4.00 | 7.45 | 3.45 |
| 2025 | Priority B | Reseal | DR01347 | 18.51 | 25.64 | 7.13 |
| 2025 | Priority B | Reseal | DR01356 | 13.06 | 17.47 | 4.41 |
| 2025 | Priority B | Reseal | DR01358 | 0.00 | 4.05 | 4.05 |
| 2025 | Priority B | Reseal | DR01363 | 0.00 | 2.84 | 2.84 |
| 2025 | Priority B | Reseal | DR01365 | 0.00 | 2.80 | 2.80 |
| 2025 | Priority B | LightRehab | DR01374 | 0.00 | 0.47 | 0.47 |
| 2025 | Priority B | Reseal | DR01377 | 20.18 | 20.75 | 0.57 |
| 2025 | Priority B | Reseal | DR01379 | 0.00 | 7.41 | 7.41 |
| 2025 | Priority B | Reseal | DR01385 | 0.88 | 2.44 | 1.56 |
| 2025 | Priority B | Reseal | DR01400 | 0.00 | 8.23 | 8.23 |
| 2025 | Priority B | Reseal | DR01419 | 0.00 | 0.66 | 0.66 |
| 2025 | Priority B | Reseal | DR01461 | 0.72 | 2.00 | 1.28 |
| 2025 | Priority B | Reseal | DR01582 | 0.00 | 1.29 | 1.29 |
| 2025 | Priority B | Reseal | DR01600 | 0.00 | 6.89 | 6.89 |
| 2025 | Priority B | Reseal | DR01615 | 9.81 | 12.42 | 2.61 |
| 2025 | Priority B | Reseal | DR01622 | 0.45 | 2.00 | 1.55 |
| 2025 | Priority B | Reseal | DR01627 | 0.00 | 8.00 | 8.00 |
| 2025 | Priority B | LightRehab | DR01654 | 5.62 | 5.72 | 0.10 |
| 2025 | Priority B | Rehabilitation | DR01688 | 15.18 | 15.64 | 0.46 |
| 2025 | Priority B | Reseal | DR01725 | 0.26 | 0.62 | 0.36 |
| 2025 | Priority B | LightRehab | DR02161 | 17.47 | 17.49 | 0.02 |
| 2025 | Priority B | LightRehab | DR02307 | 10.40 | 10.55 | 0.15 |
| 2025 | Priority B | Reseal | MR00103 | 16.00 | 18.00 | 2.00 |
| 2025 | Priority B | Reseal | MR00103 | 32.00 | 42.00 | 10.00 |
| 2025 | Priority B | LightRehab | MR00104 | 4.00 | 6.00 | 2.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2025 | Priority B | Reseal | MR00106 | 14.61 | 18.00 | 3.39 |
| 2025 | Priority B | Reseal | MR00111 | 0.00 | 1.10 | 1.10 |
| 2025 | Priority B | Reseal | MR00113 | 0.00 | 3.69 | 3.69 |
| 2025 | Priority B | LightRehab | MR00115 | 11.30 | 13.00 | 1.70 |
| 2025 | Priority B | LightRehab | MR00115 | 10.00 | 13.00 | 3.00 |
| 2025 | Priority B | Reseal | MR00119 | 23.81 | 25.75 | 1.94 |
| 2025 | Priority B | Reseal | MR00119 | 23.81 | 25.75 | 1.94 |
| 2025 | Priority B | LightRehab | MR00122 | 14.95 | 15.96 | 1.01 |
| 2025 | Priority B | LightRehab | MR00123 | 0.00 | 4.46 | 4.46 |
| 2025 | Priority B | Rehabilitation | MR00126 | 4.81 | 5.11 | 0.30 |
| 2025 | Priority B | Reseal | MR00130 | 5.12 | 6.40 | 1.28 |
| 2025 | Priority B | Reseal | MR00130 | 0.00 | 2.00 | 2.00 |
| 2025 | Priority B | Reseal | MR00130 | 2.00 | 6.40 | 4.40 |
| 2025 | Priority B | LightRehab | MR00134 | 0.00 | 4.00 | 4.00 |
| 2025 | Priority B | LightRehab | MR00134 | 4.00 | 6.00 | 2.00 |
| 2025 | Priority B | LightRehab | MR00134 | 6.00 | 8.00 | 2.00 |
| 2025 | Priority B | LightRehab | MR00159 | 2.00 | 4.00 | 2.00 |
| 2025 | Priority B | Reseal | MR00163 | 0.00 | 2.00 | 2.00 |
| 2025 | Priority B | LightRehab | MR00164 | 0.00 | 2.00 | 2.00 |
| 2025 | Priority B | Reseal | MR00166 | 0.11 | 4.71 | 4.60 |
| 2025 | Priority B | LightRehab | MR00167 | 0.00 | 0.87 | 0.87 |
| 2025 | Priority B | Rehabilitation | MR00168 | 5.88 | 10.26 | 4.38 |
| 2025 | Priority B | Recon | MR00174 | 1.61 | 2.00 | 0.39 |
| 2025 | Priority B | Reseal | MR00174 | 0.16 | 0.60 | 0.44 |
| 2025 | Priority B | LightRehab | MR00174 | 0.60 | 1.97 | 1.37 |
| 2025 | Priority B | Reseal | MR00174 | 2.86 | 3.82 | 0.96 |
| 2025 | Priority B | Reseal | MR00174 | 17.25 | 31.70 | 14.45 |
| 2025 | Priority B | Reseal | MR00174 | 47.15 | 50.00 | 2.85 |
| 2025 | Priority B | Reseal | MR00177 | 18.00 | 19.60 | 1.60 |
| 2025 | Priority B | Reseal | MR00189 | 16.63 | 21.50 | 4.87 |
| 2025 | Priority B | LightRehab | MR00189 | 21.50 | 22.00 | 0.50 |
| 2025 | Priority B | Reseal | MR00199 | 3.67 | 5.63 | 1.96 |
| 2025 | Priority B | LightRehab | MR00200 | 0.47 | 2.00 | 1.53 |
| 2025 | Priority B | LightRehab | MR00200 | 6.00 | 12.40 | 6.40 |
| 2025 | Priority B | LightRehab | MR00202 | 1.80 | 4.27 | 2.47 |
| 2025 | Priority B | Rehabilitation | MR00205 | 0.00 | 8.62 | 8.62 |
| 2025 | Priority B | Reseal | MR00210 | 1.90 | 3.78 | 1.88 |
| 2025 | Priority B | LightRehab | MR00210 | 3.68 | 3.94 | 0.26 |
| 2025 | Priority B | Reseal | MR00213 | 0.00 | 5.32 | 5.32 |
| 2025 | Priority B | LightRehab | MR00215 | 16.00 | 21.19 | 5.19 |
| 2025 | Priority B | LightRehab | MR00217 | 5.44 | 9.77 | 4.33 |
| 2025 | Priority B | LightRehab | MR00219 | 0.00 | 1.63 | 1.63 |
| 2025 | Priority B | LightRehab | MR00219 | 0.00 | 1.63 | 1.63 |
| 2025 | Priority B | Rehabilitation | MR00222 | 1.41 | 1.58 | 0.17 |
| 2025 | Priority B | Reseal | MR00226 | 0.00 | 0.96 | 0.96 |
| 2025 | Priority B | LightRehab | MR00226 | 0.96 | 2.01 | 1.05 |
| 2025 | Priority B | Reseal | MR00228 | 21.22 | 23.10 | 1.88 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2025 | Priority B | Reseal | MR00230 | 0.00 | 4.00 | 4.00 |
| 2025 | Priority B | Reseal | MR00238 | 0.00 | 1.29 | 1.29 |
| 2025 | Priority B | Reseal | MR00238 | 10.48 | 12.12 | 1.64 |
| 2025 | Priority B | LightRehab | MR00238 | 0.00 | 1.29 | 1.29 |
| 2025 | Priority B | LightRehab | MR00238 | 10.48 | 12.12 | 1.64 |
| 2025 | Priority B | Reseal | MR00261 | 12.00 | 28.00 | 16.00 |
| 2025 | Priority B | LightRehab | MR00261 | 28.00 | 29.03 | 1.03 |
| 2025 | Priority B | Rehabilitation | MR00269 | 0.00 | 9.35 | 9.35 |
| 2025 | Priority B | Rehabilitation | MR00269 | 25.40 | 33.79 | 8.39 |
| 2025 | Priority B | LightRehab | MR00272 | 1.81 | 2.99 | 1.18 |
| 2025 | Priority B | Reseal | MR00289 | 0.00 | 5.00 | 5.00 |
| 2025 | Priority B | Reseal | MR00291 | 0.00 | 8.99 | 8.99 |
| 2025 | Priority B | Reseal | MR00294 | 0.00 | 1.59 | 1.59 |
| 2025 | Priority B | Reseal | MR00295 | 20.00 | 75.49 | 55.49 |
| 2025 | Priority B | LightRehab | MR00301 | 3.34 | 4.64 | 1.30 |
| 2025 | Priority B | LightRehab | MR00301 | 4.64 | 5.07 | 0.43 |
| 2025 | Priority B | Reseal | MR00308 | 0.00 | 0.89 | 0.89 |
| 2025 | Priority B | LightRehab | MR00310 | 112.02 | 114.29 | 2.27 |
| 2025 | Priority B | Reseal | MR00316 | 0.00 | 0.25 | 0.25 |
| 2025 | Priority B | Reseal | MR00347 | 9.34 | 10.00 | 0.66 |
| 2025 | Priority B | Reseal | MR00351 | 0.00 | 17.67 | 17.67 |
| 2025 | Priority B | Reseal | MR00352 | 6.00 | 8.86 | 2.86 |
| 2025 | Priority B | Reseal | MR00355 | 35.46 | 35.86 | 0.40 |
| 2025 | Priority B | Reseal | MR00355 | 39.43 | 41.63 | 2.20 |
| 2025 | Priority B | Reseal | MR00355 | 44.34 | 44.51 | 0.17 |
| 2025 | Priority B | Reseal | MR00355 | 54.54 | 54.68 | 0.14 |
| 2025 | Priority B | Reseal | MR00355 | 56.98 | 70.83 | 13.85 |
| 2025 | Priority B | Reseal | MR00365 | 0.00 | 14.12 | 14.12 |
| 2025 | Priority B | Reseal | MR00383 | 0.00 | 1.61 | 1.61 |
| 2025 | Priority B | Rehabilitation | MR00527 | 0.00 | 4.10 | 4.10 |
| 2025 | Priority B | Reseal | MR00531 | 48.00 | 50.00 | 2.00 |
| 2025 | Priority B | Rehabilitation | MR00533 | 13.19 | 23.08 | 9.89 |
| 2025 | Priority B | Rehabilitation | MR00547 | 22.32 | 22.40 | 0.08 |
| 2025 | Priority B | Reseal | MR00547 | 42.00 | 46.00 | 4.00 |
| 2025 | Priority B | Reseal | MR00559 | 2.00 | 3.20 | 1.20 |
| 2025 | Priority B | Reseal | MR00559 | 3.20 | 12.75 | 9.55 |
| 2025 | Priority B | Recon | OP05205 | 0.00 | 0.42 | 0.42 |
| 2025 | Priority B | Reseal | OP05215 | 0.00 | 0.31 | 0.31 |
| 2025 | Priority B | Rehabilitation | OP05247 | 0.00 | 0.94 | 0.94 |
| 2025 | Priority B | Reseal | OP06046 | 0.75 | 3.22 | 2.47 |
| 2025 | Priority B | Reseal | OP06811 | 0.00 | 0.48 | 0.48 |
| 2025 | Priority B | Reseal | OP07643 | 3.02 | 5.54 | 2.52 |
| 2025 | Priority B | Reseal | TR00201 | 28.24 | 30.00 | 1.76 |
| 2025 | Priority B | Reseal | TR00204 | 0.00 | 0.63 | 0.63 |
| 2025 | Priority B | Reseal | TR00210 | 4.45 | 6.06 | 1.61 |
| 2025 | Priority B | Reseal | TR00210 | 0.00 | 6.06 | 6.06 |
| 2025 | Priority B | LightRehab | TR00211 | 0.00 | 0.87 | 0.87 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2025 | Priority B | Reseal | TR00902 | 0.21 | 21.25 | 21.04 |
| 2025 | Priority B | Reseal | TR01602 | 32.00 | 34.00 | 2.00 |
| 2025 | Priority B | Reseal | TR01602 | 34.00 | 34.65 | 0.65 |
| 2025 | Priority B | Rehabilitation | TR01608 | 43.48 | 48.12 | 4.64 |
| 2025 | Priority B | Reseal | TR01609 | 0.00 | 42.05 | 42.05 |
| 2025 | Priority B | Reseal | TR02102 | 24.60 | 36.65 | 12.05 |
| 2025 | Priority B | LightRehab | TR02103 | 0.00 | 0.82 | 0.82 |
| 2025 | Priority B | Reseal | TR02103 | 6.00 | 8.00 | 2.00 |
| 2025 | Priority B | Reseal | TR02201 | 20.60 | 36.00 | 15.40 |
| 2025 | Priority B | LightRehab | TR02201 | 36.05 | 37.03 | 0.98 |
| 2025 | Priority B | Reseal | TR02202 | 3.55 | 71.40 | 67.85 |
| 2025 | Priority B | LightRehab | TR02303 | 60.87 | 61.48 | 0.61 |
| 2025 | Priority B | Reseal | TR02501 | 37.00 | 42.21 | 5.21 |
| 2025 | Priority B | LightRehab | TR02501 | 43.00 | 43.31 | 0.31 |
| 2025 | Priority B | LightRehab | TR02801 | 26.69 | 29.46 | 2.77 |
| 2025 | Priority B | LightRehab | TR02801 | 2.00 | 4.00 | 2.00 |
| 2025 | Priority B | Reseal | TR02801 | 4.00 | 10.00 | 6.00 |
| 2025 | Priority B | Reseal | TR02801 | 16.00 | 28.00 | 12.00 |
| 2025 | Priority B | LightRehab | TR02801 | 28.00 | 29.46 | 1.46 |
| 2025 | Priority B | Rehabilitation | TR02802 | 43.26 | 43.88 | 0.62 |
| 2025 | Priority B | Reseal | TR03002 | 21.50 | 34.65 | 13.15 |
| 2025 | Priority B | Reseal | TR03002 | 34.65 | 47.39 | 12.74 |
| 2025 | Priority B | Reseal | TR03002 | 47.39 | 48.44 | 1.05 |
| 2025 | Priority B | Reseal | TR03101 | 4.54 | 13.58 | 9.04 |
| 2025 | Priority B | Reseal | TR03101 | 13.58 | 14.00 | 0.42 |
| 2025 | Priority B | LightRehab | TR03102 | 0.00 | 1.05 | 1.05 |
| 2025 | Priority B | LightRehab | TR03102 | 20.00 | 24.00 | 4.00 |
| 2025 | Priority B | Reseal | TR03103 | 1.42 | 33.00 | 31.58 |
| 2025 | Priority B | Reseal | TR03105 | 0.42 | 0.90 | 0.48 |
| 2025 | Priority B | Reseal | TR03201 | 44.00 | 45.15 | 1.15 |
| 2025 | Priority B | Reseal | TR03301 | 10.27 | 13.05 | 2.78 |
| 2025 | Priority B | Reseal | TR03302 | 0.00 | 50.00 | 50.00 |
| 2025 | Priority B | Reseal | TR03302 | 64.00 | 66.00 | 2.00 |
| 2025 | Priority B | LightRehab | TR03303 | 0.00 | 1.06 | 1.06 |
| 2025 | Priority B | Reseal | TR03303 | 1.86 | 2.80 | 0.94 |
| 2025 | Priority B | Reseal | TR05401 | 0.00 | 1.71 | 1.71 |
| 2025 | Priority B | Reseal | TR05501 | 60.50 | 61.80 | 1.30 |
| 2025 | Priority B | Reseal | TR07501 | 31.22 | 31.95 | 0.73 |
| 2025 | Priority B | Reseal | TR07701 | 8.24 | 26.00 | 17.76 |
| 2025 | Priority B | Reseal | TR07701 | 54.00 | 56.00 | 2.00 |
| 2025 | Priority B | Reseal | TR08301 | 25.78 | 34.00 | 8.22 |
| 2025 | Priority B | Reseal | TR08301 | 48.50 | 58.00 | 9.50 |
| 2025 | Priority B | Reseal | TR08302 | 0.00 | 11.16 | 11.16 |
| 2025 | Priority B | Reseal | TR08302 | 15.25 | 23.01 | 7.76 |
| 2025 | Priority B | Reseal | TR08501 | 0.60 | 4.22 | 3.62 |
| 2026 | Priority C | LightRehab | DR01012 | 1.62 | 3.55 | 1.93 |
| 2026 | Priority C | Reseal | DR01053 | 0.81 | 6.00 | 5.19 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2026 | Priority C | LightRehab | DR01101 | 10.00 | 11.78 | 1.78 |
| 2026 | Priority C | LightRehab | DR01114 | 0.00 | 1.70 | 1.70 |
| 2026 | Priority C | Reseal | DR01119 | 3.74 | 4.59 | 0.85 |
| 2026 | Priority C | LightRehab | DR01125 | 4.00 | 6.00 | 2.00 |
| 2026 | Priority C | LightRehab | DR01154 | 3.85 | 3.91 | 0.06 |
| 2026 | Priority C | LightRehab | DR01154 | 11.86 | 13.40 | 1.54 |
| 2026 | Priority C | Reseal | DR01214 | 4.00 | 6.48 | 2.48 |
| 2026 | Priority C | LightRehab | DR01252 | 12.37 | 12.54 | 0.17 |
| 2026 | Priority C | Reseal | DR01264 | 10.26 | 19.18 | 8.92 |
| 2026 | Priority C | Reseal | DR01285 | 0.00 | 2.00 | 2.00 |
| 2026 | Priority C | Reseal | DR01287 | 0.00 | 4.00 | 4.00 |
| 2026 | Priority C | LightRehab | DR01288 | 22.60 | 22.85 | 0.25 |
| 2026 | Priority C | LightRehab | DR01379 | 8.26 | 8.59 | 0.33 |
| 2026 | Priority C | LightRehab | DR01412 | 0.00 | 1.71 | 1.71 |
| 2026 | Priority C | LightRehab | DR01425 | 0.00 | 2.63 | 2.63 |
| 2026 | Priority C | Reseal | DR01440 | 0.00 | 2.00 | 2.00 |
| 2026 | Priority C | Reseal | DR01458 | 6.00 | 10.92 | 4.92 |
| 2026 | Priority C | LightRehab | DR01480 | 0.65 | 0.85 | 0.20 |
| 2026 | Priority C | Reseal | DR01487 | 102.53 | 102.83 | 0.30 |
| 2026 | Priority C | Reseal | DR01487 | 105.93 | 123.32 | 17.39 |
| 2026 | Priority C | Reseal | DR01573 | 7.93 | 9.06 | 1.13 |
| 2026 | Priority C | LightRehab | DR01592 | 0.00 | 0.32 | 0.32 |
| 2026 | Priority C | Reseal | DR01770 | 0.00 | 2.00 | 2.00 |
| 2026 | Priority C | Reseal | DR01770 | 6.00 | 8.00 | 2.00 |
| 2026 | Priority C | Reseal | DR01770 | 8.00 | 10.00 | 2.00 |
| 2026 | Priority C | Reseal | DR01770 | 10.00 | 12.33 | 2.33 |
| 2026 | Priority C | LightRehab | DR01775 | 0.00 | 1.90 | 1.90 |
| 2026 | Priority C | Reseal | DR02159 | 0.00 | 0.62 | 0.62 |
| 2026 | Priority C | Reseal | MR00023 | 1.64 | 4.00 | 2.36 |
| 2026 | Priority C | Reseal | MR00027 | 26.00 | 31.72 | 5.72 |
| 2026 | Priority C | LightRehab | MR00027 | 70.00 | 71.65 | 1.65 |
| 2026 | Priority C | Reseal | MR00027 | 20.00 | 26.00 | 6.00 |
| 2026 | Priority C | Reseal | MR00027 | 26.00 | 31.72 | 5.72 |
| 2026 | Priority C | LightRehab | MR00028 | 0.00 | 0.54 | 0.54 |
| 2026 | Priority C | Rehabilitation | MR00101 | 42.00 | 60.00 | 18.00 |
| 2026 | Priority C | LightRehab | MR00103 | 18.00 | 20.00 | 2.00 |
| 2026 | Priority C | LightRehab | MR00103 | 22.00 | 24.00 | 2.00 |
| 2026 | Priority C | Rehabilitation | MR00103 | 42.00 | 64.70 | 22.70 |
| 2026 | Priority C | LightRehab | MR00104 | 0.90 | 4.00 | 3.10 |
| 2026 | Priority C | LightRehab | MR00106 | 36.00 | 36.47 | 0.47 |
| 2026 | Priority C | Rehabilitation | MR00108 | 0.00 | 3.17 | 3.17 |
| 2026 | Priority C | Reseal | MR00113 | 0.00 | 3.69 | 3.69 |
| 2026 | Priority C | Rehabilitation | MR00126 | 4.81 | 5.11 | 0.30 |
| 2026 | Priority C | Reseal | MR00159 | 2.00 | 9.36 | 7.36 |
| 2026 | Priority C | LightRehab | MR00159 | 0.00 | 2.00 | 2.00 |
| 2026 | Priority C | Reseal | MR00168 | 0.00 | 6.10 | 6.10 |
| 2026 | Priority C | Reseal | MR00168 | 0.00 | 5.88 | 5.88 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2026 | Priority C | LightRehab | MR00168 | 10.26 | 11.00 | 0.74 |
| 2026 | Priority C | LightRehab | MR00172 | 1.25 | 2.02 | 0.77 |
| 2026 | Priority C | Reseal | MR00172 | 2.02 | 2.49 | 0.47 |
| 2026 | Priority C | Reseal | MR00172 | 2.49 | 8.00 | 5.51 |
| 2026 | Priority C | Rehabilitation | MR00174 | 2.52 | 2.84 | 0.32 |
| 2026 | Priority C | Rehabilitation | MR00174 | 1.97 | 2.47 | 0.50 |
| 2026 | Priority C | Rehabilitation | MR00174 | 2.47 | 2.86 | 0.39 |
| 2026 | Priority C | Reseal | MR00174 | 14.00 | 17.25 | 3.25 |
| 2026 | Priority C | Reseal | MR00174 | 32.00 | 42.00 | 10.00 |
| 2026 | Priority C | Reseal | MR00174 | 42.00 | 46.15 | 4.15 |
| 2026 | Priority C | LightRehab | MR00174 | 58.49 | 59.32 | 0.83 |
| 2026 | Priority C | Reseal | MR00177 | 17.05 | 19.60 | 2.55 |
| 2026 | Priority C | Reseal | MR00187 | 4.72 | 14.71 | 9.99 |
| 2026 | Priority C | Reseal | MR00188 | 22.00 | 24.00 | 2.00 |
| 2026 | Priority C | Reseal | MR00188 | 24.00 | 26.80 | 2.80 |
| 2026 | Priority C | LightRehab | MR00189 | 26.00 | 32.81 | 6.81 |
| 2026 | Priority C | LightRehab | MR00192 | 0.00 | 3.22 | 3.22 |
| 2026 | Priority C | LightRehab | MR00192 | 0.00 | 3.72 | 3.72 |
| 2026 | Priority C | Reseal | MR00199 | 20.00 | 22.46 | 2.46 |
| 2026 | Priority C | Reseal | MR00201 | 56.20 | 56.92 | 0.72 |
| 2026 | Priority C | Reseal | MR00201 | 56.20 | 56.92 | 0.72 |
| 2026 | Priority C | Rehabilitation | MR00207 | 1.40 | 2.70 | 1.30 |
| 2026 | Priority C | LightRehab | MR00208 | 0.00 | 3.46 | 3.46 |
| 2026 | Priority C | LightRehab | MR00208 | 0.00 | 4.92 | 4.92 |
| 2026 | Priority C | LightRehab | MR00216 | 0.00 | 4.14 | 4.14 |
| 2026 | Priority C | LightRehab | MR00217 | 0.00 | 4.66 | 4.66 |
| 2026 | Priority C | LightRehab | MR00217 | 9.77 | 19.87 | 10.10 |
| 2026 | Priority C | Reseal | MR00218 | 0.00 | 5.56 | 5.56 |
| 2026 | Priority C | Rehabilitation | MR00224 | 0.00 | 0.29 | 0.29 |
| 2026 | Priority C | LightRehab | MR00224 | 0.00 | 2.35 | 2.35 |
| 2026 | Priority C | Reseal | MR00224 | 6.00 | 20.00 | 14.00 |
| 2026 | Priority C | LightRehab | MR00228 | 23.10 | 23.76 | 0.66 |
| 2026 | Priority C | LightRehab | MR00240 | 0.00 | 2.14 | 2.14 |
| 2026 | Priority C | LightRehab | MR00261 | 0.80 | 2.00 | 1.20 |
| 2026 | Priority C | LightRehab | MR00264 | 0.84 | 8.00 | 7.16 |
| 2026 | Priority C | Reseal | MR00264 | 8.00 | 12.00 | 4.00 |
| 2026 | Priority C | LightRehab | MR00278 | 0.00 | 1.31 | 1.31 |
| 2026 | Priority C | Rehabilitation | MR00279 | 18.00 | 20.00 | 2.00 |
| 2026 | Priority C | LightRehab | MR00287 | 30.03 | 30.71 | 0.68 |
| 2026 | Priority C | Reseal | MR00289 | 14.00 | 16.00 | 2.00 |
| 2026 | Priority C | LightRehab | MR00292 | 0.00 | 0.30 | 0.30 |
| 2026 | Priority C | LightRehab | MR00301 | 2.71 | 4.73 | 2.02 |
| 2026 | Priority C | Reseal | MR00310 | 1.21 | 1.91 | 0.70 |
| 2026 | Priority C | Reseal | MR00310 | 1.91 | 37.90 | 35.99 |
| 2026 | Priority C | Rehabilitation | MR00310 | 37.90 | 50.50 | 12.60 |
| 2026 | Priority C | Reseal | MR00310 | 50.50 | 57.75 | 7.25 |
| 2026 | Priority C | Reseal | MR00310 | 57.75 | 58.00 | 0.25 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2026 | Priority C | LightRehab | MR00347 | 1.57 | 2.00 | 0.43 |
| 2026 | Priority C | Reseal | MR00347 | 2.00 | 3.24 | 1.24 |
| 2026 | Priority C | Reseal | MR00352 | 4.00 | 6.00 | 2.00 |
| 2026 | Priority C | LightRehab | MR00375 | 0.87 | 1.03 | 0.16 |
| 2026 | Priority C | Rehabilitation | MR00382 | 0.00 | 0.23 | 0.23 |
| 2026 | Priority C | Reseal | MR00382 | 0.23 | 2.12 | 1.89 |
| 2026 | Priority C | Reseal | MR00382 | 2.12 | 4.96 | 2.84 |
| 2026 | Priority C | Reseal | MR00526 | 0.00 | 2.00 | 2.00 |
| 2026 | Priority C | Reseal | MR00527 | 4.10 | 6.76 | 2.66 |
| 2026 | Priority C | LightRehab | MR00539 | 12.00 | 14.00 | 2.00 |
| 2026 | Priority C | LightRehab | MR00542 | 0.00 | 0.33 | 0.33 |
| 2026 | Priority C | LightRehab | MR00547 | 0.00 | 1.66 | 1.66 |
| 2026 | Priority C | Reseal | MR00547 | 1.66 | 8.00 | 6.34 |
| 2026 | Priority C | LightRehab | MR00547 | 21.55 | 23.10 | 1.55 |
| 2026 | Priority C | Reseal | MR00547 | 46.00 | 56.00 | 10.00 |
| 2026 | Priority C | Reseal | MR00548 | 0.00 | 2.00 | 2.00 |
| 2026 | Priority C | Reseal | MR00548 | 2.00 | 12.00 | 10.00 |
| 2026 | Priority C | Reseal | MR00548 | 14.00 | 15.61 | 1.61 |
| 2026 | Priority C | LightRehab | MR00548 | 15.61 | 17.28 | 1.67 |
| 2026 | Priority C | Reseal | MR00559 | 12.75 | 14.00 | 1.25 |
| 2026 | Priority C | Reseal | OP05255 | 0.00 | 1.41 | 1.41 |
| 2026 | Priority C | LightRehab | OP05657 | 0.00 | 0.67 | 0.67 |
| 2026 | Priority C | Reseal | OP06878 | 0.00 | 1.98 | 1.98 |
| 2026 | Priority C | Reseal | OP07647 | 0.00 | 4.00 | 4.00 |
| 2026 | Priority C | Reseal | TR00101 | 18.00 | 19.36 | 1.36 |
| 2026 | Priority C | Rehabilitation | TR00101 | 19.36 | 24.55 | 5.19 |
| 2026 | Priority C | Reseal | TR00102 | 56.00 | 62.00 | 6.00 |
| 2026 | Priority C | Reseal | TR00203 | 48.36 | 48.79 | 0.43 |
| 2026 | Priority C | LightRehab | TR00209 | 24.06 | 25.36 | 1.30 |
| 2026 | Priority C | Rehabilitation | TR00209 | 26.89 | 27.10 | 0.21 |
| 2026 | Priority C | Reseal | TR00901 | 0.00 | 8.00 | 8.00 |
| 2026 | Priority C | Reseal | TR00901 | 0.00 | 8.00 | 8.00 |
| 2026 | Priority C | Recon | TR01601 | 0.00 | 0.53 | 0.53 |
| 2026 | Priority C | LightRehab | TR01601 | 6.00 | 8.00 | 2.00 |
| 2026 | Priority C | LightRehab | TR01601 | 8.00 | 10.00 | 2.00 |
| 2026 | Priority C | LightRehab | TR01601 | 23.84 | 24.33 | 0.49 |
| 2026 | Priority C | LightRehab | TR01602 | 0.73 | 2.00 | 1.27 |
| 2026 | Priority C | Reseal | TR02102 | 0.00 | 2.00 | 2.00 |
| 2026 | Priority C | LightRehab | TR02102 | 36.65 | 37.16 | 0.51 |
| 2026 | Priority C | LightRehab | TR02102 | 37.16 | 37.68 | 0.52 |
| 2026 | Priority C | Rehabilitation | TR02202 | 0.00 | 0.85 | 0.85 |
| 2026 | Priority C | LightRehab | TR02202 | 0.85 | 2.00 | 1.15 |
| 2026 | Priority C | LightRehab | TR02303 | 34.00 | 35.12 | 1.12 |
| 2026 | Priority C | Rehabilitation | TR02802 | 0.00 | 1.27 | 1.27 |
| 2026 | Priority C | Rehabilitation | TR02802 | 24.00 | 43.26 | 19.26 |
| 2026 | Priority C | LightRehab | TR02901 | 0.00 | 1.49 | 1.49 |
| 2026 | Priority C | LightRehab | TR02901 | 71.73 | 72.24 | 0.51 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2026 | Priority C | LightRehab | TR02901 | 72.24 | 72.54 | 0.30 |
| 2026 | Priority C | LightRehab | TR02902 | 0.00 | 1.03 | 1.03 |
| 2026 | Priority C | LightRehab | TR03001 | 24.00 | 26.00 | 2.00 |
| 2026 | Priority C | LightRehab | TR03001 | 30.00 | 32.11 | 2.11 |
| 2026 | Priority C | LightRehab | TR03002 | 48.44 | 48.85 | 0.41 |
| 2026 | Priority C | LightRehab | TR03101 | 45.02 | 45.67 | 0.65 |
| 2026 | Priority C | LightRehab | TR03102 | 0.00 | 1.46 | 1.46 |
| 2026 | Priority C | LightRehab | TR03105 | 28.00 | 30.00 | 2.00 |
| 2026 | Priority C | Recon | TR03301 | 0.52 | 6.00 | 5.48 |
| 2026 | Priority C | Reseal | TR03301 | 6.52 | 10.27 | 3.75 |
| 2026 | Priority C | Reseal | TR03301 | 13.05 | 16.08 | 3.03 |
| 2026 | Priority C | LightRehab | TR03302 | 75.20 | 76.56 | 1.36 |
| 2026 | Priority C | LightRehab | TR03302 | 75.35 | 76.56 | 1.21 |
| 2026 | Priority C | Reseal | TR03303 | 2.80 | 4.00 | 1.20 |
| 2026 | Priority C | LightRehab | TR03501 | 0.13 | 0.62 | 0.49 |
| 2026 | Priority C | LightRehab | TR03501 | 0.62 | 2.59 | 1.97 |
| 2026 | Priority C | LightRehab | TR05501 | 2.00 | 4.00 | 2.00 |
| 2026 | Priority C | Reseal | TR05501 | 4.00 | 6.00 | 2.00 |
| 2026 | Priority C | Reseal | TR05501 | 6.00 | 16.00 | 10.00 |
| 2026 | Priority C | LightRehab | TR07501 | 31.95 | 33.96 | 2.01 |
| 2026 | Priority C | LightRehab | TR07501 | 18.00 | 20.00 | 2.00 |
| 2026 | Priority C | LightRehab | TR07501 | 31.95 | 33.96 | 2.01 |
| 2026 | Priority C | Rehabilitation | TR07502 | 0.00 | 0.48 | 0.48 |
| 2026 | Priority C | Reseal | TR07701 | 8.24 | 14.48 | 6.24 |
| 2026 | Priority C | Reseal | TR07701 | 48.22 | 50.00 | 1.78 |
| 2026 | Priority C | Reseal | TR07701 | 64.00 | 82.00 | 18.00 |
| 2026 | Priority C | Reseal | TR07701 | 126.00 | 130.00 | 4.00 |
| 2026 | Priority C | LightRehab | TR08501 | 0.00 | 0.60 | 0.60 |
| 2026 | Priority C | Reseal | TR08501 | 4.22 | 12.09 | 7.87 |
| 2027 | Priority C | LightRehab | DR01039 | 0.00 | 0.88 | 0.88 |
| 2027 | Priority C | LightRehab | DR01069 | 0.84 | 2.00 | 1.16 |
| 2027 | Priority C | LightRehab | DR01078 | 0.76 | 2.20 | 1.44 |
| 2027 | Priority C | Rehabilitation | DR01085 | 0.00 | 3.47 | 3.47 |
| 2027 | Priority C | LightRehab | DR01100 | 1.74 | 8.38 | 6.64 |
| 2027 | Priority C | Rehabilitation | DR01101 | 6.00 | 10.00 | 4.00 |
| 2027 | Priority C | Reseal | DR01119 | 2.76 | 3.64 | 0.88 |
| 2027 | Priority C | Reseal | DR01119 | 4.66 | 7.27 | 2.61 |
| 2027 | Priority C | Reseal | DR01126 | 9.16 | 18.82 | 9.66 |
| 2027 | Priority C | LightRehab | DR01146 | 4.40 | 6.41 | 2.01 |
| 2027 | Priority C | LightRehab | DR01154 | 4.57 | 4.79 | 0.22 |
| 2027 | Priority C | Reseal | DR01171 | 2.30 | 3.82 | 1.52 |
| 2027 | Priority C | LightRehab | DR01175 | 17.09 | 17.87 | 0.78 |
| 2027 | Priority C | Reseal | DR01238 | 4.00 | 5.00 | 1.00 |
| 2027 | Priority C | LightRehab | DR01284 | 3.50 | 3.70 | 0.20 |
| 2027 | Priority C | LightRehab | DR01294 | 0.00 | 0.11 | 0.11 |
| 2027 | Priority C | Reseal | DR01295 | 0.00 | 2.69 | 2.69 |
| 2027 | Priority C | LightRehab | DR01329 | 0.00 | 1.00 | 1.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2027 | Priority C | LightRehab | DR01341 | 0.00 | 1.03 | 1.03 |
| 2027 | Priority C | LightRehab | DR01343 | 0.44 | 3.10 | 2.66 |
| 2027 | Priority C | LightRehab | DR01351 | 0.00 | 1.13 | 1.13 |
| 2027 | Priority C | LightRehab | DR01364 | 6.03 | 6.24 | 0.21 |
| 2027 | Priority C | Reseal | DR01380 | 7.11 | 7.79 | 0.68 |
| 2027 | Priority C | LightRehab | DR01394 | 6.00 | 10.00 | 4.00 |
| 2027 | Priority C | LightRehab | DR01394 | 10.00 | 11.37 | 1.37 |
| 2027 | Priority C | LightRehab | DR01395 | 0.00 | 1.86 | 1.86 |
| 2027 | Priority C | Reseal | DR01411 | 55.40 | 56.14 | 0.74 |
| 2027 | Priority C | Reseal | DR01441 | 0.00 | 1.93 | 1.93 |
| 2027 | Priority C | Reseal | DR01452 | 0.00 | 2.00 | 2.00 |
| 2027 | Priority C | Reseal | DR01453 | 0.00 | 2.38 | 2.38 |
| 2027 | Priority C | LightRehab | DR01596 | 1.65 | 3.26 | 1.61 |
| 2027 | Priority C | Reseal | DR01599 | 9.06 | 11.43 | 2.37 |
| 2027 | Priority C | Reseal | DR01605 | 1.05 | 1.47 | 0.42 |
| 2027 | Priority C | Reseal | DR02151 | 3.07 | 4.19 | 1.12 |
| 2027 | Priority C | Reseal | DR02176 | 0.56 | 6.00 | 5.44 |
| 2027 | Priority C | LightRehab | MR00023 | 20.00 | 22.00 | 2.00 |
| 2027 | Priority C | Rehabilitation | MR00025 | 1.54 | 3.67 | 2.13 |
| 2027 | Priority C | Reseal | MR00027 | 18.26 | 20.00 | 1.74 |
| 2027 | Priority C | Reseal | MR00027 | 20.00 | 26.00 | 6.00 |
| 2027 | Priority C | Reseal | MR00027 | 36.20 | 37.50 | 1.30 |
| 2027 | Priority C | LightRehab | MR00104 | 6.00 | 7.82 | 1.82 |
| 2027 | Priority C | LightRehab | MR00111 | 0.00 | 0.85 | 0.85 |
| 2027 | Priority C | Rehabilitation | MR00116 | 0.00 | 6.93 | 6.93 |
| 2027 | Priority C | LightRehab | MR00163 | 2.00 | 3.21 | 1.21 |
| 2027 | Priority C | Rehabilitation | MR00174 | 2.00 | 2.52 | 0.52 |
| 2027 | Priority C | Rehabilitation | MR00174 | 59.32 | 60.08 | 0.76 |
| 2027 | Priority C | Rehabilitation | MR00177 | 4.53 | 8.17 | 3.64 |
| 2027 | Priority C | Rehabilitation | MR00177 | 30.15 | 32.35 | 2.20 |
| 2027 | Priority C | Reseal | MR00188 | 18.00 | 22.00 | 4.00 |
| 2027 | Priority C | LightRehab | MR00189 | 31.24 | 32.53 | 1.29 |
| 2027 | Priority C | Rehabilitation | MR00189 | 32.53 | 32.81 | 0.28 |
| 2027 | Priority C | Reseal | MR00189 | 10.70 | 16.63 | 5.93 |
| 2027 | Priority C | Rehabilitation | MR00191 | 0.00 | 9.57 | 9.57 |
| 2027 | Priority C | Reseal | MR00191 | 9.57 | 23.71 | 14.14 |
| 2027 | Priority C | Reseal | MR00191 | 23.71 | 41.95 | 18.24 |
| 2027 | Priority C | Rehabilitation | MR00201 | 44.17 | 46.10 | 1.93 |
| 2027 | Priority C | Rehabilitation | MR00201 | 58.88 | 74.59 | 15.71 |
| 2027 | Priority C | LightRehab | MR00215 | 46.53 | 47.85 | 1.32 |
| 2027 | Priority C | LightRehab | MR00215 | 64.00 | 66.00 | 2.00 |
| 2027 | Priority C | LightRehab | MR00223 | 0.00 | 13.00 | 13.00 |
| 2027 | Priority C | LightRehab | MR00224 | 20.00 | 26.00 | 6.00 |
| 2027 | Priority C | LightRehab | MR00224 | 26.00 | 28.00 | 2.00 |
| 2027 | Priority C | LightRehab | MR00261 | 0.00 | 0.80 | 0.80 |
| 2027 | Priority C | LightRehab | MR00261 | 2.00 | 12.00 | 10.00 |
| 2027 | Priority C | LightRehab | MR00261 | 29.03 | 37.40 | 8.37 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2027 | Priority C | Reseal | MR00262 | 0.00 | 2.00 | 2.00 |
| 2027 | Priority C | LightRehab | MR00274 | 0.00 | 1.52 | 1.52 |
| 2027 | Priority C | LightRehab | MR00279 | 10.00 | 14.00 | 4.00 |
| 2027 | Priority C | LightRehab | MR00279 | 14.00 | 18.00 | 4.00 |
| 2027 | Priority C | LightRehab | MR00279 | 20.00 | 22.00 | 2.00 |
| 2027 | Priority C | Rehabilitation | MR00279 | 26.00 | 28.00 | 2.00 |
| 2027 | Priority C | Reseal | MR00287 | 18.00 | 22.00 | 4.00 |
| 2027 | Priority C | LightRehab | MR00289 | 5.00 | 12.00 | 7.00 |
| 2027 | Priority C | LightRehab | MR00289 | 12.00 | 14.00 | 2.00 |
| 2027 | Priority C | Reseal | MR00289 | 16.00 | 18.54 | 2.54 |
| 2027 | Priority C | Rehabilitation | MR00300 | 0.00 | 1.55 | 1.55 |
| 2027 | Priority C | LightRehab | MR00306 | 0.36 | 0.72 | 0.36 |
| 2027 | Priority C | LightRehab | MR00307 | 0.00 | 2.10 | 2.10 |
| 2027 | Priority C | Reseal | MR00332 | 0.00 | 6.00 | 6.00 |
| 2027 | Priority C | Reseal | MR00332 | 12.00 | 18.00 | 6.00 |
| 2027 | Priority C | Reseal | MR00332 | 18.00 | 22.00 | 4.00 |
| 2027 | Priority C | LightRehab | MR00333 | 0.00 | 1.91 | 1.91 |
| 2027 | Priority C | Rehabilitation | MR00339 | 0.00 | 1.87 | 1.87 |
| 2027 | Priority C | Reseal | MR00342 | 8.00 | 12.00 | 4.00 |
| 2027 | Priority C | Rehabilitation | MR00349 | 3.35 | 4.63 | 1.28 |
| 2027 | Priority C | LightRehab | MR00355 | 0.00 | 4.00 | 4.00 |
| 2027 | Priority C | Rehabilitation | MR00529 | 59.41 | 59.61 | 0.20 |
| 2027 | Priority C | Reseal | MR00529 | 0.00 | 8.00 | 8.00 |
| 2027 | Priority C | LightRehab | MR00531 | 0.00 | 4.00 | 4.00 |
| 2027 | Priority C | Reseal | MR00539 | 22.00 | 26.00 | 4.00 |
| 2027 | Priority C | Reseal | MR00546 | 26.00 | 32.00 | 6.00 |
| 2027 | Priority C | LightRehab | MR00547 | 8.00 | 14.00 | 6.00 |
| 2027 | Priority C | Reseal | MR00559 | 15.83 | 16.31 | 0.48 |
| 2027 | Priority C | LightRehab | OP04058 | 0.00 | 2.00 | 2.00 |
| 2027 | Priority C | LightRehab | OP05856 | 0.00 | 1.39 | 1.39 |
| 2027 | Priority C | Reseal | OP06887 | 1.41 | 2.20 | 0.79 |
| 2027 | Priority C | LightRehab | OP07643 | 0.00 | 3.02 | 3.02 |
| 2027 | Priority C | Rehabilitation | TR00101 | 0.00 | 2.97 | 2.97 |
| 2027 | Priority C | Reseal | TR00201 | 28.24 | 42.79 | 14.55 |
| 2027 | Priority C | LightRehab | TR00209 | 12.00 | 14.00 | 2.00 |
| 2027 | Priority C | Rehabilitation | TR00210 | 59.98 | 60.93 | 0.95 |
| 2027 | Priority C | Reseal | TR01101 | 10.00 | 17.48 | 7.48 |
| 2027 | Priority C | Reseal | TR01101 | 10.00 | 17.48 | 7.48 |
| 2027 | Priority C | Rehabilitation | TR01601 | 0.53 | 2.00 | 1.47 |
| 2027 | Priority C | LightRehab | TR01602 | 22.00 | 24.00 | 2.00 |
| 2027 | Priority C | Reseal | TR02101 | 10.00 | 22.00 | 12.00 |
| 2027 | Priority C | LightRehab | TR02103 | 0.82 | 6.00 | 5.18 |
| 2027 | Priority C | Reseal | TR02201 | 2.00 | 4.00 | 2.00 |
| 2027 | Priority C | Rehabilitation | TR02202 | 0.00 | 0.79 | 0.79 |
| 2027 | Priority C | LightRehab | TR02303 | 35.84 | 36.54 | 0.70 |
| 2027 | Priority C | Reseal | TR02303 | 56.00 | 60.87 | 4.87 |
| 2027 | Priority C | LightRehab | TR02501 | 18.00 | 20.00 | 2.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2027 | Priority C | Reseal | TR02701 | 0.00 | 4.00 | 4.00 |
| 2027 | Priority C | Reseal | TR02701 | 4.00 | 12.00 | 8.00 |
| 2027 | Priority C | Reseal | TR02701 | 14.00 | 18.00 | 4.00 |
| 2027 | Priority C | Reseal | TR02701 | 26.00 | 30.00 | 4.00 |
| 2027 | Priority C | Reseal | TR02701 | 30.00 | 36.00 | 6.00 |
| 2027 | Priority C | Reseal | TR02701 | 36.00 | 38.00 | 2.00 |
| 2027 | Priority C | Reseal | TR02701 | 38.00 | 42.00 | 4.00 |
| 2027 | Priority C | Reseal | TR02701 | 42.00 | 50.00 | 8.00 |
| 2027 | Priority C | Reseal | TR02701 | 50.00 | 52.00 | 2.00 |
| 2027 | Priority C | Rehabilitation | TR02802 | 2.62 | 6.00 | 3.38 |
| 2027 | Priority C | LightRehab | TR03001 | 26.00 | 30.00 | 4.00 |
| 2027 | Priority C | LightRehab | TR03002 | 14.00 | 16.00 | 2.00 |
| 2027 | Priority C | LightRehab | TR03101 | 14.00 | 16.00 | 2.00 |
| 2027 | Priority C | Rehabilitation | TR03102 | 1.90 | 2.16 | 0.26 |
| 2027 | Priority C | LightRehab | TR03102 | 1.46 | 6.00 | 4.54 |
| 2027 | Priority C | Rehabilitation | TR03102 | 6.00 | 8.00 | 2.00 |
| 2027 | Priority C | LightRehab | TR03102 | 12.00 | 15.68 | 3.68 |
| 2027 | Priority C | Reseal | TR03103 | 33.00 | 34.00 | 1.00 |
| 2027 | Priority C | LightRehab | TR03104 | 76.06 | 76.08 | 0.02 |
| 2027 | Priority C | LightRehab | TR03105 | 26.00 | 28.00 | 2.00 |
| 2027 | Priority C | LightRehab | TR03105 | 36.00 | 38.00 | 2.00 |
| 2027 | Priority C | Reseal | TR03106 | 1.10 | 4.00 | 2.90 |
| 2027 | Priority C | Reseal | TR03106 | 4.00 | 14.00 | 10.00 |
| 2027 | Priority C | LightRehab | TR03106 | 18.00 | 20.00 | 2.00 |
| 2027 | Priority C | Reseal | TR03303 | 4.00 | 24.00 | 20.00 |
| 2027 | Priority C | Reseal | TR03303 | 34.00 | 35.36 | 1.36 |
| 2027 | Priority C | LightRehab | TR08301 | 6.00 | 10.00 | 4.00 |
| 2028 | Priority C | Rehabilitation | DR01050 | 0.00 | 6.00 | 6.00 |
| 2028 | Priority C | Rehabilitation | DR01056 | 0.00 | 1.32 | 1.32 |
| 2028 | Priority C | LightRehab | DR01069 | 2.00 | 5.76 | 3.76 |
| 2028 | Priority C | LightRehab | DR01091 | 0.00 | 1.37 | 1.37 |
| 2028 | Priority C | Reseal | DR01113 | 0.29 | 1.75 | 1.46 |
| 2028 | Priority C | Rehabilitation | DR01118 | 1.05 | 6.31 | 5.26 |
| 2028 | Priority C | LightRehab | DR01134 | 4.00 | 9.89 | 5.89 |
| 2028 | Priority C | Reseal | DR01138 | 0.00 | 1.47 | 1.47 |
| 2028 | Priority C | Reseal | DR01205 | 2.00 | 4.00 | 2.00 |
| 2028 | Priority C | LightRehab | DR01214 | 0.00 | 2.00 | 2.00 |
| 2028 | Priority C | Reseal | DR01359 | 0.00 | 3.00 | 3.00 |
| 2028 | Priority C | LightRehab | DR01373 | 2.06 | 3.27 | 1.21 |
| 2028 | Priority C | Reseal | DR01394 | 0.00 | 6.00 | 6.00 |
| 2028 | Priority C | LightRehab | DR01398 | 12.00 | 14.00 | 2.00 |
| 2028 | Priority C | LightRehab | DR01444 | 13.39 | 13.76 | 0.37 |
| 2028 | Priority C | LightRehab | DR01526 | 0.00 | 0.62 | 0.62 |
| 2028 | Priority C | Reseal | DR01528 | 0.00 | 2.10 | 2.10 |
| 2028 | Priority C | LightRehab | DR01529 | 14.85 | 14.86 | 0.01 |
| 2028 | Priority C | LightRehab | DR01618 | 1.12 | 2.59 | 1.47 |
| 2028 | Priority C | Reseal | DR01631 | 0.00 | 4.15 | 4.15 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2028 | Priority C | Reseal | DR01770 | 2.00 | 6.00 | 4.00 |
| 2028 | Priority C | Reseal | DR02157 | 0.00 | 1.03 | 1.03 |
| 2028 | Priority C | Reseal | DR02184 | 14.00 | 16.30 | 2.30 |
| 2028 | Priority C | LightRehab | DR02203 | 0.56 | 0.96 | 0.40 |
| 2028 | Priority C | Reseal | DR02215 | 0.00 | 4.00 | 4.00 |
| 2028 | Priority C | Rehabilitation | MR00027 | 34.25 | 36.20 | 1.95 |
| 2028 | Priority C | LightRehab | MR00027 | 51.94 | 54.00 | 2.06 |
| 2028 | Priority C | LightRehab | MR00027 | 58.00 | 62.00 | 4.00 |
| 2028 | Priority C | Reseal | MR00106 | 36.00 | 42.20 | 6.20 |
| 2028 | Priority C | Rehabilitation | MR00133 | 6.60 | 8.76 | 2.16 |
| 2028 | Priority C | Rehabilitation | MR00172 | 10.00 | 14.00 | 4.00 |
| 2028 | Priority C | Rehabilitation | MR00175 | 0.56 | 2.65 | 2.09 |
| 2028 | Priority C | Rehabilitation | MR00176 | 0.00 | 3.13 | 3.13 |
| 2028 | Priority C | Rehabilitation | MR00189 | 33.69 | 34.70 | 1.01 |
| 2028 | Priority C | LightRehab | MR00201 | 0.00 | 2.00 | 2.00 |
| 2028 | Priority C | LightRehab | MR00201 | 6.00 | 12.00 | 6.00 |
| 2028 | Priority C | Rehabilitation | MR00201 | 50.23 | 54.61 | 4.38 |
| 2028 | Priority C | LightRehab | MR00215 | 0.00 | 16.00 | 16.00 |
| 2028 | Priority C | LightRehab | MR00215 | 68.00 | 69.34 | 1.34 |
| 2028 | Priority C | Reseal | MR00231 | 0.00 | 4.00 | 4.00 |
| 2028 | Priority C | Reseal | MR00231 | 18.00 | 20.22 | 2.22 |
| 2028 | Priority C | LightRehab | MR00238 | 1.29 | 4.00 | 2.71 |
| 2028 | Priority C | LightRehab | MR00238 | 4.00 | 10.48 | 6.48 |
| 2028 | Priority C | Reseal | MR00240 | 2.14 | 10.00 | 7.86 |
| 2028 | Priority C | Reseal | MR00267 | 0.00 | 0.34 | 0.34 |
| 2028 | Priority C | LightRehab | MR00277 | 28.00 | 30.90 | 2.90 |
| 2028 | Priority C | LightRehab | MR00277 | 30.90 | 31.95 | 1.05 |
| 2028 | Priority C | Reseal | MR00278 | 2.72 | 3.96 | 1.24 |
| 2028 | Priority C | LightRehab | MR00279 | 24.00 | 26.00 | 2.00 |
| 2028 | Priority C | LightRehab | MR00279 | 28.00 | 30.00 | 2.00 |
| 2028 | Priority C | LightRehab | MR00279 | 30.00 | 35.33 | 5.33 |
| 2028 | Priority C | LightRehab | MR00287 | 2.69 | 4.00 | 1.31 |
| 2028 | Priority C | LightRehab | MR00298 | 20.45 | 20.70 | 0.25 |
| 2028 | Priority C | Rehabilitation | MR00303 | 0.00 | 0.34 | 0.34 |
| 2028 | Priority C | Rehabilitation | MR00310 | 0.26 | 0.97 | 0.71 |
| 2028 | Priority C | Reseal | MR00331 | 0.27 | 1.43 | 1.16 |
| 2028 | Priority C | Reseal | MR00332 | 6.00 | 12.00 | 6.00 |
| 2028 | Priority C | LightRehab | MR00332 | 26.00 | 30.64 | 4.64 |
| 2028 | Priority C | LightRehab | MR00347 | 0.00 | 1.57 | 1.57 |
| 2028 | Priority C | Reseal | MR00347 | 3.24 | 4.80 | 1.56 |
| 2028 | Priority C | Rehabilitation | MR00349 | 0.00 | 1.52 | 1.52 |
| 2028 | Priority C | Rehabilitation | MR00349 | 2.16 | 4.63 | 2.47 |
| 2028 | Priority C | LightRehab | MR00350 | 0.00 | 2.43 | 2.43 |
| 2028 | Priority C | Rehabilitation | MR00383 | 1.61 | 3.77 | 2.16 |
| 2028 | Priority C | LightRehab | MR00394 | 0.00 | 2.00 | 2.00 |
| 2028 | Priority C | LightRehab | MR00533 | 8.00 | 13.19 | 5.19 |
| 2028 | Priority C | LightRehab | MR00539 | 26.00 | 29.16 | 3.16 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2028 | Priority C | LightRehab | MR00547 | 14.00 | 21.55 | 7.55 |
| 2028 | Priority C | LightRehab | OP04018 | 0.00 | 1.32 | 1.32 |
| 2028 | Priority C | Reseal | OP04019 | 0.00 | 2.00 | 2.00 |
| 2028 | Priority C | LightRehab | OP04094 | 0.00 | 1.27 | 1.27 |
| 2028 | Priority C | Reseal | OP05361 | 0.00 | 2.00 | 2.00 |
| 2028 | Priority C | LightRehab | TR00102 | 4.00 | 6.00 | 2.00 |
| 2028 | Priority C | Reseal | TR00201 | 30.00 | 42.79 | 12.79 |
| 2028 | Priority C | Reseal | TR00203 | 48.46 | 48.79 | 0.33 |
| 2028 | Priority C | Reseal | TR00204 | 0.00 | 0.52 | 0.52 |
| 2028 | Priority C | Rehabilitation | TR00211 | 0.87 | 2.91 | 2.04 |
| 2028 | Priority C | Reseal | TR01101 | 2.00 | 10.00 | 8.00 |
| 2028 | Priority C | Reseal | TR01101 | 2.00 | 10.00 | 8.00 |
| 2028 | Priority C | LightRehab | TR02101 | 52.00 | 53.90 | 1.90 |
| 2028 | Priority C | Reseal | TR02201 | 4.00 | 20.60 | 16.60 |
| 2028 | Priority C | Rehabilitation | TR02302 | 0.00 | 2.00 | 2.00 |
| 2028 | Priority C | Rehabilitation | TR02302 | 2.00 | 6.00 | 4.00 |
| 2028 | Priority C | Rehabilitation | TR02302 | 8.00 | 17.63 | 9.63 |
| 2028 | Priority C | LightRehab | TR02401 | 2.00 | 8.00 | 6.00 |
| 2028 | Priority C | Reseal | TR02401 | 14.00 | 24.76 | 10.76 |
| 2028 | Priority C | LightRehab | TR02501 | 9.30 | 10.00 | 0.70 |
| 2028 | Priority C | Rehabilitation | TR02501 | 42.21 | 43.00 | 0.79 |
| 2028 | Priority C | LightRehab | TR02801 | 12.00 | 16.00 | 4.00 |
| 2028 | Priority C | Rehabilitation | TR02802 | 1.27 | 2.62 | 1.35 |
| 2028 | Priority C | LightRehab | TR03001 | 4.00 | 8.00 | 4.00 |
| 2028 | Priority C | LightRehab | TR03002 | 6.00 | 8.00 | 2.00 |
| 2028 | Priority C | LightRehab | TR03002 | 12.00 | 14.00 | 2.00 |
| 2028 | Priority C | LightRehab | TR03101 | 16.00 | 26.00 | 10.00 |
| 2028 | Priority C | LightRehab | TR03101 | 26.00 | 38.00 | 12.00 |
| 2028 | Priority C | Rehabilitation | TR03102 | 8.00 | 10.00 | 2.00 |
| 2028 | Priority C | LightRehab | TR03102 | 24.00 | 25.99 | 1.99 |
| 2028 | Priority C | LightRehab | TR03102 | 27.23 | 27.29 | 0.06 |
| 2028 | Priority C | LightRehab | TR03105 | 30.00 | 36.00 | 6.00 |
| 2028 | Priority C | LightRehab | TR03302 | 66.00 | 75.09 | 9.09 |
| 2028 | Priority C | LightRehab | TR07701 | 26.00 | 48.22 | 22.22 |
| 2029 | Priority C | Rehabilitation | DR01021 | 0.00 | 3.55 | 3.55 |
| 2029 | Priority C | LightRehab | DR01050 | 6.00 | 7.34 | 1.34 |
| 2029 | Priority C | Reseal | DR01084 | 0.00 | 1.10 | 1.10 |
| 2029 | Priority C | LightRehab | DR01108 | 2.00 | 6.82 | 4.82 |
| 2029 | Priority C | LightRehab | DR01252 | 0.00 | 0.18 | 0.18 |
| 2029 | Priority C | Rehabilitation | DR01388 | 0.00 | 3.12 | 3.12 |
| 2029 | Priority C | LightRehab | DR01398 | 0.00 | 4.00 | 4.00 |
| 2029 | Priority C | Reseal | DR01398 | 14.00 | 22.00 | 8.00 |
| 2029 | Priority C | LightRehab | DR01398 | 22.00 | 23.63 | 1.63 |
| 2029 | Priority C | LightRehab | DR01418 | 0.00 | 3.68 | 3.68 |
| 2029 | Priority C | LightRehab | DR01435 | 0.00 | 9.66 | 9.66 |
| 2029 | Priority C | Reseal | DR01447 | 0.00 | 7.85 | 7.85 |
| 2029 | Priority C | LightRehab | DR01489 | 0.00 | 1.03 | 1.03 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2029 | Priority C | LightRehab | DR01599 | 19.64 | 20.62 | 0.98 |
| 2029 | Priority C | Reseal | DR01673 | 6.00 | 7.29 | 1.29 |
| 2029 | Priority C | Reseal | DR02176 | 24.00 | 28.00 | 4.00 |
| 2029 | Priority C | Reseal | DR02224 | 0.00 | 4.53 | 4.53 |
| 2029 | Priority C | Rehabilitation | MR00023 | 0.00 | 1.64 | 1.64 |
| 2029 | Priority C | LightRehab | MR00023 | 22.00 | 23.09 | 1.09 |
| 2029 | Priority C | Rehabilitation | MR00025 | 3.67 | 3.98 | 0.31 |
| 2029 | Priority C | LightRehab | MR00027 | 66.50 | 70.00 | 3.50 |
| 2029 | Priority C | Rehabilitation | MR00027 | 31.72 | 36.20 | 4.48 |
| 2029 | Priority C | Rehabilitation | MR00027 | 46.00 | 51.60 | 5.60 |
| 2029 | Priority C | LightRehab | MR00027 | 54.00 | 56.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00027 | 66.00 | 66.95 | 0.95 |
| 2029 | Priority C | Reseal | MR00028 | 0.54 | 24.00 | 23.46 |
| 2029 | Priority C | Rehabilitation | MR00101 | 60.00 | 61.60 | 1.60 |
| 2029 | Priority C | Rehabilitation | MR00103 | 20.00 | 22.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00103 | 24.00 | 32.00 | 8.00 |
| 2029 | Priority C | Rehabilitation | MR00133 | 10.03 | 10.76 | 0.73 |
| 2029 | Priority C | LightRehab | MR00174 | 31.70 | 32.00 | 0.30 |
| 2029 | Priority C | Rehabilitation | MR00176 | 0.00 | 3.00 | 3.00 |
| 2029 | Priority C | LightRehab | MR00188 | 16.00 | 18.00 | 2.00 |
| 2029 | Priority C | Rehabilitation | MR00199 | 18.00 | 20.00 | 2.00 |
| 2029 | Priority C | Rehabilitation | MR00201 | 58.88 | 59.02 | 0.14 |
| 2029 | Priority C | LightRehab | MR00215 | 28.00 | 30.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00215 | 30.00 | 32.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00215 | 32.00 | 40.00 | 8.00 |
| 2029 | Priority C | LightRehab | MR00215 | 40.00 | 42.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00215 | 42.00 | 46.53 | 4.53 |
| 2029 | Priority C | LightRehab | MR00215 | 47.85 | 58.00 | 10.15 |
| 2029 | Priority C | LightRehab | MR00215 | 58.00 | 64.00 | 6.00 |
| 2029 | Priority C | LightRehab | MR00220 | 0.00 | 8.24 | 8.24 |
| 2029 | Priority C | LightRehab | MR00224 | 2.35 | 6.00 | 3.65 |
| 2029 | Priority C | LightRehab | MR00224 | 28.00 | 32.53 | 4.53 |
| 2029 | Priority C | Reseal | MR00233 | 10.00 | 12.84 | 2.84 |
| 2029 | Priority C | LightRehab | MR00238 | 4.00 | 10.48 | 6.48 |
| 2029 | Priority C | LightRehab | MR00264 | 0.00 | 0.84 | 0.84 |
| 2029 | Priority C | Reseal | MR00264 | 24.00 | 28.00 | 4.00 |
| 2029 | Priority C | LightRehab | MR00278 | 1.31 | 2.72 | 1.41 |
| 2029 | Priority C | LightRehab | MR00279 | 0.00 | 10.00 | 10.00 |
| 2029 | Priority C | LightRehab | MR00279 | 22.00 | 24.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00291 | 8.99 | 9.72 | 0.73 |
| 2029 | Priority C | LightRehab | MR00298 | 0.00 | 4.00 | 4.00 |
| 2029 | Priority C | Rehabilitation | MR00310 | 0.00 | 1.21 | 1.21 |
| 2029 | Priority C | LightRehab | MR00312 | 5.10 | 5.92 | 0.82 |
| 2029 | Priority C | LightRehab | MR00332 | 22.00 | 24.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00339 | 1.87 | 2.25 | 0.38 |
| 2029 | Priority C | LightRehab | MR00342 | 0.00 | 8.00 | 8.00 |
| 2029 | Priority C | Recon | MR00347 | 10.00 | 11.85 | 1.85 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2029 | Priority C | LightRehab | MR00348 | 0.38 | 6.00 | 5.62 |
| 2029 | Priority C | LightRehab | MR00348 | 12.00 | 14.45 | 2.45 |
| 2029 | Priority C | LightRehab | MR00375 | 0.00 | 1.03 | 1.03 |
| 2029 | Priority C | LightRehab | MR00394 | 2.00 | 4.50 | 2.50 |
| 2029 | Priority C | LightRehab | MR00526 | 10.00 | 12.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00526 | 14.00 | 16.00 | 2.00 |
| 2029 | Priority C | Reseal | MR00529 | 8.00 | 16.00 | 8.00 |
| 2029 | Priority C | Reseal | MR00529 | 16.00 | 18.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00547 | 23.10 | 26.00 | 2.90 |
| 2029 | Priority C | LightRehab | MR00547 | 30.00 | 34.00 | 4.00 |
| 2029 | Priority C | LightRehab | MR00548 | 12.00 | 14.00 | 2.00 |
| 2029 | Priority C | LightRehab | MR00552 | 20.00 | 22.00 | 2.00 |
| 2029 | Priority C | Reseal | MR00559 | 0.00 | 2.00 | 2.00 |
| 2029 | Priority C | Rehabilitation | OP04236 | 0.00 | 2.67 | 2.67 |
| 2029 | Priority C | LightRehab | OP04492 | 0.00 | 0.46 | 0.46 |
| 2029 | Priority C | Reseal | TR00101 | 14.00 | 18.00 | 4.00 |
| 2029 | Priority C | Recon | TR00209 | 0.00 | 2.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR00209 | 14.00 | 16.00 | 2.00 |
| 2029 | Priority C | Reseal | TR00901 | 8.00 | 18.93 | 10.93 |
| 2029 | Priority C | Reseal | TR00901 | 8.00 | 18.93 | 10.93 |
| 2029 | Priority C | LightRehab | TR00902 | 34.28 | 50.00 | 15.72 |
| 2029 | Priority C | LightRehab | TR01601 | 10.00 | 23.84 | 13.84 |
| 2029 | Priority C | LightRehab | TR01602 | 24.00 | 32.00 | 8.00 |
| 2029 | Priority C | LightRehab | TR02101 | 44.00 | 52.00 | 8.00 |
| 2029 | Priority C | LightRehab | TR02103 | 8.00 | 10.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR02202 | 2.00 | 3.55 | 1.55 |
| 2029 | Priority C | Rehabilitation | TR02302 | 6.00 | 8.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR02303 | 20.00 | 24.00 | 4.00 |
| 2029 | Priority C | LightRehab | TR02303 | 24.00 | 32.00 | 8.00 |
| 2029 | Priority C | LightRehab | TR02303 | 35.12 | 35.84 | 0.72 |
| 2029 | Priority C | LightRehab | TR02401 | 0.00 | 2.00 | 2.00 |
| 2029 | Priority C | Reseal | TR02701 | 18.00 | 26.00 | 8.00 |
| 2029 | Priority C | Reseal | TR02701 | 52.00 | 56.85 | 4.85 |
| 2029 | Priority C | LightRehab | TR02801 | 10.00 | 12.00 | 2.00 |
| 2029 | Priority C | Rehabilitation | TR02801 | 29.46 | 31.03 | 1.57 |
| 2029 | Priority C | LightRehab | TR02901 | 56.13 | 58.32 | 2.19 |
| 2029 | Priority C | LightRehab | TR03001 | 0.00 | 2.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR03001 | 8.00 | 10.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR03001 | 22.00 | 24.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR03101 | 0.00 | 4.54 | 4.54 |
| 2029 | Priority C | Rehabilitation | TR03102 | 10.00 | 12.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR03102 | 15.68 | 18.76 | 3.08 |
| 2029 | Priority C | LightRehab | TR03105 | 0.00 | 0.42 | 0.42 |
| 2029 | Priority C | LightRehab | TR03105 | 0.90 | 26.00 | 25.10 |
| 2029 | Priority C | LightRehab | TR03201 | 0.00 | 6.00 | 6.00 |
| 2029 | Priority C | LightRehab | TR03201 | 6.00 | 10.00 | 4.00 |
| 2029 | Priority C | LightRehab | TR03201 | 10.00 | 12.00 | 2.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2029 | Priority C | LightRehab | TR03302 | 60.00 | 64.00 | 4.00 |
| 2029 | Priority C | LightRehab | TR03303 | 0.00 | 1.86 | 1.86 |
| 2029 | Priority C | LightRehab | TR03303 | 28.00 | 34.00 | 6.00 |
| 2029 | Priority C | LightRehab | TR03501 | 0.00 | 0.13 | 0.13 |
| 2029 | Priority C | LightRehab | TR05501 | 0.00 | 0.83 | 0.83 |
| 2029 | Priority C | LightRehab | TR05901 | 0.00 | 2.00 | 2.00 |
| 2029 | Priority C | LightRehab | TR07501 | 0.00 | 18.00 | 18.00 |
| 2029 | Priority C | LightRehab | TR07701 | 50.00 | 54.00 | 4.00 |
| 2029 | Priority C | LightRehab | TR07701 | 94.00 | 100.00 | 6.00 |
| 2029 | Priority C | LightRehab | TR07701 | 134.00 | 140.71 | 6.71 |
| 2030 | Priority C | LightRehab | DR01398 | 4.00 | 12.00 | 8.00 |
| 2030 | Priority C | LightRehab | DR01590 | 0.00 | 2.88 | 2.88 |
| 2030 | Priority C | LightRehab | DR01693 | 11.10 | 11.42 | 0.32 |
| 2030 | Priority C | LightRehab | DR02215 | 4.00 | 10.00 | 6.00 |
| 2030 | Priority C | Rehabilitation | MR00027 | 38.00 | 40.00 | 2.00 |
| 2030 | Priority C | LightRehab | MR00027 | 56.00 | 58.00 | 2.00 |
| 2030 | Priority C | Rehabilitation | MR00027 | 62.00 | 64.00 | 2.00 |
| 2030 | Priority C | Rehabilitation | MR00027 | 64.00 | 66.00 | 2.00 |
| 2030 | Priority C | LightRehab | MR00122 | 4.46 | 12.75 | 8.29 |
| 2030 | Priority C | LightRehab | MR00122 | 4.46 | 18.13 | 13.67 |
| 2030 | Priority C | Rehabilitation | MR00133 | 10.03 | 10.76 | 0.73 |
| 2030 | Priority C | LightRehab | MR00164 | 2.00 | 3.98 | 1.98 |
| 2030 | Priority C | LightRehab | MR00174 | 3.82 | 10.00 | 6.18 |
| 2030 | Priority C | LightRehab | MR00174 | 10.00 | 12.00 | 2.00 |
| 2030 | Priority C | LightRehab | MR00189 | 22.00 | 24.00 | 2.00 |
| 2030 | Priority C | LightRehab | MR00189 | 24.00 | 26.00 | 2.00 |
| 2030 | Priority C | Rehabilitation | MR00210 | 1.10 | 1.90 | 0.80 |
| 2030 | Priority C | Rehabilitation | MR00210 | 0.06 | 0.87 | 0.81 |
| 2030 | Priority C | LightRehab | MR00210 | 0.87 | 3.68 | 2.81 |
| 2030 | Priority C | Rehabilitation | MR00211 | 0.00 | 1.93 | 1.93 |
| 2030 | Priority C | LightRehab | MR00213 | 5.32 | 20.88 | 15.56 |
| 2030 | Priority C | LightRehab | MR00214 | 0.00 | 1.18 | 1.18 |
| 2030 | Priority C | LightRehab | MR00238 | 1.29 | 4.00 | 2.71 |
| 2030 | Priority C | Reseal | MR00262 | 2.00 | 19.65 | 17.65 |
| 2030 | Priority C | LightRehab | MR00287 | 4.00 | 6.00 | 2.00 |
| 2030 | Priority C | Rehabilitation | MR00287 | 6.00 | 16.00 | 10.00 |
| 2030 | Priority C | LightRehab | MR00295 | 75.49 | 78.27 | 2.78 |
| 2030 | Priority C | LightRehab | MR00302 | 0.00 | 24.59 | 24.59 |
| 2030 | Priority C | LightRehab | MR00310 | 0.00 | 0.11 | 0.11 |
| 2030 | Priority C | LightRehab | MR00347 | 12.45 | 16.00 | 3.55 |
| 2030 | Priority C | LightRehab | MR00390 | 4.00 | 8.00 | 4.00 |
| 2030 | Priority C | LightRehab | MR00529 | 55.77 | 61.86 | 6.09 |
| 2030 | Priority C | Rehabilitation | MR00547 | 26.00 | 30.00 | 4.00 |
| 2030 | Priority C | LightRehab | MR00547 | 66.00 | 70.00 | 4.00 |
| 2030 | Priority C | LightRehab | MR00547 | 70.00 | 72.81 | 2.81 |
| 2030 | Priority C | LightRehab | MR00549 | 0.00 | 0.31 | 0.31 |
| 2030 | Priority C | LightRehab | MR00552 | 22.00 | 23.00 | 1.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2030 | Priority C | Reseal | MR00559 | 14.00 | 16.31 | 2.31 |
| 2030 | Priority C | LightRehab | OP04058 | 4.00 | 6.64 | 2.64 |
| 2030 | Priority C | Reseal | TR00201 | 13.80 | 17.48 | 3.68 |
| 2030 | Priority C | Reseal | TR00201 | 13.80 | 17.48 | 3.68 |
| 2030 | Priority C | LightRehab | TR00209 | 4.00 | 6.00 | 2.00 |
| 2030 | Priority C | Recon | TR00209 | 16.00 | 18.00 | 2.00 |
| 2030 | Priority C | LightRehab | TR01602 | 2.00 | 22.00 | 20.00 |
| 2030 | Priority C | LightRehab | TR02103 | 10.00 | 20.49 | 10.49 |
| 2030 | Priority C | LightRehab | TR02303 | 0.00 | 10.00 | 10.00 |
| 2030 | Priority C | Reseal | TR02303 | 10.00 | 12.00 | 2.00 |
| 2030 | Priority C | LightRehab | TR02303 | 12.00 | 20.00 | 8.00 |
| 2030 | Priority C | Recon | TR02401 | 8.00 | 10.00 | 2.00 |
| 2030 | Priority C | LightRehab | TR02501 | 10.00 | 16.00 | 6.00 |
| 2030 | Priority C | LightRehab | TR02501 | 16.00 | 18.00 | 2.00 |
| 2030 | Priority C | LightRehab | TR03001 | 20.00 | 22.00 | 2.00 |
| 2030 | Priority C | LightRehab | TR03002 | 0.00 | 0.38 | 0.38 |
| 2030 | Priority C | LightRehab | TR03002 | 16.00 | 21.50 | 5.50 |
| 2030 | Priority C | LightRehab | TR03101 | 38.00 | 42.00 | 4.00 |
| 2030 | Priority C | LightRehab | TR03105 | 42.00 | 47.63 | 5.63 |
| 2030 | Priority C | LightRehab | TR03106 | 14.00 | 18.00 | 4.00 |
| 2030 | Priority C | LightRehab | TR03201 | 12.00 | 31.20 | 19.20 |
| 2030 | Priority C | Reseal | TR03401 | 43.34 | 43.91 | 0.57 |
| 2030 | Priority C | LightRehab | TR07501 | 28.00 | 31.22 | 3.22 |
| 2030 | Priority C | LightRehab | TR07701 | 56.00 | 62.00 | 6.00 |
| 2030 | Priority C | LightRehab | TR07701 | 86.00 | 88.00 | 2.00 |
| 2030 | Priority C | LightRehab | TR07701 | 88.00 | 90.00 | 2.00 |
| 2030 | Priority C | Rehabilitation | TR08101 | 8.69 | 14.02 | 5.33 |
| 2030 | Priority C | Rehabilitation | TR08101 | 8.69 | 14.02 | 5.33 |
| 2030 | Priority C | LightRehab | TR08301 | 24.00 | 25.78 | 1.78 |
| 2030 | Priority C | Reseal | DR01138 | 1.47 | 2.47 | 1.00 |
| 2030 | Priority C | Reseal | DR01300 | 1.37 | 4.36 | 2.99 |
| 2030 | Priority C | Reseal | DR01614 | 0.00 | 1.70 | 1.70 |
| 2030 | Priority C | Reseal | DR02183 | 27.01 | 27.32 | 0.31 |
| 2030 | Priority C | Reseal | DR02185 | 0.00 | 1.36 | 1.36 |
| 2030 | Priority C | Reseal | MR00027 | 66.95 | 75.20 | 8.25 |
| 2030 | Priority C | Reseal | MR00177 | 19.60 | 23.76 | 4.16 |
| 2030 | Priority C | Reseal | MR00177 | 26.92 | 30.15 | 3.23 |
| 2030 | Priority C | Reseal | MR00177 | 19.60 | 30.15 | 10.55 |
| 2030 | Priority C | Reseal | MR00230 | 4.00 | 4.79 | 0.79 |
| 2030 | Priority C | Reseal | MR00269 | 9.35 | 25.40 | 16.05 |
| 2030 | Priority C | Reseal | MR00347 | 4.80 | 9.34 | 4.54 |
| 2030 | Priority C | Reseal | TR00201 | 0.00 | 13.80 | 13.80 |
| 2030 | Priority C | Reseal | TR00201 | 0.00 | 13.80 | 13.80 |
| 2030 | Priority C | Reseal | TR00202 | 0.00 | 1.60 | 1.60 |
| 2030 | Priority C | Reseal | TR00202 | 1.60 | 7.69 | 6.09 |
| 2030 | Priority C | Reseal | TR00202 | 0.00 | 1.60 | 1.60 |
| 2030 | Priority C | Reseal | TR00202 | 1.60 | 8.54 | 6.94 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2030 | Priority C | Reseal | TR00209 | 18.00 | 24.06 | 6.06 |
| 2030 | Priority C | Reseal | TR00210 | 54.76 | 59.15 | 4.39 |
| 2030 | Priority C | Reseal | TR02501 | 3.98 | 9.30 | 5.32 |
| 2030 | Priority C | Reseal | TR02802 | 6.00 | 24.00 | 18.00 |
| 2031 | Priority C | LightRehab | DR01001 | 0.00 | 7.63 | 7.63 |
| 2031 | Priority C | Rehabilitation | DR01052 | 0.00 | 4.81 | 4.81 |
| 2031 | Priority C | Rehabilitation | DR01102 | 0.00 | 14.90 | 14.90 |
| 2031 | Priority C | LightRehab | DR01108 | 0.00 | 2.00 | 2.00 |
| 2031 | Priority C | LightRehab | DR01205 | 0.00 | 2.00 | 2.00 |
| 2031 | Priority C | Reseal | DR01342 | 14.00 | 18.00 | 4.00 |
| 2031 | Priority C | LightRehab | MR00023 | 18.00 | 20.00 | 2.00 |
| 2031 | Priority C | Rehabilitation | MR00027 | 40.00 | 44.00 | 4.00 |
| 2031 | Priority C | Rehabilitation | MR00027 | 44.00 | 46.00 | 2.00 |
| 2031 | Priority C | Rehabilitation | MR00121 | 0.00 | 2.35 | 2.35 |
| 2031 | Priority C | Rehabilitation | MR00133 | 8.76 | 10.03 | 1.27 |
| 2031 | Priority C | Rehabilitation | MR00133 | 8.76 | 10.03 | 1.27 |
| 2031 | Priority C | LightRehab | MR00134 | 8.00 | 9.74 | 1.74 |
| 2031 | Priority C | LightRehab | MR00174 | 12.00 | 14.00 | 2.00 |
| 2031 | Priority C | Rehabilitation | MR00188 | 11.13 | 16.00 | 4.87 |
| 2031 | Priority C | LightRehab | MR00191 | 41.95 | 49.87 | 7.92 |
| 2031 | Priority C | LightRehab | MR00199 | 13.90 | 18.00 | 4.10 |
| 2031 | Priority C | LightRehab | MR00201 | 50.23 | 51.97 | 1.74 |
| 2031 | Priority C | LightRehab | MR00201 | 12.00 | 13.85 | 1.85 |
| 2031 | Priority C | Rehabilitation | MR00201 | 42.70 | 46.10 | 3.40 |
| 2031 | Priority C | LightRehab | MR00201 | 46.10 | 50.23 | 4.13 |
| 2031 | Priority C | Rehabilitation | MR00201 | 56.92 | 58.34 | 1.42 |
| 2031 | Priority C | LightRehab | MR00215 | 25.13 | 28.00 | 2.87 |
| 2031 | Priority C | LightRehab | MR00215 | 66.00 | 68.00 | 2.00 |
| 2031 | Priority C | Reseal | MR00229 | 0.00 | 3.10 | 3.10 |
| 2031 | Priority C | Reseal | MR00231 | 4.00 | 8.00 | 4.00 |
| 2031 | Priority C | LightRehab | MR00240 | 10.00 | 14.69 | 4.69 |
| 2031 | Priority C | LightRehab | MR00265 | 2.00 | 4.00 | 2.00 |
| 2031 | Priority C | LightRehab | MR00277 | 22.00 | 28.00 | 6.00 |
| 2031 | Priority C | LightRehab | MR00282 | 0.00 | 8.00 | 8.00 |
| 2031 | Priority C | Rehabilitation | MR00290 | 0.00 | 2.00 | 2.00 |
| 2031 | Priority C | Rehabilitation | MR00290 | 2.00 | 4.00 | 2.00 |
| 2031 | Priority C | LightRehab | MR00290 | 4.00 | 6.00 | 2.00 |
| 2031 | Priority C | LightRehab | MR00290 | 6.00 | 16.00 | 10.00 |
| 2031 | Priority C | LightRehab | MR00298 | 4.00 | 14.55 | 10.55 |
| 2031 | Priority C | LightRehab | MR00303 | 0.34 | 8.00 | 7.66 |
| 2031 | Priority C | LightRehab | MR00310 | 110.00 | 112.02 | 2.02 |
| 2031 | Priority C | LightRehab | MR00312 | 0.00 | 2.00 | 2.00 |
| 2031 | Priority C | LightRehab | MR00312 | 5.92 | 10.22 | 4.30 |
| 2031 | Priority C | LightRehab | MR00331 | 0.00 | 0.27 | 0.27 |
| 2031 | Priority C | Rehabilitation | MR00332 | 24.00 | 26.00 | 2.00 |
| 2031 | Priority C | LightRehab | MR00339 | 1.87 | 3.91 | 2.04 |
| 2031 | Priority C | LightRehab | MR00348 | 6.00 | 8.00 | 2.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2031 | Priority C | LightRehab | MR00359 | 0.00 | 2.00 | 2.00 |
| 2031 | Priority C | Reseal | MR00529 | 18.00 | 55.77 | 37.77 |
| 2031 | Priority C | LightRehab | MR00547 | 34.00 | 42.00 | 8.00 |
| 2031 | Priority C | LightRehab | MR00547 | 61.90 | 66.00 | 4.10 |
| 2031 | Priority C | LightRehab | OP04087 | 0.00 | 3.92 | 3.92 |
| 2031 | Priority C | LightRehab | OP07644 | 0.00 | 3.75 | 3.75 |
| 2031 | Priority C | LightRehab | TR00102 | 0.00 | 4.00 | 4.00 |
| 2031 | Priority C | LightRehab | TR00209 | 2.00 | 4.00 | 2.00 |
| 2031 | Priority C | Recon | TR00209 | 6.00 | 12.00 | 6.00 |
| 2031 | Priority C | LightRehab | TR02401 | 10.00 | 12.00 | 2.00 |
| 2031 | Priority C | LightRehab | TR02401 | 12.00 | 14.00 | 2.00 |
| 2031 | Priority C | LightRehab | TR02501 | 20.00 | 22.00 | 2.00 |
| 2031 | Priority C | LightRehab | TR02501 | 22.00 | 30.00 | 8.00 |
| 2031 | Priority C | LightRehab | TR02501 | 30.00 | 37.00 | 7.00 |
| 2031 | Priority C | Reseal | TR02701 | 12.00 | 14.00 | 2.00 |
| 2031 | Priority C | LightRehab | TR02901 | 36.00 | 40.00 | 4.00 |
| 2031 | Priority C | LightRehab | TR02902 | 1.63 | 8.00 | 6.37 |
| 2031 | Priority C | LightRehab | TR03001 | 10.00 | 12.00 | 2.00 |
| 2031 | Priority C | LightRehab | TR03101 | 42.00 | 45.02 | 3.02 |
| 2031 | Priority C | Rehabilitation | TR03102 | 18.76 | 20.00 | 1.24 |
| 2031 | Priority C | LightRehab | TR03106 | 46.00 | 47.80 | 1.80 |
| 2031 | Priority C | LightRehab | TR03301 | 6.00 | 6.52 | 0.52 |
| 2031 | Priority C | LightRehab | TR05901 | 2.00 | 5.15 | 3.15 |
| 2031 | Priority C | LightRehab | TR07701 | 82.00 | 86.00 | 4.00 |
| 2031 | Priority C | LightRehab | TR07701 | 90.00 | 94.00 | 4.00 |
| 2031 | Priority C | LightRehab | TR07701 | 100.00 | 126.00 | 26.00 |
| 2031 | Priority C | LightRehab | TR08301 | 0.00 | 6.00 | 6.00 |
| 2031 | Priority C | Reseal | MR00027 | 31.72 | 34.25 | 2.53 |
| 2031 | Priority C | Reseal | MR00103 | 11.36 | 14.00 | 2.64 |
| 2031 | Priority C | Reseal | MR00103 | 14.00 | 16.00 | 2.00 |
| 2031 | Priority C | Reseal | MR00106 | 18.00 | 22.00 | 4.00 |
| 2031 | Priority C | Reseal | MR00106 | 22.00 | 23.46 | 1.46 |
| 2031 | Priority C | Reseal | MR00106 | 14.61 | 18.00 | 3.39 |
| 2031 | Priority C | Reseal | MR00106 | 18.00 | 20.00 | 2.00 |
| 2031 | Priority C | Reseal | MR00106 | 20.00 | 23.46 | 3.46 |
| 2031 | Priority C | Reseal | MR00115 | 0.00 | 10.00 | 10.00 |
| 2031 | Priority C | Reseal | MR00122 | 23.02 | 24.65 | 1.63 |
| 2031 | Priority C | Reseal | MR00128 | 1.30 | 2.88 | 1.58 |
| 2031 | Priority C | Reseal | MR00133 | 6.60 | 8.76 | 2.16 |
| 2031 | Priority C | Reseal | MR00159 | 0.00 | 2.00 | 2.00 |
| 2031 | Priority C | Reseal | MR00159 | 4.00 | 9.36 | 5.36 |
| 2031 | Priority C | Reseal | MR00165 | 0.00 | 9.13 | 9.13 |
| 2031 | Priority C | Reseal | MR00172 | 0.00 | 0.05 | 0.05 |
| 2031 | Priority C | Reseal | MR00172 | 0.05 | 1.25 | 1.20 |
| 2031 | Priority C | Reseal | MR00172 | 8.00 | 10.00 | 2.00 |
| 2031 | Priority C | Reseal | MR00174 | 50.00 | 58.49 | 8.49 |
| 2031 | Priority C | Reseal | MR00175 | 0.00 | 0.56 | 0.56 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2031 | Priority C | Reseal | MR00177 | 30.15 | 32.35 | 2.20 |
| 2031 | Priority C | Reseal | MR00177 | 4.53 | 8.17 | 3.64 |
| 2031 | Priority C | Reseal | MR00187 | 1.54 | 4.72 | 3.18 |
| 2031 | Priority C | Reseal | MR00189 | 33.69 | 35.55 | 1.86 |
| 2031 | Priority C | Reseal | MR00199 | 3.67 | 13.90 | 10.23 |
| 2031 | Priority C | Reseal | MR00200 | 2.00 | 6.00 | 4.00 |
| 2031 | Priority C | Reseal | MR00201 | 56.92 | 58.34 | 1.42 |
| 2031 | Priority C | Reseal | MR00201 | 54.61 | 56.20 | 1.59 |
| 2031 | Priority C | Reseal | MR00301 | 0.65 | 3.34 | 2.69 |
| 2031 | Priority C | Reseal | MR00344 | 0.00 | 6.30 | 6.30 |
| 2031 | Priority C | Reseal | MR00344 | 6.81 | 14.84 | 8.03 |
| 2031 | Priority C | Reseal | MR00552 | 0.00 | 20.00 | 20.00 |
| 2031 | Priority C | Reseal | MR00552 | 23.00 | 24.28 | 1.28 |
| 2031 | Priority C | Reseal | TR00209 | 26.43 | 26.89 | 0.46 |
| 2031 | Priority C | Reseal | TR00210 | 0.00 | 0.52 | 0.52 |
| 2031 | Priority C | Reseal | TR00210 | 59.15 | 59.98 | 0.83 |
| 2031 | Priority C | Reseal | TR01601 | 2.00 | 6.00 | 4.00 |
| 2031 | Priority C | Reseal | TR02201 | 36.88 | 37.03 | 0.15 |
| 2031 | Priority C | Reseal | TR02201 | 36.00 | 36.05 | 0.05 |
| 2031 | Priority C | Reseal | TR03101 | 45.18 | 45.67 | 0.49 |
| 2031 | Priority C | Reseal | TR03201 | 31.20 | 44.00 | 12.80 |
| 2031 | Priority C | Reseal | TR03302 | 75.09 | 75.35 | 0.26 |
| 2031 | Priority C | Reseal | TR05501 | 0.83 | 2.00 | 1.17 |
| 2031 | Priority C | Reseal | TR07502 | 0.48 | 1.07 | 0.59 |
| 2032 | Priority C | LightRehab | DR01001 | 12.00 | 13.76 | 1.76 |
| 2032 | Priority C | LightRehab | DR01067 | 0.00 | 3.25 | 3.25 |
| 2032 | Priority C | Reseal | DR01094 | 0.00 | 2.57 | 2.57 |
| 2032 | Priority C | LightRehab | DR01284 | 0.00 | 0.89 | 0.89 |
| 2032 | Priority C | LightRehab | DR01285 | 4.00 | 6.11 | 2.11 |
| 2032 | Priority C | Reseal | DR01342 | 18.00 | 20.15 | 2.15 |
| 2032 | Priority C | Reseal | DR01390 | 0.00 | 4.00 | 4.00 |
| 2032 | Priority C | LightRehab | DR01400 | 18.00 | 22.40 | 4.40 |
| 2032 | Priority C | LightRehab | DR01438 | 0.50 | 2.00 | 1.50 |
| 2032 | Priority C | LightRehab | DR01438 | 2.00 | 6.62 | 4.62 |
| 2032 | Priority C | LightRehab | DR02176 | 6.00 | 8.00 | 2.00 |
| 2032 | Priority C | LightRehab | MR00023 | 4.00 | 8.00 | 4.00 |
| 2032 | Priority C | LightRehab | MR00023 | 8.00 | 18.00 | 10.00 |
| 2032 | Priority C | LightRehab | MR00172 | 14.00 | 15.76 | 1.76 |
| 2032 | Priority C | Rehabilitation | MR00177 | 8.17 | 16.47 | 8.30 |
| 2032 | Priority C | Rehabilitation | MR00177 | 8.17 | 18.00 | 9.83 |
| 2032 | Priority C | LightRehab | MR00201 | 46.10 | 50.23 | 4.13 |
| 2032 | Priority C | LightRehab | MR00264 | 12.00 | 18.00 | 6.00 |
| 2032 | Priority C | LightRehab | MR00287 | 30.71 | 32.00 | 1.29 |
| 2032 | Priority C | LightRehab | MR00337 | 0.00 | 0.60 | 0.60 |
| 2032 | Priority C | LightRehab | MR00348 | 14.96 | 17.03 | 2.07 |
| 2032 | Priority C | LightRehab | MR00395 | 4.88 | 7.24 | 2.36 |
| 2032 | Priority C | LightRehab | MR00526 | 2.00 | 10.00 | 8.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2032 | Priority C | LightRehab | MR00533 | 2.00 | 8.00 | 6.00 |
| 2032 | Priority C | LightRehab | MR00535 | 0.00 | 24.00 | 24.00 |
| 2032 | Priority C | LightRehab | MR00539 | 10.61 | 12.00 | 1.39 |
| 2032 | Priority C | LightRehab | MR00542 | 18.00 | 20.00 | 2.00 |
| 2032 | Priority C | LightRehab | MR00546 | 32.00 | 34.00 | 2.00 |
| 2032 | Priority C | LightRehab | OP04058 | 2.00 | 4.00 | 2.00 |
| 2032 | Priority C | LightRehab | OP05227 | 0.00 | 1.60 | 1.60 |
| 2032 | Priority C | LightRehab | OP05361 | 2.00 | 5.53 | 3.53 |
| 2032 | Priority C | LightRehab | OP07628 | 0.00 | 1.43 | 1.43 |
| 2032 | Priority C | Rehabilitation | TR00902 | 50.00 | 52.03 | 2.03 |
| 2032 | Priority C | LightRehab | TR02101 | 0.00 | 10.00 | 10.00 |
| 2032 | Priority C | LightRehab | TR02102 | 2.00 | 19.67 | 17.67 |
| 2032 | Priority C | Reseal | TR02303 | 38.00 | 54.00 | 16.00 |
| 2032 | Priority C | LightRehab | TR02901 | 40.00 | 42.00 | 2.00 |
| 2032 | Priority C | LightRehab | TR02902 | 8.00 | 10.00 | 2.00 |
| 2032 | Priority C | LightRehab | TR03001 | 2.00 | 4.00 | 2.00 |
| 2032 | Priority C | LightRehab | TR03002 | 8.00 | 12.00 | 4.00 |
| 2032 | Priority C | LightRehab | TR03102 | 25.99 | 26.50 | 0.51 |
| 2032 | Priority C | LightRehab | TR03103 | 61.49 | 62.44 | 0.95 |
| 2032 | Priority C | LightRehab | TR03105 | 47.63 | 48.18 | 0.55 |
| 2032 | Priority C | LightRehab | TR03106 | 0.00 | 1.10 | 1.10 |
| 2032 | Priority C | LightRehab | TR03106 | 20.00 | 28.00 | 8.00 |
| 2032 | Priority C | LightRehab | TR03106 | 28.00 | 30.00 | 2.00 |
| 2032 | Priority C | LightRehab | TR03106 | 30.00 | 36.00 | 6.00 |
| 2032 | Priority C | LightRehab | TR03303 | 26.00 | 28.00 | 2.00 |
| 2032 | Priority C | LightRehab | TR05501 | 28.00 | 38.00 | 10.00 |
| 2032 | Priority C | LightRehab | TR07501 | 20.00 | 28.00 | 8.00 |
| 2032 | Priority C | LightRehab | TR07701 | 62.00 | 64.00 | 2.00 |
| 2032 | Priority C | LightRehab | TR07701 | 130.00 | 134.00 | 4.00 |
| 2032 | Priority C | Reseal | DR01079 | 0.00 | 0.24 | 0.24 |
| 2032 | Priority C | Reseal | DR01101 | 0.00 | 6.00 | 6.00 |
| 2032 | Priority C | Reseal | DR01214 | 2.00 | 4.00 | 2.00 |
| 2032 | Priority C | Reseal | DR01285 | 2.00 | 4.00 | 2.00 |
| 2032 | Priority C | Reseal | DR01358 | 0.00 | 4.05 | 4.05 |
| 2032 | Priority C | Reseal | DR01379 | 0.00 | 7.41 | 7.41 |
| 2032 | Priority C | Reseal | DR01461 | 0.72 | 2.00 | 1.28 |
| 2032 | Priority C | Reseal | DR01600 | 0.00 | 6.89 | 6.89 |
| 2032 | Priority C | Rehabilitation | DR01788 | 0.00 | 1.46 | 1.46 |
| 2032 | Priority C | Reseal | MR00103 | 16.00 | 18.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00103 | 32.00 | 42.00 | 10.00 |
| 2032 | Priority C | Reseal | MR00104 | 4.00 | 6.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00106 | 14.61 | 18.00 | 3.39 |
| 2032 | Priority C | Reseal | MR00111 | 0.00 | 1.10 | 1.10 |
| 2032 | Priority C | Reseal | MR00113 | 0.00 | 3.69 | 3.69 |
| 2032 | Priority C | Reseal | MR00115 | 11.30 | 13.00 | 1.70 |
| 2032 | Priority C | Reseal | MR00115 | 10.00 | 13.00 | 3.00 |
| 2032 | Priority C | Reseal | MR00119 | 23.81 | 25.75 | 1.94 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2032 | Priority C | Reseal | MR00119 | 23.81 | 25.75 | 1.94 |
| 2032 | Priority C | Reseal | MR00122 | 14.95 | 15.96 | 1.01 |
| 2032 | Priority C | Reseal | MR00123 | 0.00 | 4.46 | 4.46 |
| 2032 | Priority C | Reseal | MR00126 | 4.81 | 5.11 | 0.30 |
| 2032 | Priority C | Reseal | MR00130 | 5.12 | 6.40 | 1.28 |
| 2032 | Priority C | Reseal | MR00130 | 0.00 | 2.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00130 | 2.00 | 6.40 | 4.40 |
| 2032 | Priority C | Reseal | MR00134 | 0.00 | 4.00 | 4.00 |
| 2032 | Priority C | Reseal | MR00134 | 4.00 | 6.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00134 | 6.00 | 8.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00159 | 2.00 | 4.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00163 | 0.00 | 2.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00164 | 0.00 | 2.00 | 2.00 |
| 2032 | Priority C | Reseal | MR00166 | 0.11 | 4.71 | 4.60 |
| 2032 | Priority C | Reseal | MR00167 | 0.00 | 0.87 | 0.87 |
| 2032 | Priority C | Reseal | MR00168 | 5.88 | 10.26 | 4.38 |
| 2032 | Priority C | Reseal | MR00174 | 0.16 | 0.60 | 0.44 |
| 2032 | Priority C | Reseal | MR00174 | 0.60 | 1.97 | 1.37 |
| 2032 | Priority C | Reseal | MR00174 | 2.86 | 3.82 | 0.96 |
| 2032 | Priority C | Reseal | MR00174 | 17.25 | 31.70 | 14.45 |
| 2032 | Priority C | Reseal | MR00174 | 47.15 | 50.00 | 2.85 |
| 2032 | Priority C | Reseal | MR00177 | 18.00 | 19.60 | 1.60 |
| 2032 | Priority C | Reseal | MR00189 | 16.63 | 21.50 | 4.87 |
| 2032 | Priority C | Reseal | MR00189 | 21.50 | 22.00 | 0.50 |
| 2032 | Priority C | Reseal | MR00199 | 3.67 | 5.63 | 1.96 |
| 2032 | Priority C | Reseal | MR00200 | 0.47 | 2.00 | 1.53 |
| 2032 | Priority C | Reseal | MR00200 | 6.00 | 12.40 | 6.40 |
| 2032 | Priority C | Reseal | MR00202 | 1.80 | 4.27 | 2.47 |
| 2032 | Priority C | Reseal | MR00205 | 0.00 | 8.62 | 8.62 |
| 2032 | Priority C | Reseal | MR00210 | 1.90 | 3.78 | 1.88 |
| 2032 | Priority C | Reseal | MR00210 | 3.68 | 3.94 | 0.26 |
| 2032 | Priority C | Reseal | MR00213 | 0.00 | 5.32 | 5.32 |
| 2032 | Priority C | Reseal | MR00215 | 16.00 | 21.19 | 5.19 |
| 2032 | Priority C | Reseal | MR00217 | 5.44 | 9.77 | 4.33 |
| 2032 | Priority C | Reseal | MR00226 | 0.96 | 2.01 | 1.05 |
| 2032 | Priority C | Reseal | MR00228 | 21.22 | 23.10 | 1.88 |
| 2032 | Priority C | Reseal | MR00230 | 0.00 | 4.00 | 4.00 |
| 2032 | Priority C | Reseal | MR00238 | 0.00 | 1.29 | 1.29 |
| 2032 | Priority C | Reseal | MR00238 | 10.48 | 12.12 | 1.64 |
| 2032 | Priority C | Reseal | MR00238 | 0.00 | 1.29 | 1.29 |
| 2032 | Priority C | Reseal | MR00238 | 10.48 | 12.12 | 1.64 |
| 2032 | Priority C | Reseal | MR00272 | 1.81 | 2.99 | 1.18 |
| 2032 | Priority C | Reseal | MR00289 | 0.00 | 5.00 | 5.00 |
| 2032 | Priority C | Reseal | MR00301 | 3.34 | 4.64 | 1.30 |
| 2032 | Priority C | Reseal | MR00301 | 4.64 | 5.07 | 0.43 |
| 2032 | Priority C | Reseal | MR00347 | 9.34 | 10.00 | 0.66 |
| 2032 | Priority C | Reseal | MR00352 | 6.00 | 8.86 | 2.86 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2032 | Priority C | Reseal | MR00383 | 0.00 | 1.61 | 1.61 |
| 2032 | Priority C | Reseal | MR00547 | 42.00 | 46.00 | 4.00 |
| 2032 | Priority C | Reseal | MR00559 | 2.00 | 3.20 | 1.20 |
| 2032 | Priority C | Reseal | MR00559 | 3.20 | 12.75 | 9.55 |
| 2032 | Priority C | Reseal | OP07643 | 3.02 | 5.54 | 2.52 |
| 2032 | Priority C | Reseal | TR00201 | 28.24 | 30.00 | 1.76 |
| 2032 | Priority C | Reseal | TR00210 | 4.45 | 6.06 | 1.61 |
| 2032 | Priority C | Reseal | TR00210 | 0.00 | 6.06 | 6.06 |
| 2032 | Priority C | Reseal | TR00211 | 0.00 | 0.87 | 0.87 |
| 2032 | Priority C | Reseal | TR00902 | 0.21 | 21.25 | 21.04 |
| 2032 | Priority C | Reseal | TR01602 | 34.00 | 34.65 | 0.65 |
| 2032 | Priority C | Reseal | TR02102 | 24.60 | 36.65 | 12.05 |
| 2032 | Priority C | Reseal | TR02103 | 0.00 | 0.82 | 0.82 |
| 2032 | Priority C | Reseal | TR02103 | 6.00 | 8.00 | 2.00 |
| 2032 | Priority C | Reseal | TR02201 | 20.60 | 36.00 | 15.40 |
| 2032 | Priority C | Reseal | TR02303 | 60.87 | 61.48 | 0.61 |
| 2032 | Priority C | Reseal | TR02501 | 37.00 | 42.21 | 5.21 |
| 2032 | Priority C | Reseal | TR02501 | 43.00 | 43.31 | 0.31 |
| 2032 | Priority C | Reseal | TR02801 | 26.69 | 29.46 | 2.77 |
| 2032 | Priority C | Reseal | TR02801 | 2.00 | 4.00 | 2.00 |
| 2032 | Priority C | Reseal | TR02801 | 4.00 | 10.00 | 6.00 |
| 2032 | Priority C | Reseal | TR02801 | 16.00 | 28.00 | 12.00 |
| 2032 | Priority C | Reseal | TR02801 | 28.00 | 29.46 | 1.46 |
| 2032 | Priority C | Reseal | TR02802 | 43.26 | 43.88 | 0.62 |
| 2032 | Priority C | Reseal | TR03002 | 47.39 | 48.44 | 1.05 |
| 2032 | Priority C | Reseal | TR03101 | 4.54 | 13.58 | 9.04 |
| 2032 | Priority C | Reseal | TR03101 | 13.58 | 14.00 | 0.42 |
| 2032 | Priority C | Reseal | TR03102 | 20.00 | 24.00 | 4.00 |
| 2032 | Priority C | Reseal | TR03105 | 0.42 | 0.90 | 0.48 |
| 2032 | Priority C | Reseal | TR03201 | 44.00 | 45.15 | 1.15 |
| 2032 | Priority C | Reseal | TR03301 | 10.27 | 13.05 | 2.78 |
| 2032 | Priority C | Reseal | TR03303 | 0.00 | 1.06 | 1.06 |
| 2032 | Priority C | Reseal | TR03303 | 1.86 | 2.80 | 0.94 |
| 2032 | Priority C | Reseal | TR05401 | 0.00 | 1.71 | 1.71 |
| 2032 | Priority C | Reseal | TR05501 | 60.50 | 61.80 | 1.30 |
| 2032 | Priority C | Reseal | TR07501 | 31.22 | 31.95 | 0.73 |
| 2032 | Priority C | Reseal | TR07701 | 8.24 | 26.00 | 17.76 |
| 2032 | Priority C | Reseal | TR07701 | 54.00 | 56.00 | 2.00 |
| 2032 | Priority C | Reseal | TR08501 | 0.60 | 4.22 | 3.62 |
| 2033 | Priority C | LightRehab | DR01157 | 8.49 | 9.04 | 0.55 |
| 2033 | Priority C | LightRehab | DR01205 | 4.00 | 10.00 | 6.00 |
| 2033 | Priority C | LightRehab | DR01205 | 12.00 | 16.00 | 4.00 |
| 2033 | Priority C | LightRehab | DR01318 | 0.00 | 3.65 | 3.65 |
| 2033 | Priority C | LightRehab | DR01342 | 0.00 | 14.00 | 14.00 |
| 2033 | Priority C | Reseal | DR01390 | 4.00 | 6.93 | 2.93 |
| 2033 | Priority C | Reseal | DR01834 | 2.00 | 4.00 | 2.00 |
| 2033 | Priority C | LightRehab | DR02188 | 0.00 | 9.75 | 9.75 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2033 | Priority C | LightRehab | DR02215 | 10.00 | 15.73 | 5.73 |
| 2033 | Priority C | LightRehab | MR00027 | 18.26 | 20.00 | 1.74 |
| 2033 | Priority C | LightRehab | MR00027 | 36.20 | 38.00 | 1.80 |
| 2033 | Priority C | LightRehab | MR00233 | 0.00 | 10.00 | 10.00 |
| 2033 | Priority C | LightRehab | MR00287 | 16.00 | 18.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00287 | 26.00 | 30.03 | 4.03 |
| 2033 | Priority C | LightRehab | MR00305 | 2.97 | 6.96 | 3.99 |
| 2033 | Priority C | LightRehab | MR00312 | 2.00 | 5.10 | 3.10 |
| 2033 | Priority C | LightRehab | MR00313 | 0.00 | 4.89 | 4.89 |
| 2033 | Priority C | LightRehab | MR00316 | 0.25 | 0.26 | 0.01 |
| 2033 | Priority C | LightRehab | MR00348 | 8.00 | 10.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00348 | 10.00 | 12.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00352 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00531 | 4.00 | 8.00 | 4.00 |
| 2033 | Priority C | LightRehab | MR00531 | 10.00 | 14.00 | 4.00 |
| 2033 | Priority C | LightRehab | MR00531 | 20.00 | 22.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00531 | 22.00 | 30.00 | 8.00 |
| 2033 | Priority C | LightRehab | MR00538 | 22.00 | 24.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00542 | 24.00 | 26.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00544 | 46.00 | 48.00 | 2.00 |
| 2033 | Priority C | LightRehab | MR00544 | 48.00 | 49.21 | 1.21 |
| 2033 | Priority C | LightRehab | OP04095 | 0.00 | 0.33 | 0.33 |
| 2033 | Priority C | LightRehab | TR02101 | 28.00 | 44.00 | 16.00 |
| 2033 | Priority C | LightRehab | TR02201 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | LightRehab | TR02303 | 32.00 | 34.00 | 2.00 |
| 2033 | Priority C | LightRehab | TR02901 | 1.49 | 22.00 | 20.51 |
| 2033 | Priority C | LightRehab | TR02901 | 32.00 | 34.00 | 2.00 |
| 2033 | Priority C | LightRehab | TR02901 | 34.00 | 36.00 | 2.00 |
| 2033 | Priority C | LightRehab | TR02901 | 58.32 | 71.73 | 13.41 |
| 2033 | Priority C | LightRehab | TR03106 | 36.00 | 46.00 | 10.00 |
| 2033 | Priority C | LightRehab | TR03302 | 50.00 | 60.00 | 10.00 |
| 2033 | Priority C | LightRehab | TR03303 | 24.00 | 26.00 | 2.00 |
| 2033 | Priority C | Rehabilitation | TR05401 | 0.33 | 1.71 | 1.38 |
| 2033 | Priority C | Reseal | DR01012 | 1.62 | 3.55 | 1.93 |
| 2033 | Priority C | Reseal | DR01101 | 10.00 | 11.78 | 1.78 |
| 2033 | Priority C | Reseal | DR01114 | 0.00 | 1.70 | 1.70 |
| 2033 | Priority C | Reseal | DR01119 | 3.74 | 4.59 | 0.85 |
| 2033 | Priority C | Reseal | DR01214 | 4.00 | 6.48 | 2.48 |
| 2033 | Priority C | Reseal | DR01285 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | Reseal | DR01425 | 0.00 | 2.63 | 2.63 |
| 2033 | Priority C | Reseal | DR01440 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | Reseal | DR01573 | 7.93 | 9.06 | 1.13 |
| 2033 | Priority C | Reseal | DR01775 | 0.00 | 1.90 | 1.90 |
| 2033 | Priority C | Reseal | MR00023 | 1.64 | 4.00 | 2.36 |
| 2033 | Priority C | Reseal | MR00027 | 26.00 | 31.72 | 5.72 |
| 2033 | Priority C | Reseal | MR00027 | 70.00 | 71.65 | 1.65 |
| 2033 | Priority C | Reseal | MR00027 | 20.00 | 26.00 | 6.00 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2033 | Priority C | Reseal | MR00027 | 26.00 | 31.72 | 5.72 |
| 2033 | Priority C | Reseal | MR00028 | 0.00 | 0.54 | 0.54 |
| 2033 | Priority C | Reseal | MR00101 | 42.00 | 60.00 | 18.00 |
| 2033 | Priority C | Reseal | MR00103 | 18.00 | 20.00 | 2.00 |
| 2033 | Priority C | Reseal | MR00103 | 22.00 | 24.00 | 2.00 |
| 2033 | Priority C | Reseal | MR00103 | 42.00 | 64.70 | 22.70 |
| 2033 | Priority C | Reseal | MR00104 | 0.90 | 4.00 | 3.10 |
| 2033 | Priority C | Reseal | MR00106 | 36.00 | 36.47 | 0.47 |
| 2033 | Priority C | Reseal | MR00108 | 0.00 | 3.17 | 3.17 |
| 2033 | Priority C | Reseal | MR00113 | 0.00 | 3.69 | 3.69 |
| 2033 | Priority C | Reseal | MR00126 | 4.81 | 5.11 | 0.30 |
| 2033 | Priority C | Reseal | MR00159 | 2.00 | 9.36 | 7.36 |
| 2033 | Priority C | Reseal | MR00159 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | Reseal | MR00168 | 0.00 | 6.10 | 6.10 |
| 2033 | Priority C | Reseal | MR00168 | 0.00 | 5.88 | 5.88 |
| 2033 | Priority C | Reseal | MR00168 | 10.26 | 11.00 | 0.74 |
| 2033 | Priority C | Reseal | MR00172 | 1.25 | 2.02 | 0.77 |
| 2033 | Priority C | Reseal | MR00172 | 2.02 | 2.49 | 0.47 |
| 2033 | Priority C | Reseal | MR00172 | 2.49 | 8.00 | 5.51 |
| 2033 | Priority C | Reseal | MR00174 | 1.97 | 2.47 | 0.50 |
| 2033 | Priority C | Reseal | MR00174 | 14.00 | 17.25 | 3.25 |
| 2033 | Priority C | Reseal | MR00174 | 32.00 | 42.00 | 10.00 |
| 2033 | Priority C | Reseal | MR00174 | 42.00 | 46.15 | 4.15 |
| 2033 | Priority C | Reseal | MR00174 | 58.49 | 59.32 | 0.83 |
| 2033 | Priority C | Reseal | MR00177 | 17.05 | 19.60 | 2.55 |
| 2033 | Priority C | Reseal | MR00187 | 4.72 | 14.71 | 9.99 |
| 2033 | Priority C | Reseal | MR00188 | 22.00 | 24.00 | 2.00 |
| 2033 | Priority C | Reseal | MR00188 | 24.00 | 26.80 | 2.80 |
| 2033 | Priority C | Reseal | MR00189 | 26.00 | 32.81 | 6.81 |
| 2033 | Priority C | Rehabilitation | MR00191 | 9.57 | 23.71 | 14.14 |
| 2033 | Priority C | Rehabilitation | MR00191 | 23.71 | 41.95 | 18.24 |
| 2033 | Priority C | Reseal | MR00192 | 0.00 | 3.22 | 3.22 |
| 2033 | Priority C | Reseal | MR00192 | 0.00 | 3.72 | 3.72 |
| 2033 | Priority C | Reseal | MR00199 | 20.00 | 22.46 | 2.46 |
| 2033 | Priority C | Reseal | MR00201 | 56.20 | 56.92 | 0.72 |
| 2033 | Priority C | Reseal | MR00201 | 56.20 | 56.92 | 0.72 |
| 2033 | Priority C | Reseal | MR00208 | 0.00 | 3.46 | 3.46 |
| 2033 | Priority C | Reseal | MR00208 | 0.00 | 4.92 | 4.92 |
| 2033 | Priority C | Reseal | MR00216 | 0.00 | 4.14 | 4.14 |
| 2033 | Priority C | Reseal | MR00217 | 0.00 | 4.66 | 4.66 |
| 2033 | Priority C | Reseal | MR00218 | 0.00 | 5.56 | 5.56 |
| 2033 | Priority C | Reseal | MR00224 | 0.00 | 0.29 | 0.29 |
| 2033 | Priority C | Reseal | MR00224 | 0.00 | 2.35 | 2.35 |
| 2033 | Priority C | Reseal | MR00224 | 6.00 | 20.00 | 14.00 |
| 2033 | Priority C | Reseal | MR00240 | 0.00 | 2.14 | 2.14 |
| 2033 | Priority C | Reseal | MR00261 | 0.80 | 2.00 | 1.20 |
| 2033 | Priority C | Reseal | MR00264 | 0.84 | 8.00 | 7.16 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2033 | Priority C | Reseal | MR00278 | 0.00 | 1.31 | 1.31 |
| 2033 | Priority C | Reseal | MR00279 | 18.00 | 20.00 | 2.00 |
| 2033 | Priority C | Reseal | MR00287 | 30.03 | 30.71 | 0.68 |
| 2033 | Priority C | Reseal | MR00289 | 14.00 | 16.00 | 2.00 |
| 2033 | Priority C | Reseal | MR00301 | 2.71 | 4.73 | 2.02 |
| 2033 | Priority C | Reseal | MR00310 | 1.21 | 1.91 | 0.70 |
| 2033 | Priority C | Reseal | MR00310 | 1.91 | 37.90 | 35.99 |
| 2033 | Priority C | Reseal | MR00347 | 1.57 | 2.00 | 0.43 |
| 2033 | Priority C | Reseal | MR00382 | 0.23 | 2.12 | 1.89 |
| 2033 | Priority C | Reseal | MR00382 | 2.12 | 4.96 | 2.84 |
| 2033 | Priority C | Reseal | MR00527 | 4.10 | 6.76 | 2.66 |
| 2033 | Priority C | Reseal | MR00547 | 0.00 | 1.66 | 1.66 |
| 2033 | Priority C | Reseal | MR00548 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | Reseal | OP05255 | 0.00 | 1.41 | 1.41 |
| 2033 | Priority C | Reseal | TR00101 | 18.00 | 19.36 | 1.36 |
| 2033 | Priority C | Reseal | TR00209 | 24.06 | 25.36 | 1.30 |
| 2033 | Priority C | Reseal | TR00209 | 26.89 | 27.10 | 0.21 |
| 2033 | Priority C | Reseal | TR00901 | 0.00 | 8.00 | 8.00 |
| 2033 | Priority C | Reseal | TR00901 | 0.00 | 8.00 | 8.00 |
| 2033 | Priority C | Rehabilitation | TR01101 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | Reseal | TR01601 | 6.00 | 8.00 | 2.00 |
| 2033 | Priority C | Reseal | TR01601 | 8.00 | 10.00 | 2.00 |
| 2033 | Priority C | Reseal | TR01602 | 0.73 | 2.00 | 1.27 |
| 2033 | Priority C | Reseal | TR02102 | 0.00 | 2.00 | 2.00 |
| 2033 | Priority C | Reseal | TR02102 | 36.65 | 37.16 | 0.51 |
| 2033 | Priority C | Reseal | TR02102 | 37.16 | 37.68 | 0.52 |
| 2033 | Priority C | Reseal | TR02202 | 0.00 | 0.85 | 0.85 |
| 2033 | Priority C | Reseal | TR02202 | 0.85 | 2.00 | 1.15 |
| 2033 | Priority C | Reseal | TR02303 | 34.00 | 35.12 | 1.12 |
| 2033 | Priority C | Reseal | TR02802 | 0.00 | 1.27 | 1.27 |
| 2033 | Priority C | Reseal | TR02901 | 0.00 | 1.49 | 1.49 |
| 2033 | Priority C | Reseal | TR02901 | 72.24 | 72.54 | 0.30 |
| 2033 | Priority C | Reseal | TR03001 | 24.00 | 26.00 | 2.00 |
| 2033 | Priority C | Reseal | TR03001 | 30.00 | 32.11 | 2.11 |
| 2033 | Priority C | Reseal | TR03101 | 45.02 | 45.67 | 0.65 |
| 2033 | Priority C | Reseal | TR03102 | 0.00 | 1.46 | 1.46 |
| 2033 | Priority C | Reseal | TR03301 | 0.52 | 6.00 | 5.48 |
| 2033 | Priority C | Reseal | TR03301 | 6.52 | 10.27 | 3.75 |
| 2033 | Priority C | Reseal | TR03301 | 13.05 | 16.08 | 3.03 |
| 2033 | Priority C | Reseal | TR03302 | 75.20 | 76.56 | 1.36 |
| 2033 | Priority C | Reseal | TR03302 | 75.35 | 76.56 | 1.21 |
| 2033 | Priority C | Reseal | TR03303 | 2.80 | 4.00 | 1.20 |
| 2033 | Priority C | Reseal | TR07501 | 31.95 | 33.96 | 2.01 |
| 2033 | Priority C | Reseal | TR07501 | 18.00 | 20.00 | 2.00 |
| 2033 | Priority C | Reseal | TR07501 | 31.95 | 33.96 | 2.01 |
| 2033 | Priority C | Reseal | TR07502 | 0.00 | 0.48 | 0.48 |
| 2033 | Priority C | Reseal | TR07701 | 8.24 | 14.48 | 6.24 |

| OPTIMUM DELIVERY YEAR | PRIORITY | RECOMMENDED TREATMENT | ROAD NUMBER | START KM | END KM | LENGTH |
|---|---|---|---|---|---|---|
| 2033 | Priority C | Reseal | TR07701 | 48.22 | 50.00 | 1.78 |
| 2033 | Priority C | Reseal | TR07701 | 64.00 | 82.00 | 18.00 |
| 2033 | Priority C | Reseal | TR08501 | 4.22 | 12.09 | 7.87 |

# Appendix L – Gazetted list of projects

## *Key to table headings*

**Delivery Mechanism** (Individual project or Packaged program)

**Total Expenditure** (until 31 March 2023) - Gazetted project list updated from Vote 10 Budget

Note 1: Site handover/commencement of construction - date of letter of acceptance
Note 2: Construction completion date (take over date) - practical completion date

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration Date: Start Note 1 | Project duration Date: Finish Note 2 | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | | | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| **1. Maintenance and Repairs** | | | | | | | | | | | | | | |
| **Own Funds and Provincial Roads Maintenance Funds** | | | | | | | | | | | | | | |
| 1 | Data Collection for Asset Management (CUR) | Not Applicable | City of Cape Town | City of Cape Town | 2018/04/01 | 2025/04/01 | Provincial Roads Maintenance Grant | Transport Infrastructure | Packaged program | 115 057 | 85 518 | 9 696 | 10 693 | 6 881 |
| 2 | Maintenance - Garden Route | Packaged Programme | Garden Route | All | 2015/04/01 | 2029/03/31 | Equitable share | Transport Infrastructure | Packaged program | 900 000 | 573 460 | 87 797 | 89 849 | 94 000 |
| 3 | Maintenance - Cape Town PRMG | Packaged Programme | City of Cape Town | All | 2015/04/01 | 2030/04/01 | Provincial Roads Maintenance Grant | Transport Infrastructure | Packaged program | 1 105 338 | 988 539 | 35 000 | 20 000 | 20 000 |
| 4 | Routine Maintenance CK DM | Packaged Programme | Central Karoo | All | 2017/04/01 | 2030/03/31 | Equitable share | Transport Infrastructure | Packaged program | 300 000 | 158 593 | 27 260 | 28 625 | 30 055 |
| 5 | Routine Maintenance Garden Route DM | Packaged Programme | Garden Route | All | 2017/04/01 | 2030/03/31 | Equitable share | Transport Infrastructure | Packaged program | 900 000 | 510 047 | 101 850 | 106 945 | 112 290 |
| 6 | Maintenance - Cape Town | Packaged Programme | City of Cape Town | All | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged program | 3 644 891 | 1 374 435 | 342 286 | 334 577 | 350 863 |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration Date: Start Note 1 | Project duration Date: Finish Note 2 | Source of funding | Budget programme name | Delivery Mechanism | Total project cost R'000 | Total Expenditure (until 31 March 2023) R'000 | 2023/24 R'000 | 2024/25 R'000 | 2025/26 R'000 |
| 7 | Routine Maintenance WC DM | Packaged Programme | West Coast | All | 2017/04/01 | 2030/03/31 | Equitable share | Transport Infrastructure | Packaged program | 700 000 | 352 552 | 99 105 | 104 060 | 109 265 |
| 8 | Routine Maintenance CW DM | Packaged Programme | Cape Winelands | Witzenberg | 2017/04/01 | 2030/03/31 | Equitable share | Transport Infrastructure | Packaged program | 600 000 | 353 058 | 77 000 | 80 850 | 84 895 |
| 9 | Maintenance - Cape Winelands | Packaged Programme | Cape Winelands | Stellenbosch | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged program | 125 527 700 | 781 492 | 142 317 | 145 017 | 163 558 |
| 10 | Routine Maintenance OB | Packaged Programme | Overberg | Overberg | 2017/04/01 | 2030/03/31 | Equitable share | Transport Infrastructure | Packaged program | 400 000 | 228 195 | 50 415 | 52 935 | 55 585 |
| **TOTAL: MAINTENANCE AND REPAIRS** | | | | | | | | | | **134 192 986** | **5 405 889** | **972 726** | **973 551** | **1 027 392** |
| | | | | | | | | | | | | | | |
| **2. NEW OR REPLACED INFRASTRUCUTRE** | | | | | | | | | | | | | | |
| **Own Funds** | | | | | | | | | | | | | | |
| 1 | C1234.01 Worcester Eastern Bypass TR33/1 | Stage 1: Initiation/ Prefeasibility | Cape Winelands | Breede Valley | 2024/04/01 | 2031/03/27 | Equitable Share | Transport Infrastructure | Individual Project | 300 000 | - | - | 31 000 | 130 000 |
| 2 | Design Fees New | Stage 5: Works | City of Cape Town | City of Cape Town | 2016/04/01 | 2025/04/01 | Equitable Share | Transport Infrastructure | Packaged program | 260 000 | 188 264 | 6 000 | 7 000 | 8 000 |
| 3 | C967 Malmesbury Bypass | Stage 4: Design Documentation | Cape Winelands | Drakenstein | 2022/01/01 | 2026/03/30 | Equitable Share | Transport Infrastructure | Individual Project | 530 000 | - | 200 000 | 220 000 | 100 000 |
| 4 | FMS on N1 | Stage 5: Works | City of Cape Town | City of Cape Town | 2013/04/01 | 2025/04/01 | Equitable Share | Transport Infrastructure | Packaged program | 80 466 | 44 356 | 10 000 | 10 000 | 10 000 |
| 5 | C377.1 George West bypass | Stage 3: Design Development | Garden Route | George | 2024/04/01 | 2029/03/01 | Equitable Share | Transport Infrastructure | Individual Project | 270 000 | - | - | 47 000 | 160 000 |
| 6 | C1159 Extended R300 Freeway | Stage 2: Concept/ Feasibility | City of Cape Town | City of Cape Town | 2022/04/01 | 2028/04/01 | Equitable Share | Transport Infrastructure | Individual Project | 520 000 | - | 5 000 | 200 000 | 240 000 |
| **TOTAL: NEW OR REPLACED INFRASTRUCUTRE** | | | | | | | | | | **1 960 466** | **232 620** | **221 000** | **515 000** | **648 000** |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 3. REHABILITATION, RENOVATIONS AND REFURBISHMENTS | | | | | | | | | | | | | | |
| Own Funds and Provincial Roads Maintenance Funds | | | | | | | | | | | | | | |
| 1 | C1158.1 Emergency flood damage repairs near Stormsvlei (Sonderend River) | Stage 5: Works | Overberg | Swellendam | 2021/04/01 | 2024/03/31 | Equitable share | Transport Infrastructure | Individual Project | 70 000 | 44 484 | 1 000 | - | - |
| 2 | C749.2 Paarl-Franschoek | Stage 3: Design Development | Cape Winelands | Drakenstein | 2021/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Individual Project | 500 000 | - | 50 000 | - | - |
| 3 | OB DM Reseal | Stage 5: Works | Overberg | Cape Agulhas | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged program | 196 000 | 87 584 | 19 830 | 20 820 | 21 865 |
| 4 | WC DM Reseal | Stage 5: Works | West Coast | Swartland | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged program | 250 000 | 160 011 | 19 605 | 20 585 | 21 615 |
| 5 | Garden Route DM Reseal | Stage 5: Works | Garden Route | Oudtshoorn | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged program | 313 000 | 165 784 | 25 000 | 26 250 | 27 565 |
| 6 | OB DM Regravel | Stage 5: Works | Overberg | Overberg | 2015/04/01 | 2030/03/31 | Equitable share | Transport Infrastructure | Packaged program | 387 000 | 211 424 | 35 000 | 36 750 | 38 590 |
| 7 | CW DM Regravel | Stage 5: Works | Cape Winelands | Stellenbosch | 2015/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Packaged program | 348 000 | 177 547 | 30 000 | 31 500 | 33 075 |
| 8 | WC DM Regravel | Stage 5: Works | West Coast | Swartland | 2015/04/01 | 2026/03/01 | Equitable share | Transport Infrastructure | Packaged program | 326 000 | 177 100 | 25 335 | 26 600 | 27 930 |
| 9 | Garden Route DM Regravel | Stage 5: Works | Garden Route | Oudtshoorn | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged program | 307 000 | 158 834 | 27 300 | 28 665 | 30 100 |
| 10 | CK DM Regravel | Stage 5: Works | Central Karoo | Beaufort West | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged program | 363 000 | 172 479 | 34 960 | 36 710 | 38 545 |
| 11 | C749.2 PRMG Rehab Paarl-F/hoek MR191 | Stage 4: Design Documentation | Cape Winelands | Drakenstein | 2016/06/16 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 400 000 | - | 50 000 | 190 000 | 130 000 |
| 12 | Design Fees Rehabilitation | Packaged Programme | City of Cape Town | City of Cape Town | 2016/04/01 | 2030/03/31 | Equitable share | Transport Infrastructure | Packaged Programme | 849 000 | 432 011 | 60 000 | 65 000 | 70 000 |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 13 | C1151 Kuilsriver-Stellenbosch | Stage 6: Handover | City of Cape Town | City of Cape Town | 2021/04/01 | 2024/05/31 | Equitable share | Transport Infrastructure | Individual Project | 57 000 | - | 1 000 | - | - |
| 14 | C1145 PRMG Voor Paardeberg rd | Stage 2: Concept/ Feasibility | Cape Winelands | Drakenstein | 2022/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 184 000 | - | 45 000 | - | - |
| 15 | C1154 Hartenbos - Oudtshoorn | Stage 2: Concept/ Feasibility | Garden Route | Mossel Bay | 2021/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Individual Project | 130 000 | - | 20 000 | 20 000 | - |
| 16 | C1201 Rehab/reseal MR264 Swellendam - Bredasdorp | Stage 2: Concept/ Feasibility | Overberg | Swellendam | 2025/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 490 000 | - | - | - | 100 000 |
| 17 | C1203 Reseal Trunk & Divisional roads around Worcester | Stage 2: Concept/ Feasibility | Cape Winelands | Breede Valley | 2023/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Individual Project | 115 000 | - | 20 000 | 50 000 | 12 000 |
| 18 | C1155.3 Emergency flood damage repairs near Bonnievale (Bree River) | Stage 5: Works | Cape Winelands | Langeberg | 2021/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 33 000 | 26 484 | 1 000 | - | - |
| 19 | C1202 PRMG Rehab/reseal MR264 Swellendam - Bredasdorp (38,5km) | Stage 2: Concept/Feasibility | Cape Winelands | Breede Valley | 2025/03/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 98 000 | - | - | - | 32 000 |
| 20 | C1183.1 Beaufort West area. Repair and replacement of bridge and large | Stage 5: Works | Central Karoo | Beaufort West | 2022/04/01 | 2024/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 55 000 | 25 161 | 3 000 | - | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| | structures | | | | | | | | | | | | | |
| 21 | C1088.1 Reseal Stanford-Riviersonderend | Stage 5: Works | Overberg | Theewaterskloof | 2021/04/01 | 2024/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 200 000 | 55 596 | 35 000 | - | - |
| 22 | C975.4 Carinus Bridge at Velddrift | Stage 1: Initiation/ Prefeasibility | West Coast | Bergrivier | 2023/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 460 000 | - | 20 000 | 90 000 | 32 500 |
| 23 | C802.5 St Helena - Stomp-neusbaai Phase2 | Stage 4: Design Documentation | West Coast | West Coast Saldanha Bay | 2022/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 375 000 | - | 107 000 | 50 000 | 2 000 |
| 24 | C1049.3 Rehab/upgrade Waarburgh/Protea Rd | Stage 4: Design Documentation | City of Cape Town | City of Cape Town | 2022/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Individual Project | 200 000 | - | 60 000 | 40 000 | - |
| 25 | C1213 Reseal/rehab NC Border - N1 - Murraysburg | Stage 2: Concept/ Feasibility | Central Karoo | Beaufort West | 2021/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 454 000 | - | 57 000 | 80 000 | 3 000 |
| 26 | C1214 Reseal MR331 Stilbaai-Jongensfontein | Stage 1: Initiation/ Prefeasibility | Garden Route | Hessequa | 2023/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 110 000 | - | 26 000 | 1 000 | - |
| 27 | C1216 Reseal/rehab Ceres-Opdie Berg-Citrusdal | Stage 2: Concept/ Feasibility | Cape Winelands | Witzenberg | 2023/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 538 000 | - | 50 000 | 150 000 | 100 000 |
| 28 | C1217 Reseal Stellenbosch - Pniel (Helshoogte Pass) | Stage 1: Initiation/ Prefeasibility | Cape Winelands | Stellenbosch | 2024/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 88 000 | - | - | 22 000 | 46 000 |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 29 | C1116.1 Reseal Wolseley - Ceres - Touwsrivier 86km | Stage 4: Design Documentation | Cape Winelands | Witzenberg | 2023/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Individual Project | 200 000 | - | 30 000 | 20 000 | - |
| 30 | C1215 Reseal Plettenberg Bay Airport road and others 14 km | Stage 1: Initiation/ Prefeasibility | Garden Route | Bitou | 2024/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Individual Project | 40 000 | - | - | 36 000 | 1 000 |
| 31 | C1038 Vissershok | Stage 2: Concept/ Feasibility | City of Cape Town | City of Cape Town | 2023/04/01 | 2026/03/31 | Equitable Share | Provincial Roads Maintenance Grant | Individual Project | 100 000 | - | - | - | 5 000 |
| 32 | C1156.1 Emergency replacement of culvert C12328 Paarl | Stage 4: Design Documentation | Cape Winelands | Drakenstein | 2023/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 1 500 | - | 1 500 | - | - |
| 33 | C1156.2 Rehabilitate/Replace Bridge 0593 at km10,5 Soetendal, Paarl | Stage 4: Design Documentation | Cape Winelands | Drakenstein | 2023/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 4 000 | - | 4 000 | - | - |
| 34 | C1155.4 Emergency accident repairs to bridges B2927&B2927A at Wingfield | Stage 3: Design Development | City of Cape Town | City of Cape Town | 2025/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 4 000 | - | - | - | 3 000 |
| 35 | C1158.2 Emergency replacement of | Stage 4: Design Documentation | Cape Winelands | Breede Valley | 2025/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 9 000 | - | - | 9 000 | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration Date: Start Note 1 | Project duration Date: Finish Note 2 | Source of funding | Budget programme name | Delivery Mechanism | Total project cost R'000 | Total Expenditure (until 31 March 2023) R'000 | 2023/24 R'000 | 2024/25 R'000 | 2025/26 R'000 |
| | Bridge0495 near De Doorns | | | | | | | | | | | | | |
| 36 | C1225.1 Reseal N1 - Stellenbosch | Stage 1: Initiation/ Pre-feasibility | Cape Winelands | Stellenbosch | 2025/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 61 000 | - | - | - | 60 000 |
| 37 | C1227 Reseal Bottelary Road 10km | Stage 1: Initiation/ Pre-feasibility | City of Cape Town | City of Cape Town | 2025/04/01 | 2027/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 40 000 | - | - | - | 40 000 |
| 38 | C1229.1 Reseal Paarl - Franschhoek 14,5km | Stage 1: Initiation/ Pre-feasibility | Cape Winelands | Stellenbosch | 2025/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 45 000 | - | - | - | 45 000 |
| 39 | C1230 Reseal Langebaanweg - Vredenburg, Langebaan - Saldanha 24km | Stage 1: Initiation/ Pre-feasibility | West Coast | Saldanha Bay | 2023/04/01 | 2025/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 82 000 | - | 65 000 | 17 000 | - |
| 40 | C1231 Reseal/Rehab Vredendal - Van Rhynsdorp, Vredendal - Klawer 31km | Stage 1: Initiation/ Pre-feasibility | West Coast | Matzikama | 2024/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 90 000 | - | - | 2 500 | 85 000 |
| 41 | C1232 Reseal Van Rhynsdorp - NC Border 35km (Rehab Van Rhyns Pass) | Stage 1: Initiation/ Pre-feasibility | West Coast | Matzikama | 2024/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 130 000 | - | - | 2 500 | 120 000 |
| 42 | C1228 Reseal Old Paarl Road Klapmuts - Paarl | Stage 1: Initiation/ Pre-feasibility | Cape Winelands | Stellenbosch | 2024/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 65 000 | - | - | 5 000 | 60 000 |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 43 | C1025.10 Resurface Wingfield Bosmansdam | Stage 4: Design Documentation | City of Cape Town | City of Cape Town | 2023/04/01 | 2025/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 26 000 | - | - | 1 000 | - |
| 44 | C1204 Recon TR30/2 Villiersdorp -Worcester | Stage 4: Design Documentation | Overberg | Theewaterskloof | 2025/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 120 000 | - | - | - | 15 000 |
| 45 | C1206 Rehab Philidelphia & Atlantis rd | Stage 4: Design Documentation | City of Cape Town | City of Cape Town | 2025/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 190 000 | - | - | - | 17 000 |
| 46 | C1156.3 C12249 Replacement near Malmesbury | Stage 4: Design Documentation | West Coast | Swartland | 2023/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 5 000 | - | 5 000 | - | - |
| 47 | C1102.02 Rustenburg & Bainskloof Restareas | Stage 5: Works | Cape Winelands | Drakenstein | 2023/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 20 000 | - | 20 000 | - | - |
| 48 | C1240 UniCity Provincial Roads | Stage 1: Initiation/ Pre-feasibility | City of Cape Town | City of Cape Town | 2023/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 160 000 | - | 80 500 | 39 555 | 39 821 |
| 49 | C1025.10 Reseal N7 Wingfield -Bosmansdam km 0-2 dual | Stage 4: Design Documentation | City of Cape Town | City of Cape Town | 2022/04/01 | 2024/03/29 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 30 000 | - | 25 000 | - | - |
| 50 | C1116.1 Reseal Wolseley - Ceres - Touwsrivier 86km | Stage 4: Design Documentation | Cape Winelands | Witzenberg | 2023/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 120 000 | - | 70 000 | 48 000 | - |
| 51 | C914 Spier road phase 3 | Stage 5: Works | Cape Winelands | Stellenbosch | 2021/04/01 | 2026/04/01 | Equitable Share | Transport Infrastructure | Individual Project | 281 000 | 80 925 | 120 000 | 20 000 | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 52 | C1103 Reseal Grootriver and Bloukrans | Stage 5: Works | Garden Route | Bitou | 2019/04/01 | 2024/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 176 000 | 73 385 | 2 000 | - | - |
| 53 | C1119 Replace Bridges Structures in Tesselaarsdal area | Stage 5: Works | Overberg | Theewaterskloof | 2020/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 45 000 | 22 407 | 500 | - | - |
| 54 | C1148 Reseal Knysna Lagoon Road N2 TR1/1 & MR347 | Stage 5: Works | Garden Route | Knysna | 2020/04/01 | 2024/05/07 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 767 000 | 1 586 | 1 000 | - | - |
| 55 | C1000 Hermanus - Gansbaai | Stage 5: Works | Overberg | Overstrand | 2022/04/01 | 2026/02/01 | Equitable Share | Transport Infrastructure | Individual Project | 780 000 | 58 232 | 130 000 | 130 000 | 58 000 |
| 56 | C838.6 Caledon - Sandbaai | Stage 5: Works | Overberg | Overstrand | 2021/09/08 | 2024/12/08 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 230 000 | 96 658 | 22 000 | - | - |
| 57 | C1142 Rehab Simondium Reseal | Stage 3: Design Development | Cape Winelands | Drakenstein | 2021/10/02 | 2026/06/01 | Equitable Share | Transport Infrastructure | Individual Project | 560 000 | - | 65 759 | 115 000 | - |
| 58 | C1101 Reconstruct Walboomskraal | Stage 3: Design Development | Garden Route | George | 2023/04/01 | 2026/10/01 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 160 000 | - | 35 000 | 75 000 | 5 000 |
| 59 | C1104 Reseal Meiringspoort to Prince Albert | Stage 5: Works | Central Karoo | Prince Albert | 2022/04/04 | 2024/07/04 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 156 000 | 41 871 | 20 000 | - | - |
| 60 | C1125 PRMG Riversdal ladismith | Stage 4: Design Documentation | Garden Route | Hessequa | 2022/11/01 | 2026/06/01 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 270 000 | - | 125 000 | 3 000 | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration Date: Start Note 1 | Project duration Date: Finish Note 2 | Source of funding | Budget programme name | Delivery Mechanism | Total project cost R'000 | Total Expenditure (until 31 March 2023) R'000 | 2023/24 R'000 | 2024/25 R'000 | 2025/26 R'000 |
| 61 | C1141 Reseal Montagu - Barrydale | Stage 2: Concept/ Feasibility | Cape Winelands | Langeberg | 2023/04/01 | 2025/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 105 000 | - | 35 000 | 20 000 | - |
| 62 | C1143 PRMG Reseal Ashton-Swellendam, N2-Zuurbraak, Barrydale-Montagu & various DR`s & OP`s (66km) | Stage 5: Works | Overberg | Swellendam | 2022/02/21 | 2026/11/21 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 192 000 | 58 100 | 40 000 | 2 000 | - |
| 63 | C1146 Barrington ,old Kynsna &Wilderness | Stage 3: Design Development | Garden Route | Knysna | 2022/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 64 000 | - | 25 000 | 15 000 | - |
| 64 | C1202 Rehab/reseal MR264 Swellendam - Bredasdorp (38,5km) | Stage 2: Concept/ Feasibility | Cape Winelands | Breede Valley | 2024/01/01 | 2026/05/01 | Equitable Share | Transport Infrastructure | Individual Project | 435 000 | - | - | 25 086 | 59 233 |
| 65 | C1144 Reseal Riebeek west | Stage 5: Works | West Coast | Swartland | 2021/09/21 | 2024/09/22 | Equitable Share | Transport Infrastructure | Individual Project | 60 000 | 30 789 | 1 000 | - | - |
| 66 | C1145 Voor Paardeberg rd | Stage 2: Concept/ Feasibility | Cape Winelands | Drakenstein | 2022/04/01 | 2026/04/01 | Equitable Share | Transport Infrastructure | Individual Project | 60 000 | - | 35 000 | 12 000 | - |
| 67 | C1146 PRMG Barrington ,old Kynsna &Wilderness | Stage 2: Concept/ Feasibility | Garden Route | Knysna | 2023/07/01 | 2026/05/01 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 181 000 | - | 35 000 | - | - |
| 68 | C1147 Reseal Strandfontein/Lutzville/Vredendal | Stage 4: Design Documentation | West Coast | Matzikama | 2022/04/01 | 2025/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 110 000 | - | 57 000 | 1 000 | - |
| 69 | C1149 Reseal Somerset West Sir Lowry`s pass | Stage 6: Handover | City of Cape Town | City of Cape Town | 2021/03/01 | 2024/04/30 | Equitable Share | Transport Infrastructure | Individual Project | 80 000 | 11 700 | 1 000 | - | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 70 | C1153 Barrydale ladismith | Stage 5: Works | Garden Route | Kannaland | 2021/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 170 000 | 71 875 | 1 000 | - | - |
| 71 | C1154 PRMG Hartenbos -Oudtshoorn | Stage 2: Concept/ Feasibility | Garden Route | Mossel Bay | 2023/04/01 | 2026/04/01 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 400 000 | - | 65 000 | 21 000 | - |
| 72 | C1183 PRMG Klaarstroom Beaufort West | Stage 5: Works | Central Karoo | Beaufort West | 2020/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 340 000 | 213 768 | 75 000 | 4 000 | - |
| 73 | C1184 Reseal N2 | Stage 5: Works | City of Cape Town | City of Cape Town | 2021/04/01 | 2024/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 310 000 | 103 400 | 3 000 | - | - |
| 74 | C1203 PRMGReseal Trunk & Divisional roads around Worcester (58km) | Stage 2: Concept/ Feasibility | Cape Winelands | Breede Valley | 2023/03/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 120 000 | - | 30 000 | 50 000 | - |
| 75 | C1205 PRMG Reseal Bonnievale/Ashton | Stage 2: Concept/ Feasibility | Cape Winelands | Langeberg | 2023/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 160 000 | - | 40 000 | 3 000 | - |
| 76 | C1105 Reseal Du Toits Kloof | Stage 4: Design Documentation | Cape Winelands | Drakenstein | 2023/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 250 000 | 24 064 | 80 000 | 16 000 | - |
| 77 | C1141 Reseal Montagu-Barrydale | Stage 2: Concept/ Feasibility | Cape Winelands | Langeberg | 2021/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 350 000 | - | 55 000 | 10 000 | - |
| 78 | C1152 Westcoast Rd - Atlantis-Yesterfontein | Stage 5: Works | West Coast | Swartland | 2021/04/01 | 2024/05/30 | Equitable Share | Transport Infrastructure | Individual Project | 70 000 | 2 536 | 1 000 | - | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration Date: Start Note 1 | Project duration Date: Finish Note 2 | Source of funding | Budget programme name | Delivery Mechanism | Total project cost R'000 | Total Expenditure (until 31 March 2023) R'000 | 2023/24 R'000 | 2024/25 R'000 | 2025/26 R'000 |
| | C1008 Rehab Calitzdrop | Stage 5: Works | Garden Route | Kannaland | 2021/04/01 | 2025/11/07 | Provincial Roads Maintenance Grant | | | 200 000 | 63 065 | 67 000 | 2 000 | - |
| **TOTAL: REHABILITATION, RENOVATIONS AND REFURBISHMENTS** | | | | | | | | | | **16 520 500** | **2 848 860** | **2 291 289** | **1 690 521** | **1 379 839** |
| | | | | | | | | | | | | | | |
| **4. UPGRADING AND ADDITIONS** | | | | | | | | | | | | | | |
| **Own Funds and Provincial Roads Maintenance Grant** | | | | | | | | | | | | | | |
| 1 | C1038.01 Safety Impr N7 Potsdam - Melkbos - Van Schoorsdrift I/C | Stage 1: Initiation/ Pre-feasibility | City of Cape Town | City of Cape Town | 2023/04/01 | 2026/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 160 000 | - | 40 000 | 30 000 | 87 500 |
| 2 | DR1337 Wansbek DM | Stage 1: Initiation/ Pre-feasibility | Cape Winelands | Langeberg | 2023/04/01 | 2026/03/30 | Equitable share | Transport Infrastructure | Individual Project | 80 000 | - | - | - | 37 000 |
| 3 | C733.5 Mariners Way | Stage 4: Design Documentation | City of Cape Town | City of Cape Town | 2023/01/10 | 2026/03/31 | Equitable share | Transport Infrastructure | Individual Project | 260 000 | 13 252 | 20 000 | 100 000 | 70 000 |
| 4 | Design Fees Upgrade | Packaged Programme | City of Cape Town | City of Cape Town | 2016/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Packaged Programme | 480 000 | 274 281 | 64 000 | 64 500 | 65 325 |
| 5 | Expropriation | Stage 5: Works | City of Cape Town | City of Cape Town | 2015/04/01 | 2025/04/01 | Equitable share | Transport Infrastructure | Individual Project | 200 000 | 161 550 | 9 350 | 10 000 | 10 500 |
| 6 | C974.1 Safety Improvements R44 Phase 1 - Winery I/C | Stage 2: Concept/ Feasibility | Cape Winelands | Drakenstein | 2023/01/07 | 2026/04/01 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 300 000 | - | 10 175 | 130 000 | 60 000 |
| 7 | C1102.1 Dual MR201 N1 to Kliprug Rd | Stage 5: Works | Cape Winelands | Drakenstein | 2022/04/01 | 2026/03/30 | Equitable share | Transport Infrastructure | Individual Project | 270 000 | 35 121 | 90 000 | 3 000 | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 8 | C964.2 Mossel Bay-Hartenbos AMP & upgrading Package 2 | Stage 5: Works | Garden Route | Mossel Bay | 2021/03/30 | 2026/02/01 | Equitable share | Transport Infrastructure | Individual Project | 475 000 | 24 643 | 140 000 | 125 000 | 25 000 |
| 9 | C1010 Stompneusbaai DM | Stage 5: Works | West Coast | Saldanha Bay | 2018/04/02 | 2025/03/31 | Equitable share | Transport Infrastructure | Individual Project | 360 000 | 276 031 | 5 000 | - | - |
| 10 | DR1206 Buffeljags DM | Stage 5: Works | Overberg | Overstrand | 2021/03/05 | 2025/03/30 | Equitable share | Transport Infrastructure | Individual Project | 80 000 | 55 849 | 14 000 | - | - |
| 11 | C1225 Stellenbosch - N1 doubling | Stage 1: Initiation/ Pre-feasibility | Cape Winelands | Stellenbosch | 2025/04/01 | 2026/03/31 | Equitable Share | Programme 3 - Transport Infrastructure | Individual Project | 20 000 | - | - | - | 5 000 |
| 12 | C1122 Capacity Improvement TR28/1 Hermanus to Botrivier & reseal km 26,7-29,5 | Stage 1: Initiation/ Pre-feasibility | Overberg | Overstrand | 2025/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 20 000 | - | - | - | 5 000 |
| 13 | DR1385 Keerweder DM | Stage 2: Concept/ Feasibility | Cape Winelands | Drakenstein | 2023/04/01 | 2026/04/30 | Equitable Share | Transport Infrastructure | Individual Project | 22 000 | - | - | 13 000 | - |
| 14 | C1025.1 AFR Wingfield i/c | Stage 5: Works | City of Cape Town | City of Cape Town | 2021/07/30 | 2026/01/29 | Equitable Share | Transport Infrastructure | Individual Project | 360 000 | 176 703 | 75 000 | 5 000 | - |
| 15 | C1038.01 Safety Impr N7 Potsdam - Melkbos - Van Schoorsdrift I/C | Stage 1: Initiation/ Pre-feasibility | City of Cape Town | City of Cape Town | 2015/04/01 | 2027/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 350 000 000 | 14 099 | - | 120 000 | 42 500 |
| 16 | DR2183 Clainwilliam DM | Stage 4: Design | West Coast | Cederberg | 2024/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 20 000 | - | - | 9 000 | 6 000 |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| | | Documentation | | | | | | | | | | | | |
| 17 | C1047.01 Fancourt DM | Stage 3: Design Development | Garden Route | George | 2020/04/01 | 2025/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 82 000 | 26 095 | 39 000 | 10 000 | - |
| 18 | C852 Boontjieskraal DM | Stage 5: Works | Overberg | Theewaterskloof | 2020/04/01 | 2025/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 55 000 | 34 907 | 14 000 | - | - |
| 19 | C832.01 Gifberg DM | Stage 3: Design Development | West Coast | Matzikama | 2025/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 55 000 | - | - | - | 12 000 |
| 20 | C851 Rondevlei | Stage 5: Works | Garden Route | George | 2022/04/17 | 2024/04/17 | Equitable Share | Transport Infrastructure | Individual Project | 260 000 | 55 122 | 47 000 | 1 000 | - |
| 21 | C832 Urionskraaal DM | Stage 2: Concept/ Feasibility | West Coast | Matzikama | 2023/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 150 000 | - | 8 000 | - | 15 000 |
| 22 | C1006 De Hoop DM | Stage 2: Concept/ Feasibility | Overberg | Cape Agulhas | 2023/11/01 | 2026/03/30 | Equitable Share | Transport Infrastructure | Individual Project | 100 000 | - | - | 8 000 | 33 000 |
| 23 | C1094.1 At Elands Bay | Stage 4: Design Documentation | West Coast | Cederberg | 2023/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 10 000 | - | 2 000 | 8 000 | - |
| 24 | OP7776 Goedverwacht DM | Stage 4: Design Documentation | West Coast | Bergrivier | 2024/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 20 000 | - | - | 7 000 | 8 000 |
| 25 | MR527 De Hoek DM | Stage 4: Design Documentation | Garden Route | Oudtshoorn | 2023/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 35 000 | - | 19 000 | 15 000 | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| 26 | C1229 Dual MR201 Kliprug Rd to MR191 | Stage 2: Concept/ Feasibility | Garden Route | Knysna | 2025/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 5 000 | - | - | - | 5 000 |
| 27 | DR 1399 Die Straat | Stage 4: Design Documentation | Cape Winelands | Breede Valley | 2022/07/01 | 2023/10/10 | Equitable Share | Transport Infrastructure | Individual Project | 4 000 | - | 4 000 | - | - |
| 28 | C1011 Draaiberg | Stage 5: Works | Overberg | Theewaterskloof | 2022/04/01 | 2025/07/02 | Equitable Share | Transport Infrastructure | Individual Project | 150 000 | 29 369 | 56 000 | 2 000 | - |
| 29 | DR1374 Robertson-Lange Valley DM | Stage 1: Initiation/ Pre-feasibility | Cape Winelands | Langeberg | 2023/01/10 | 2026/01/01 | Equitable Share | Transport Infrastructure | Individual Project | 7 000 | - | - | 7 000 | - |
| 30 | C1226 IDZ Access DM | Stage 5: Works | West Coast | Saldanha Bay | 2022/04/01 | 2024/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 60 000 | 15 221 | 2 000 | - | - |
| 31 | C846 Plettenberg Bay Surface 4,88km to Wittedrift | Stage 1: Initiation/ Pre-feasibility | Garden Route | Bitou | 2024/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 95 000 | - | - | - | 30 000 |
| 32 | C822.06 Sandhoogte DM | Stage 3: Design Development | Overberg | Theewaterskloof | 2024/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 25 000 | - | - | 25 000 | - |
| 33 | DR1277 Buffeljags DM | Stage 4: Design Documentation | Overberg | Swellendam | 2023/04/01 | 2025/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 30 000 | - | 2 000 | 24 000 | - |
| 34 | DR1631 Geelhoutboom DM | Stage 3: Design Development | Garden Route | Knysna | 2013/04/01 | 2026/03/31 | Equitable Share | Transport Infrastructure | Individual Project | 60 000 | 3 382 | - | 6 000 | 43 000 |
| 35 | C1047.4 Completion contract | Stage 5: Works | Garden Route | George | 2023/04/01 | 2024/03/31 | Provincial Roads Maintenance Grant | Transport Infrastructure | Individual Project | 30 000 | - | 25 100 | - | - |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| | Maalgaten Bridge | | | | | | | | | | | | | |
| **TOTAL: MAINTENANCE AND REPAIRS** | | | | | | | | | | **354 340 000** | **1 195 625** | **685 625** | **722 500** | **559 825** |
| **5. INFRASTRUCTURE TRANSFERS – CURRENT** | | | | | | | | | | | | | | |
| **Own Funds** | | | | | | | | | | | | | | |
| 1 | Financial assistance to municipalities for maintenance of Transport Infrastructure (CUR) | Packaged Programme | Western Cape | Western Cape | 2015/04/01 | 2026/04/01 | Equitable share | Transport Infrastructure | Packaged program | 40 000 | 17 746 | 4 035 | 4 000 | 4 500 |
| **TOTAL: INFRASTRUCTURE TRANSFERS - CURRENT** | | | | | | | | | | **40 000** | **17 746** | **4 035** | **4 000** | **4 500** |
| **6. INFRASTRUCTURE TRANSFERS – CAPITAL** | | | | | | | | | | | | | | |
| **Own Funds** | | | | | | | | | | | | | | |
| 1 | Financial assistance to municipalities for maintenance of Transport Infrastructure (CAP) | Packaged Programme | Central Karoo | Prince Albert | 2015/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Packaged program | 90 000 | 19 781 | - | 18 000 | 19 000 |
| 2 | Financial assistance to municipalities for construction of Transport Infrastructure (CAP) | Packaged Programme | Central Karoo | Prince Albert | 2015/04/01 | 2026/03/31 | Equitable share | Transport Infrastructure | Packaged program | 500 000 | 368 579 | 39 300 | 13 900 | 21 000 |

| Summary of details of expenditure for infrastructure by category - Programme 3 Transport Infrastructure | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Project name | Project status | District Municipality | Local Municipality | Project duration | | Source of funding | Budget programme name | Delivery Mechanism | Total project cost | Total Expenditure (until 31 March 2023) | 2023/24 | 2024/25 | 2025/26 |
| | | | | | Date: Start Note 1 | Date: Finish Note 2 | | | | R'000 | R'000 | R'000 | R'000 | R'000 |
| | | | | | | | | | | | | | | |
| **TOTAL: INFRASTRUCTURE TRANSFERS - CAPITAL** | | | | | | | | | | **590 000** | **388 360** | **39 300** | **31900** | **40 000** |
| **TOTAL INFRASTRUCTURE** | | | | | | | | | | **507 643 952** | **10 089 100** | **4 213 975** | **3 937 472** | **3 659 556** |
| | | | | | | | | | | | | | | |
| Note 1: Site handover/commencement of construction - date of letter of acceptance. | | | | | | | | | | | | | | |
| Note 2: Construction completion date (take over date) - practical completion date. | | | | | | | | | | | | | | |

# Appendix M – Job creation estimates

The job creation estimates are for the Maintenance Programme based on the 2023/24 Financial Year.

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C0733.05 | Upgrade of MR108 between TR2/2 and Mariners Way | Upgrade | Tender/Award | 2023/10/31 | 2025/12/31 | R20 000 000 | 38 | 21 | 23 |
| C0749.02 | Upgrading of MR191 from Paarl to Franschhoek | Upgrade | Tender/Award | 2023/08/31 | 2026/02/28 | R100 000 000 | 42 | 23 | 25 |
| C0802.05 | Rehab MR533 between St Helena Bay (km 13,9) and Stompneus Bay (km 23,08) | Rehabilitation | Construction | 2023/05/31 | 2024/11/30 | R107 000 000 | 166 | 91 | 100 |
| C0838.06 | Rehab & Reseal of various sections on MR269 between Hemel-en-Aarde and Sandbaai, and Geometric improvements | Rehabilitation and Reseal | Construction | 2021/09/08 | 2023/10/25 | R22 000 000 | 141 | 78 | 85 |
| C0851 | Upgrade DR1609 - Rondevlei | Upgrade | Construction | 2022/02/17 | 2024/07/02 | R47 000 000 | 47 | 26 | 28 |
| C0914 | Upgrade of MR168 (Baden Powell Drive) between Lynedoch (Km 5.88) and MR177 (Km 10.62) | Rehabilitation | Construction | 2022/01/24 | 2024/01/25 | R120 000 000 | 78 | 43 | 47 |
| C0964.02 | Upgrade of TR33/1 at Beach Boulevard West (Km 9,90) to Garret Street (Km 13.15) | Upgrade | Construction | 2022/07/28 | 2025/10/22 | R140 000 000 | 119 | 65 | 71 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C0967 | Construction of the new TR25/1 Corridor between the intersection of TR24/1 and TR25/1 to the existing Hopefield Intersection (TR21/1 and TR11/2) at Malmesbury | Upgrade - New Road | Construction | 2023/05/31 | 2027/08/31 | R200 000 000 | 80 | 44 | 48 |
| C0975.04 | Replacement of Carinus Bridge (B2918) at Velddrift | Replacement Bridge | Tender/Award | 2023/11/30 | 2025/07/31 | R20 000 000 | 40 | 22 | 24 |
| C1000 | Upgrade of TR28 Section 2 between Stanford (Km 24.00) and Gansbaai (Km 43.88) and MR4017 (Km 0.00 To Km 4.20) | Rehabilitation | Construction | 2022/08/16 | 2024/12/17 | R130 000 000 | 161 | 89 | 97 |
| C1008 | Rehabilitation of DR1688 between Calitzdorp Spa Turnoff (Km 15,64) and Oudtshoorn (Km 43,31) | Rehabilitation | Construction | 2021/11/08 | 2024/05/07 | R67 000 000 | 282 | 155 | 169 |
| C1011 | Upgrading of MR281 between Km 0.0 and Km 10.2 along Theewaterskloof Dam | Upgrade | Construction | 2022/07/13 | 2023/09/12 | R56 000 000 | 128 | 70 | 77 |
| C1025.01 | Upgrade of Refinery Interchange on TR11/1 (km 4.1) | Upgrade | Construction | 2021/07/30 | 2024/02/06 | R75 000 000 | 284 | 156 | 170 |
| C1025.10 | Periodic Maintenance of TR11/1 (Route N7) from Wingfield Interchange (Km 0.00) to Bosmansdam Road Interchange (Km 2.00) | Periodic Maintenance | Construction | 2023/05/02 | 2023/09/02 | R25 000 000 | 38 | 21 | 23 |
| C1038.02 | Safety Improvement N7 Potsdam - Melkbos - Van Schoorsdrift I/C | Safety Improvement | Tender/Award | 2023/08/31 | 2026/01/31 | R40 000 000 | 65 | 36 | 39 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1047.04 | Replacement Contract: The widening of Bridge No. 2221 over the Maalgate River at 15.1km on TR2/9 | Widening of Bridge | Construction | 2022/09/16 | 2023/11/15 | R25 100 000 | 49 | 27 | 29 |
| C1049.03 | Upgrading of DR1098 (Km 5,47 To Km 8,79) and Rehabilitation of DR1098 (Km 8,79 To Km 14,24) | Upgrade and Rehabilitation | Tender/Award | 2023/08/31 | 2025/03/31 | R60 000 000 | 73 | 40 | 44 |
| C1088.01 | Periodic Maintenance on MR267 - Stanford to (N2) Riviersonderend (km 0.34 to km 50.58) | Periodic Maintenance | Construction | 2021/10/19 | 2023/05/19 | R35 000 000 | 9 | 5 | 5 |
| C1101 | Strengthening of TR1/1 between George (Km 19.36) and Oudtshoorn (Km 24.55) | Rehabilitation | Tender/Award | 2023/07/31 | 2024/11/30 | R35 000 000 | 120 | 66 | 72 |
| C1102.01 | Support Services - MR201(R301) between the N1 (Paarl) and the R45 (Wemmershoek) | Upgrade | Construction | 2022/01/13 | 2023/10/06 | R90 000 000 | 140 | 77 | 84 |
| C1102.02 | Upgrade of DR1413 From Km 6.59 To Km 7.94 Near Wellington | Upgrade | Construction | 2022/11/23 | 2024/07/24 | R20 000 000 | 25 | 14 | 15 |
| C1104 | Periodic Maintenance of TR33/4 0.0 to km 19.3 De Rust/Klaarstroom, and TR34/2 km 19.0 to km 47.4 Klaarstroom/Prince Albert | Periodic Maintenance | Construction | 2022/04/04 | 2023/07/04 | R20 000 000 | 60 | 33 | 36 |
| C1114.25 AD | Maintenance and control of vegetation in road reserves falling within the Cape Winelands District Municipality - Langeberg/Drakenstein Municipalities | Vegetation control | Tender/Award | 2024/02/01 | 2024/07/31 | R3 082 148 | 12 | 7 | 7 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1114.25 AE | Maintenance and control of vegetation in road reserves falling within the Cape Winelands District Municipality - Witzenberg Municipality | Vegetation control | Tender/Award | 2024/02/01 | 2024/07/31 | R2 925 887 | 12 | 7 | 7 |
| C1114.25 AF | Maintenance and control of vegetation in road reserves falling within the Cape Winelands District Municipality - Stellenbosch/Breede Valley Municipalities | Vegetation control | Tender/Award | 2024/02/01 | 2024/07/31 | R2 917 993 | 12 | 7 | 7 |
| C1114.29 AD | Maintenance and control of vegetation in road reserves falling within the Overberg District Municipality – Cape Agulhas / Overstrand | Vegetation control | Tender/Award | 2024/02/01 | 2024/07/31 | R2 933 179 | 12 | 7 | 7 |
| C1114.29 AE | Maintenance and control of vegetation in road reserves falling within the Overberg District Municipality – Overstrand / Swellendam | Vegetation control | Tender/Award | 2024/02/01 | 2024/07/31 | R3 010 265 | 12 | 7 | 7 |
| C1114.29 AF | Maintenance and control of vegetation in road reserves falling within the Overberg District Municipality – Theewaterskloof | Vegetation control | Tender/Award | 2024/02/01 | 2024/07/31 | R2 993 746 | 12 | 7 | 7 |
| C1116.01 | Periodic Maintenance on TR02202 and MR00316 between Ceres & Touwsrivier | Periodic Maintenance | Tender/Award | 2023/07/01 | 2026/09/01 | R100 000 000 | 54 | 30 | 32 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1119 | The Replacement of Structures on DR1218, DR1252 and OP4032 – Overberg District Municipality | Bridge repairs | Construction | 2022/02/08 | 2023/05/03 | R500 000 | 1 | 1 | 1 |
| C1125 | Periodic Maintenance on TR83/1, TR83/2, TR31/5 and MR365 - Riversdale/Ladismith Area | Periodic Maintenance | Construction | 2023/04/20 | 2025/02/03 | R125 000 000 | 69 | 38 | 41 |
| C1141 | Periodic Maintenance of TR03103, MR00295, MR00294, DR01356 and OP06046 - Montagu | Periodic Maintenance | Tender/Award | 2023/07/18 | 2025/07/18 | R90 000 000 | 43 | 24 | 26 |
| C1142 | The upgrade of DR1099, strengthening of MR205 and periodic maintenance of MR189, DR1090 & OP5215 near Klapmuts | Upgrade, Rehabilitation and Periodic Maintenance | Tender/Award | 2023/08/31 | 2025/03/31 | R65 759 000 | 116 | 64 | 70 |
| C1143 | Periodic Maintenance of TR03201, TR03103, TR06501, DR01354, DR01352, OP06074, OP06072 and OP06069 - Barrydale, Suurbraak and Swellendam | Periodic Maintenance | Construction | 2022/02/21 | 2023/11/21 | R40 000 000 | 80 | 44 | 48 |
| C1145 | Periodic Maintenance of DR01123 (Km 0,00 To Km 12,25), MR00174 (Km17,25 To Km 31,70) and TR02501 (Km 37,00 To Km 38,60 & Km 39,20 To Km 42,21) | Periodic Maintenance | Tender/Award | 2023/07/31 | 2024/07/31 | R80 000 000 | 100 | 55 | 60 |
| C1146 | Periodic Maintenance of MR00351, MR00355, DR01615, DR01600 and DR01627 - Knysna | Periodic Maintenance | Tender/Award | 2023/07/24 | 2025/07/24 | R60 000 000 | 56 | 31 | 34 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1147 | Periodic Maintenance of MR00552, MR00546, DR02220 - Lutzville | Periodic Maintenance | Construction | 2023/05/31 | 2026/05/31 | R57 000 000 | 37 | 20 | 22 |
| C1154 | Periodic Maintenance of TR03302 - Hartenbos to Oudtshoorn | Periodic Maintenance | Tender/Award | 2023/08/31 | 2025/01/31 | R145 000 000 | 70 | 39 | 42 |
| C1155.06 | Emergency Flood damage replacement of OP4906 causeway near Hermanus | Replacement | Construction | 2022/10/03 | 2023/04/02 | R1 650 000 | 17 | 9 | 10 |
| C1155.10 | Emergency repair of flood damage in Overberg DM: Stinkrivier at km 9.0 | Replacement | Tender/Award | 2023/09/30 | 2024/03/31 | R6 000 000 | 40 | 22 | 24 |
| C1158.02 | Emergency replacement of bridge B0495 along DR01489 at km 0.53 | Replacement Bridge | Tender/Award | 2024/01/31 | 2024/08/31 | R9 000 000 | 45 | 25 | 27 |
| C1180.01 | Maintenance of Streetlighting in City of Cape Town | Maintenance of Streetlighting | Construction | 2021/11/01 | 2024/10/31 | R19 838 935 | 15 | 8 | 9 |
| C1183 | Periodic Maintenance of TR03305 | Periodic Maintenance | Construction | 2021/09/07 | 2023/06/06 | R75 000 000 | 383 | 211 | 230 |
| C1203 | The periodic maintenance of TR03101, DR1377, DR01400 between Worcester and Robertson and TR03002, DR01347, DR01379 between Worcester and Villiersdorp | Periodic Maintenance | Tender/Award | 2023/08/31 | 2025/03/31 | R50 000 000 | 54 | 30 | 32 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1205 | The periodic maintenance of MR291, MR289, DR1358, DR1363 and DR1365 | Periodic Maintenance | Tender/Award | 2023/08/31 | 2024/12/31 | R40 000 000 | 70 | 39 | 42 |
| C1212.01 | RRM in the Cape Town Metro | Routine Maintenance | Tender/Award | 2022/05/26 | 2025/05/31 | R30 000 000 | 120 | 66 | 72 |
| C1213 | Periodic Maintenance of TR16/8 (Km 43.48 – Km 48.12) and TR16/9 (Km 0.00 -Km 42.05) between the Northern Cape Border And Murraysburg | Periodic Maintenance of TR16/8 and TR16/9 | Tender/Award | 2023/08/02 | 2026/08/02 | R57 000 000 | 20 | 11 | 12 |
| C1214 | The periodic maintenance of MR331 between Still Bay and Groot Jongensfontein | Periodic Maintenance | Tender/Award | 2023/07/31 | 2024/02/28 | R26 000 000 | 70 | 39 | 42 |
| C1216 | The Periodic Maintenance of MR310, DR1458 and DR1487 between Ceres and Op Die Berg | Periodic Maintenance | Tender/Award | 2023/09/30 | 2026/01/31 | R50 000 000 | 75 | 41 | 45 |
| C1218.01 (DC) | Data Capturing | Data Capturing | Tender/Award | 2023/04/01 | 2024/03/31 | R200 000 | 7 | 4 | 4 |
| C1218.01 (TC) | Manual traffic counting works | Manual traffic counting | Tender/Award | 2023/04/01 | 2024/03/31 | R200 000 | 20 | 11 | 12 |
| C1230 | The periodic maintenance of TR21/2, MR559 and OP7643 in the Saldanha Bay area | Periodic Maintenance | Tender/Award | 2023/08/31 | 2024/07/31 | R65 000 000 | 58 | 32 | 35 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1236.01 | Overload Control at the Beaufort West Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R3 668 307 | 28 | 15 | 17 |
| C1236.02 | Overload Control at the Somerset West Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R2 439 651 | 20 | 11 | 12 |
| C1236.03 | Overload Control at the Klawer Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R2 112 880 | 19 | 10 | 11 |
| C1236.04 | Overload Control at the Moorreesburg Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R2 235 819 | 18 | 10 | 11 |
| C1236.05 | Overload Control at the Vissershok Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R3 981 054 | 21 | 12 | 13 |
| C1236.06 | Overload Control at the Joostenberg Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R2 378 152 | 21 | 12 | 13 |
| C1236.07 | Overload Control at the Rawsonville Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R2 439 651 | 16 | 9 | 10 |
| C1236.08 | Overload Control at the Swellendam Weighbridge LB | Overload control | Construction | 2022/10/01 | 2023/09/30 | R2 378 152 | 19 | 10 | 11 |
| C1236.17 | Beaufort West Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R2 608 000 | 13 | 7 | 8 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1236.18 | Somerset West Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R1 458 000 | 13 | 7 | 8 |
| C1236.19 | Klawer Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R1 581 000 | 13 | 7 | 8 |
| C1236.20 | Moorreesburg Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R1 433 000 | 13 | 7 | 8 |
| C1236.21 | Vissershok Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R1 411 000 | 13 | 7 | 8 |
| C1236.22 | Joostenbergvlakte Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R1457 000 | 13 | 7 | 8 |
| C1236.23 | Rawsonville Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R1 443 000 | 13 | 7 | 8 |
| C1236.24 | Swellendam Weighbridge Services LB | Overload control | Construction | 2022/10/01 | 2024/01/31 | R1 528 000 | 13 | 7 | 8 |
| C1237.02 | Routine Road Maintenance in Elands Bay and Vredendal Area | Routine Maintenance | Construction | 2022/10/01 | 2023/06/30 | R2 250 000 | 44 | 24 | 26 |
| C1237.03 | Routine Road Maintenance in the Yzerfontein and Malmesbury Area | Routine Maintenance | Construction | 2022/10/01 | 2023/06/30 | R2 800 000 | 57 | 31 | 34 |

| CONTRACT NO. | CONTRACT DESCRIPTION | SCOPE | PHASE | START DATE | END DATE | ESTIMATED VALUE | Projected Work Opportunities created | Projected Number of Work Opportunities (youth) | Projected Number of Work Opportunities (women) |
|---|---|---|---|---|---|---|---|---|---|
| C1237.04 | Routine Road Maintenance in Porterville East Area | Routine Maintenance | Construction | 2022/10/01 | 2023/06/30 | R2 100 000 | 26 | 14 | 16 |
| C1237.05 | Routine Road Maintenance in Porterville West Area | Routine Maintenance | Construction | 2022/10/01 | 2023/06/30 | R2 500 000 | 27 | 15 | 16 |
| C1238.01 | Vegetation Maintenance in the Portville Area | Vegetation control | Construction | 2022/10/01 | 2023/06/30 | R1 600 000 | 27 | 15 | 16 |
| C1238.02 | Vegetation maintenance in Malmesbury Area | Vegetation control | Construction | 2022/10/01 | 2023/06/30 | R1 500 000 | 16 | 9 | 10 |
| C1238.03 | Vegetation Maintenance in the Elands Bay Area | Vegetation control | Construction | 2022/10/01 | 2023/06/30 | R1 200 000 | 15 | 8 | 9 |
| C1238.04 | Vegetation Maintenance in the Vredendal Area | Vegetation control | Construction | 2022/10/01 | 2023/06/30 | R1 450 000 | 24 | 13 | 14 |
| C1238.05 | Vegetation Maintenance in the Yzerfontein Area | Vegetation control | Construction | 2022/10/01 | 2023/06/30 | R2 000 000 | 18 | 10 | 11 |
| **TOTALS** | | | | | | | **4 397** | **2 418** | **2 638** |

# Appendix N – Contractor development training

Status for the entries is off-site.

The indirect contractor development estimates are presented in the table below and was collected during 2022/23.

| CONTRACT | CONTRACT DESCRIPTION | INDIRECT TARGETTING OF SMMEs | OWNERSHIP BY YOUTH | OWNERSHIP BY WOMEN | OWNERSHIP BY PERSONS WITH DISABILITY |
|---|---|---|---|---|---|
| C914 | Upgrade of MR168 (Baden Powell Drive) between Lynedoch (Km 5.88) and MR177 (Km 10.62) | 14 | 0 | 5 | 0 |
| C1000 | Upgrade of TR28 Section 2 between Stanford (Km 24.00) and Gansbaai (Km 43.88) and MR4017 (Km 0.00 To Km 4.20) | 6 | 1 | 1 | 0 |
| C1008 | Rehabilitation of DR1688 between Calitzdorp Spa Turnoff (Km 15,64) and Oudtshoorn (Km 43,31) | 8 | 2 | 3 | 0 |
| C1088.01 | Periodic Maintenance on MR267 - Stanford to (N2) Riviersonderend (km 0.34 to km 50.58) | 4 | 0 | 4 | 0 |
| C1143 | Periodic Maintenance of TR03201, TR03103, TR06501, DR01354, DR01352, OP06074, OP06072 and OP06069 - Barrydale, Suurbraak and Swellendam | 8 | 3 | 4 | 0 |
| C1152 | Westcoast Rd - Atlantis-Yesterfontein | 10 | 0 | 1 | 0 |
| C1183 | Periodic Maintenance of TR03305 | 31 | 6 | 17 | 0 |
| **Total** | | **81** | **12** | **35** | **0** |

# Appendix O – Standard NDOT and WCG Table of contents comparison

| Standard NDOT RAMP Table of contents | WCG Reference Guide |
|---|---|
| 1 INTRODUCTION | 1 Introduction (Page 1) |
| 1.1 Background | 1.1 Background (Page 3) |
| 1.2 Goals and Objectives of RAMP | 1.2 Goals and objectives of the RAMP (Page 4) |
| 1.3 Plan Framework | 1.3 RAMP framework (Page 6) |
| 1.4 Planning Approach and Methodology | 1.4 The asset management approach to planning (Page 9) |
| 1.5 Gap Analysis of Asset Management Maturity Level | Appendix C |
| 2 THE ROAD NETWORK | 2 The Road Network (Page 26) |
| 2.1 The Provincial Road Network | 2.4 Road carriageway length (Page 28) |
| 2.2 The Provincial Bridge and Major Culverts | 2.8 Structural data (Page 34) |
| 3 LEVEL OF SERVICE | 3 Level of Service (Pages 36-39) |
| 3.1 Departmental Norms and Standards | |
| 3.2 Current Level of Service | |
| 3.3 Desired Level of Service | |
| 3.4 Usage Data | |
| 3.5 Condition Assessment Data | |
| 3.6 Minimum Condition and Function Levels | |
| 4 CURRENT ASSET CONDITION AND PERFORMANCE | 4 Situational Analysis (Page 40) |
| 4.1 Network Inventory | 4.1 Inventory Data (Page 40) |
| 4.2 Usage of Assets | 4.2 Usage of the Assets (Page 44) |
| 4.3 Engineering Condition of Assets | 4.3 Engineering Condition of the Assets (Page 48) |
| 4.4 Paved Roads | 4.3.2 Visual condition of the paved road network (Page 48) |
| 4.5 Pavement Condition per District | 4.3.3 Visual condition of paved per district municipality (Page 51) |
| 4.6 VCI of the Paved Road Network per District | 4.3.4 Visual condition of paved per RCAM Class (Page 54) |
| 4.7 Unpaved Roads | 4.3.5 The visual condition of the unpaved road network (Page 57) |
| 4.8 Bridges | 4.3.9 Visual condition indices of Road Structures (Page 61) |
| 4.9 Comparative Condition of Assets | 4.5 Comparative conditions (Page 85) |
| 4.10 Asset Valuation | 4.7 Asset valuation (Page 89) |
| 4.11 Remaining Useful Life (RUL) | 4.8 Remaining useful lives of assets (Page 91) |
| 4.12 Trend Analysis | 4.9 Trend analysis (Page 96) |
| 4.13 Performance Gap Analysis | 4.10 Performance gap analysis (Page 103) |
| 4.14 Road Safety Assessment | 4.14 Road Safety Assessments (Pages 105) |
| 5. NEEDS DETERMINATION | 5 Needs Determination (Pages 109 - 178) |

| Standard NDOT RAMP Table of contents | WCG Reference Guide |
| --- | --- |
| 5.1 Demand Forecast/Anticipating Community Needs | |
| 5.2 Demand Management Plan | |
| 5.3 Need Determination for the Current Road Network | |
| 5.4 Budget Scenarios Analysed | |
| 6 Asset management plans | 6 Asset management plans (Page 179) |
| 7 FINANCIAL SUMMARY | 7 Financial summary (Page 181) |
| 7.1 Overview of budget and MTEF estimates | 7.1 Financial statements and projections (Page 181) |
| 7.2 Funding Strategy | 7.4 Funding strategy (Page 190) |
| 8 ORGANISATIONAL AND SUPPORT PLAN STRUCTURE | 8 Organisational and support plan structure (Page 186) |
| 8.1 Departmental Programme Human Resources Plan | 8 Organisational and support plan structure (Pages 193 - 209) |
| 9 PLAN IMPROVEMENT AND MONITORING | 9 Plan improvement and monitoring (Page 210) |
| 9.1 Performance Measures | 9.1 Performance measures (Page 210) |
| 9.2 Improvement Programme | 9.2 Improvement Programme (Page 210) |
| 9.3 Monitoring and Review Procedures | 9.2.2 Monitoring and review procedures and reporting (Page 204) |
| 9.4 Strategic Network (KPI) | 9.3 Strategic Network (Page 211) |
| 10 JOB CREATION AND SKILLS DEVELOPMENT | 10 Job creation and skills development (Page 214) |
| 10.1 Number of jobs created | 10.2 Number of jobs created (Page 217) |
| 10.2 Contractor Development | 10.4 Contractor Development (Page 219) |
| 11 SWOT ANALYSIS | 11 Strength-weaknesses-opportunities-threats (SWOT) and risk analysis (Page 220) |
| 12 CONCLUSIONS | 12 Conclusions and recommendations (Page 227) |
| 13 REFERENCES AND APPENDICES | 13 Reference (Page 228) |

# Appendix P – Road Network Information

| 2022 MANAGED ROAD NETWORK LENGTH (Data Source: RNIS) | |
|---|---|
| **Pavement type** | **Length of Road Network** |
| Flexible | 7 316.38 |
| Unpaved | 10 344.06 |

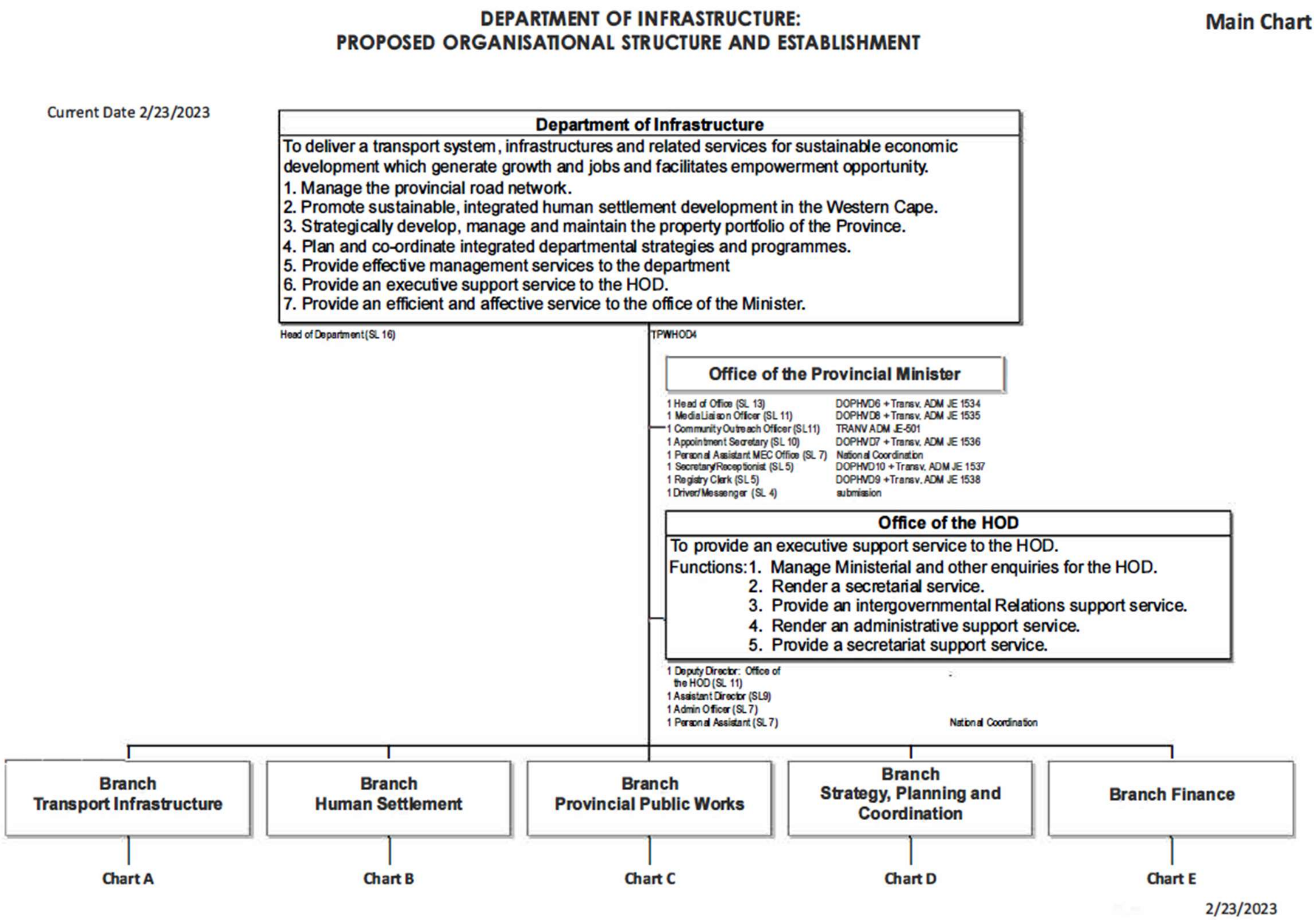
| | Flexible | Unpaved |
|---|---|---|
| Strategic Road Network (KPI) | 3 236.66 | 0.00 |

| 2022 Total PROCLAIMED Road Network Per Municipal District/Region (Data Source: RNIS) | | |
|---|---|---|
| **District Name** | **Flexible** | **Unpaved** |
| Cape Winelands | 1 764.87 | 2 872.95 |
| Central Karoo | 633.42 | 6 143.13 |
| Garden Route (Eden) | 1 555.21 | 5 303.64 |
| Overberg | 989.13 | 2 720.14 |
| West Coast | 1 732.00 | 7 830.78 |
| City of Cape Town (DMC) | 278.81 | 14.53 |
| UniCity | 362.94 | 16.72 |
| **Total** | **7 316.38** | **24901.89** |

| | Bridges | Major Culverts |
|---|---|---|
| Structures (2020 assessment) | 877 | 1 800 |

| 2022 MANAGED Road Network - Road Classification (Data Source: PMS/GRMS) | | | |
|---|---|---|---|
| **Road Class** | **Flexible** | **Unpaved** | **Total** |
| R1 & U1 | 237.69 | 0,00 | 237,69 |
| R2 & U2 | 2 934.14 | 131.24 | 3 065.38 |
| R3 & U3 | 3 014.87 | 1 722.43 | 4 737.30 |
| R4 & U4 | 1 221.49 | 8 165.23 | 9 386.72 |
| R5 & U5 | 45.15 | 325.16 | 370.31 |
| **Total** | **7 453.34** | **10 344.06** | **17 797.40** |

# Appendix Q – Organisational Structure



**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: BRANCH TRANSPORT INFRASTRUCTURE**

Chart A

Current Date 1/25/2023

**Branch Transport Infrastructure**

Purpose:To manage the provincial road network.

Functions:
1. Ensure the development and maintenance of institutional strategies and systems for roads programme, asset management and transversal operations.
2. Ensure the optimal functioning of the road network through the appropriate management of the present network and planning of future needs.
3. Ensure the optimal design of road infrastructure, both through outsourcing and in-house practises, is undertaken in terms of appropriate standards.
4. Ensure the outsourcing of road construction and maintenance contracts is undertaken in terms of relevant legislation, departmental strategies and specifications.
5. Ensure the provision of in-house civil and mechanical engineering operations is optimally undertaken in terms of relevant legislation and departmental strategies.

1 Deputy Director General: Roads (SL 15)
1 Office Manager (SL 9)
1 Personal Assistant (SL 7)
1 Administrative Officer (SL 7)

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:12:00 +02'00'

SIGNATURE

| Chief Directorate Road Programme Management | Chief Directorate Road Planning | Chief Directorate Road Design | Chief Directorate Road Contracts | Chief Directorate Road Departmental Operations |
|---|---|---|---|---|
| See Chart A1 | See Chart A2 | See Chart A3 | See Chart A4 | See Chart A5 |

# DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: CHIEF DIRECTORATE ROAD PROGRAMME MANAGEMENT

Chart A1

Current Date 1/25/2023

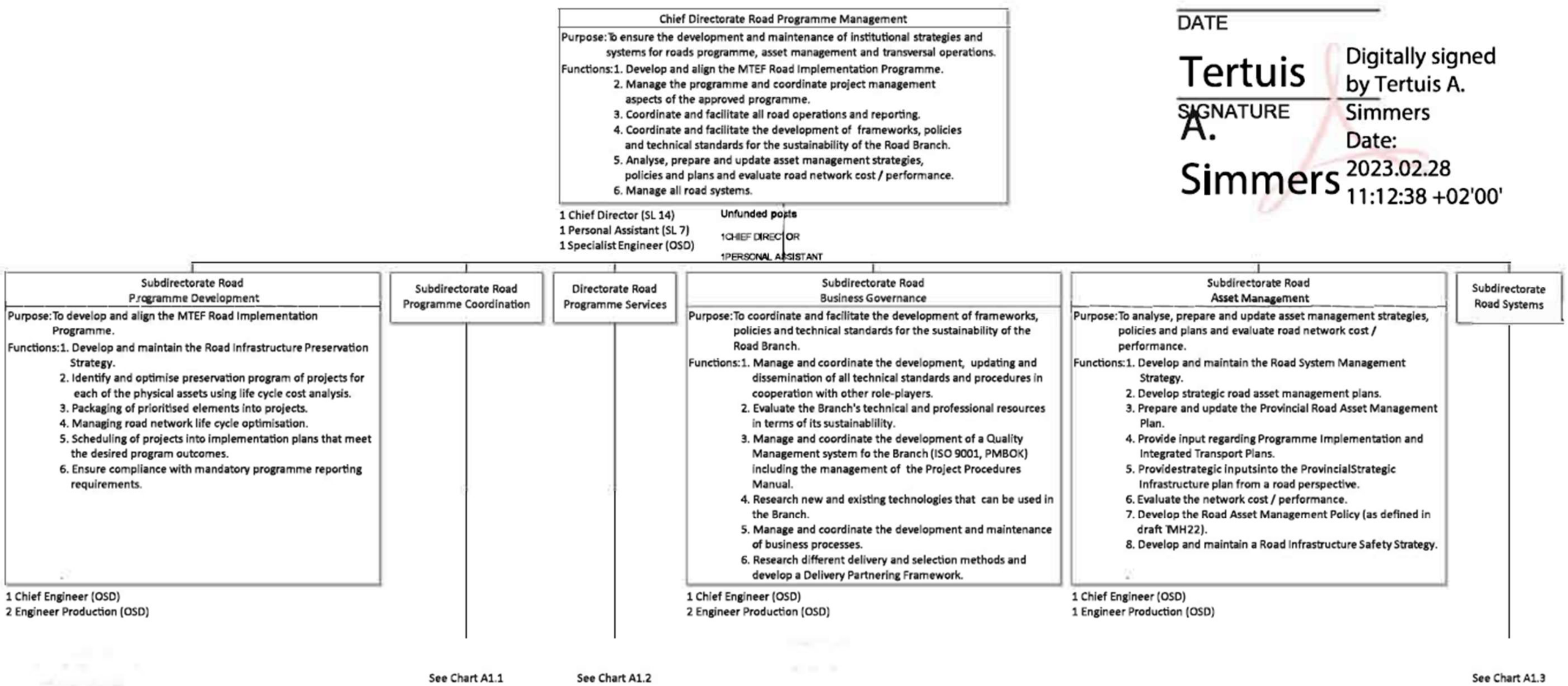
APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers

SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:12:38 +02'00'



**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT:**
**CHIEF DIRECTORATE ROAD PROGRAMME MANAGEMENT**

Chart A1.1

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:13:07 +02'00'

SIGNATURE

**Subdirectorate Road Programme Coordination**

Purpose: To manage the programme and coordinate project management aspects of the approved programme.

Functions:
1. Compile a Project Initiation Report outlining the high-level business case together with the estimated project cost and proposed schedule for a single project or a group of projects.
2. Draft a multi-year infrastructure plan and budget.
3. Draft an Infrastructure Programme Management Plan for MTEF which includes delivery management and procurement strategy and plan.
4. Coordinate the processes with regard to the preparation and briefing, preliminary design for roads, detail design and production information.
5. Manage consultants in terms of contracts in the Planning and Design stage.
6. Perform overall quality assurance on all information captured on the IRM and Departmental Project Management System.
7. Identify and facilitate timeous actions by other stakeholders.
8. Manage the Project Office.

1 Chief Engineer (OSD)
1 Administrative Officer (SL7)
4 Engineer Production (OSD)
3 Control Engineering Technologist (OSD)
1 Project Office Manager (SL9)
3 Project Administrator (SL8)
3 Data and Information Administrator (SL7)

## DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: DIRECTORATE ROAD PROGRAMME SERVICES

Chart A1.2

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
SIGNATURE
Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:13:36 +02'00'

### Directorate Road Programme Services

Purpose: To coordinate and facilitate all road operations and reporting.

Functions:
1. Ensure the processing of environmental authorisation applications for development and utilisation in terms of the National Environmental Management Act (NEMA).
2. Coordinate and facilitate all aspects of HR, Finance, SCM, Reporting and Professional Development for the Branch Roads.

1 Director (SL 13)
1 Personal Assistant (SL 7)

### Division Environmental Compliance

Purpose: To ensure the processing of environmental authorisation applications for development and utilisation in terms of the National Environmental Management Act (NEMA).

Functions:
1. Administer (process), implement and make decisions (assess and adjudicate) on development applications that require authorisation in terms of NEM, EIA regulations and NEMA.
2. Audit compliance with environmental authorisations issued in terms of the NEM, EIA regulations and NEMA.
3. Provide advice, support and comment where necessary to other stakeholders with regard to environment impact management.
4. Develop and implement various environmental impact management tools (policy, norms and standards, environmental frameworks, guideline documents, etc) for Roads in conjuction with DEADP.

1 Control Environmental Officer (OSD)
4 Specialised Environmental Officer (OSD)

### Subdirectorate Reporting, Coordination & Professional Development

Purpose: To coordinate and facilitate all aspects of HR, Finance, SCM, Reporting and Professional Development for the Branch Roads.

Functions:
1. Coordinate and facilitate all aspects of HR, Finance, Logistics and reporting (internal and external) for the branch.
2. Coordinate and facilitate all aspects regarding candidate programme and professional development in the Branch.

1 Deputy Director: Admin & Professional Develop (SL11)

### Division Administration and Reporting

Purpose: To coordinate and facilitate all aspects of HR, Finance, SCM and reporting (internal and external) for the Branch.

Functions:
1. Coordinate generic administrative functions (HR, Fin, Logistics) and liaise with relevant Head Office component (e.g. CRU, Finance, etc.).
2. Provide a comprehensive secretariat and line administrative service, inclusive of internal and external reporting for the Branch.

1 Assistant Director (SL9)
2 Administrator Branch Coord (SL7)
2 Administrator Secret & Line Supp (SL7)
1 Administration Clerk (SL 5)

### Division Candidate Programme and Professional Development

Purpose: To coordinate and facilitate all aspects regarding candidate programme and professional development

Functions:
1. Coordinate and facilitate all administrative aspects of professional development for the roads engineering professionals (engineers, technicians, technologists).
2. Coordinate and facilitate all administrative aspects of the roads candidate programme.
3. Train artisans.

~~ASSISTANT DIRECTOR~~

1 Assistant Director (SL 9)
1 Administrator Profe Dev Roads (SL7)
1 Technical Training Officer (SL8)
3 Administration Clerk (SL 5)

## DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: SUBDIRECTORATE ROAD SYSTEMS

Chart A1.3

APPROVED BY MEC
MR T SIMMERS

Current Date 1/25/2023

DATE

SIGNATURE

Tertuis A. Simmers

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:14:17 +02'00'

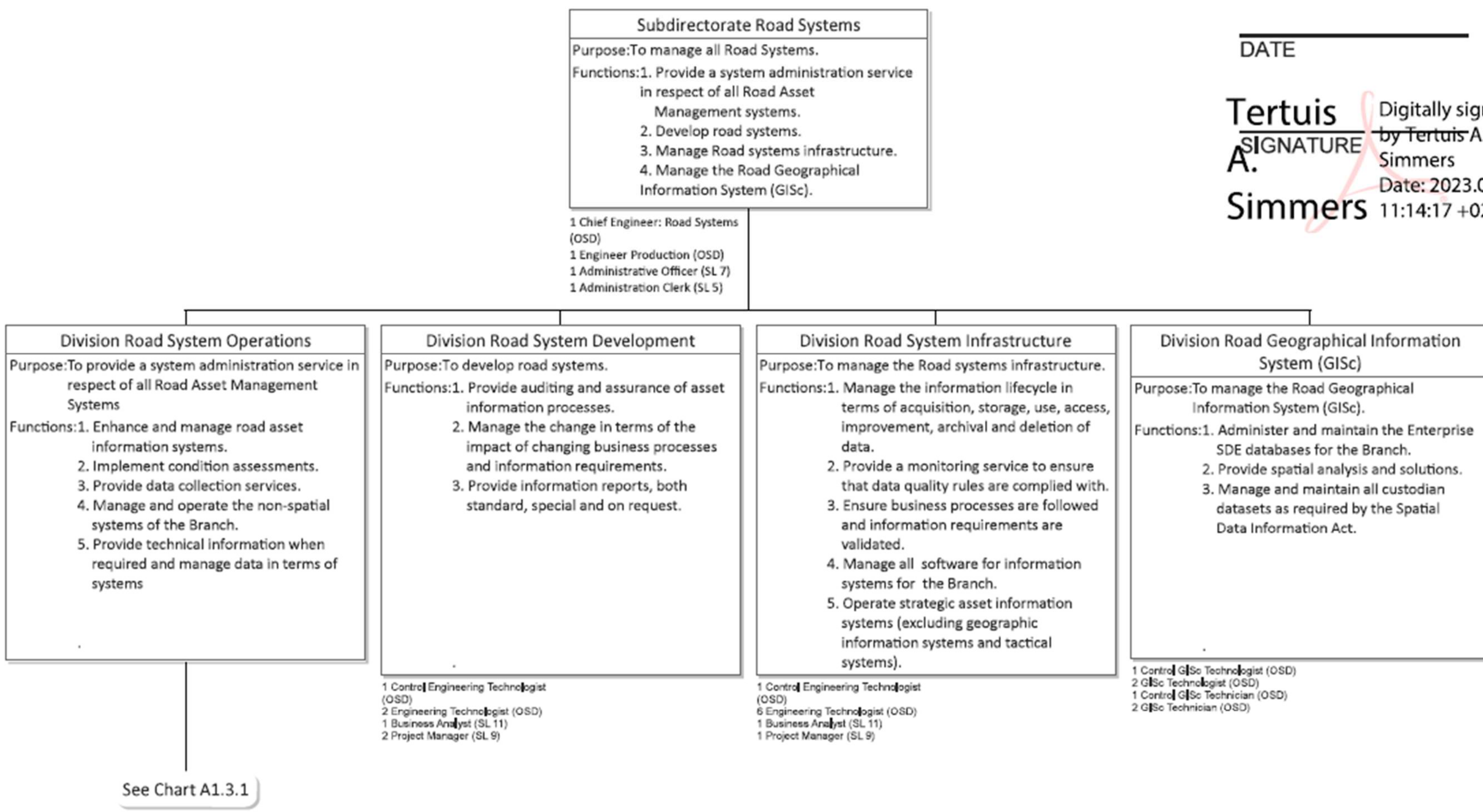


Chart A1.3.1

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: SUBDIRECTORATE ROAD SYSTEMS**

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

SIGNATURE:

Tertuis A. Simmers

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:14:38 +02'00'

**Division Road System Operations**

1 Control Engineering Technologist (OSD)

**Road Network (RNIS)**

1 Control Engineering Technician (OSD)
2 Engineering Technician Production (OSD)

**Traffic (TCS,PAS/Accident Data Centre )**

1 Engineering Technologist (OSD)
2 Engineering Technician Production (OSD)
5 Data Verifier (SL5)
5 Data Capturer (SL4)

**Paved (PMS,VisMUN,HDM4,VOC, DSC)**

2 Control Engineering Technician (OSD)
1 Engineering Technologist (OSD)
6 Engineering Technician Production (OSD)

**Un - Paved (GRMS, MIMS)**

1 Control Engineering Technician (OSD)
1 Engineering Technologist (OSD)
2 Engineering Technician Production (OSD)

**Structures (BMS)**

1 Control Engineering Technician (OSD)
1 Engineering Technician Production (OSD)

## DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT:
## CHIEF DIRECTORATE ROAD PLANNING

Chart A2

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

SIGNATURE

Tertuis A. Simmers

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:15:10 +02'00'

### Chief Directorate Road Planning

Purpose: To ensure the optimal functioning of the road network throught the approriate management of the present network and planning of future needs.

Functions:
1. Manage the planning of the declared road network in terms of new infrastructure identification needs assessment and economic evaluation.
2. Manage the operational use of the declared road network in terms of mobility, access, compliance with legislative doctrines and usage of road reserves.
3. Manage all processes regarding the proclamation of provincial roads, expropriation of land and technical cooperation with other spheres of government.

1 Chief Director (SL 14)
1 Personal Assistant (SL 7)
1 Specialist Engineer (OSD)

### Directorate Road Planning Services

See Chart A2.1

### Subdirectorate Road Investment Planning

Purpose: To manage the planning of the declared road network in terms of new infrastructure identification needs assessment and economic evaluation.

Functions:
1. Identify new infrastructre projects to address gaps in the road network in response to future demand and in support of growth and development.
2. Develop and maintain the Road Investment (New Infrastructure) Strategy.
3. Identify and optimise investment programme for each of the New Roads using the cycle cost analysis.
4. Identify and develop Corridor Management Strategies using transport models.

1 Chief Engineer (OSD)
3 Engineer Production (OSD)

### Subdirectorate Road Use Management

Purpose: To manage the operational use of the declared road network in terms of mobility, access, compliance with legislative doctrines and usage of road reserves.

Functions:
1. Develop and maintain road use management strategies.
2. Manage the impact of spatial planning on declared roads - manage infrastructural requirements in terms of the Western Cape Transport Infrastructure Act.
3. Control access to roads declared in terms of the Western Cape Transport Infrastrucutre Act.
4. Manage usage of the road reserve through judicious approval of way-leaves.
5. Evaluate proposals affecting the road network.
6. Manage legal compliance with the provisions of the Western Cape Transport Infrastructure Act.

1 Chief Engineer (OSD)
2 Engineer Production (OSD)

## DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: DIRECTORATE ROAD PLANNING SERVICES

Chart A2.1

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

SIGNATURE

Tertuis A. Simmers

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:15:33 +02'00'

### Directorate Road Planning Services

Purpose: To manage all processes regarding the proclamation of provincial roads, expropriation of land and technical cooperation with other spheres of government.

Functions:
1. Manage processes for the acquisition / expropriation, transfer and alienation of land.
2. Manage processes for the proclamation of provincial roads and technical services for road use.
3. Ensure technical cooperation between different spheres of government.

1 Director (SL 13)
1 Personal Assistant (SL 7)

### Subdirectorate Road Ownership and Expropriation

Purpose: To manage processes for the acquisition / expropriation, transfer and alienation of land.

Functions:
1. Manage the permanent and temporary acquisition/appropriation of immovable assets required for road purposes.
2. Manage the process to survey and transfer immovable road assets into the name of the Roads Trustees in terms of the Roads Ordinance 19 of 1976.
3. Manage and maintain asset register of all land acquired/ expropriated for road purposes.
4. Manage and consider applications by local authorities to acquire/expropriate land for road purposes with the aid of subsidy from department.
5. Manage the process to consider applications to alienate superfluous road reserve land.
6. Manage and consider applications by local authorities to alienate superfluous road reserve land acquired with the aid of subsidy.
7. Manage the transfer of land to other road authorities.
8. Manage proposals/applications affecting the provincial proclaimed road network.

1 Deputy Director (SL 11)
1 Assistant Director: Road Assets & Ownership (SL 9)
1 Assistant Director: Acquisition & Transfer (SL 9)
3 Admin Officer: Ownership Enquiries and Mun Acc (SL 7)
3 Admin Officer: Acquisitions & Exprop (SL 7)
3 Admin Officer: Asset Man & Alienation (SL 7)
3 Admin Officer: Survey & Transfers (SL 7)

### Subdirectorate Proclamation and Road Use

Purpose: To manage processes for the proclamation of provincial roads and technical services for road use.

Functions:
1. Coordinate and administer all technical input of proposed land use changes and their impact on the proclaimed road network.
2. Manage the processes for the proclamation, de-proclamation, closing, diversion and alteration of the classification of proclaimed provincial roads.
3. Manage and maintain all Provincial Road Network related proclamations and Road Location Plans.

1 Control Engineering Technologist (OSD)
1 Engineering Technologist (OSD)
2 Control Engineering Technician (OSD)
3 Engineering Technician (OSD)
1 Assistant Director: Proclamations and Road Use (SL 9)
1 Administrative Officer (SL 8)
3 Administrative Officer Proclamations (SL 7)
3 Technical Assistant (SL 6)
1 Administration Clerk (SL 5)

### Subdirectorate Intergovernmental Coordination

Purpose: To ensure technical cooperation between different spheres of government.

Functions:
1. Manage all road infrastructure components of Provincial and Departmental Plans within the joint planning environments.
2. Coordinate the inputs for identifying Regional level projects in terms of roads infrastructure (new & preservation).
3. Manage and engage in terms of related infrastructure planning, agreements and subsidy arrangements for all spheres of government, provided for Legislation (excluding departmental, agency functions for C municipalities).
4. Participate in, and comment on, regional road and transport integrated infrastructure planning processes and requirements across municipal borders.

1 Control Engineering Technologist (OSD)
1 Engineering Technologist (OSD)
2 Engineering Technician Production (OSD)
1 Administrative Officer (SL 7)

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT:**
**CHIEF DIRECTORATE ROAD DESIGN**

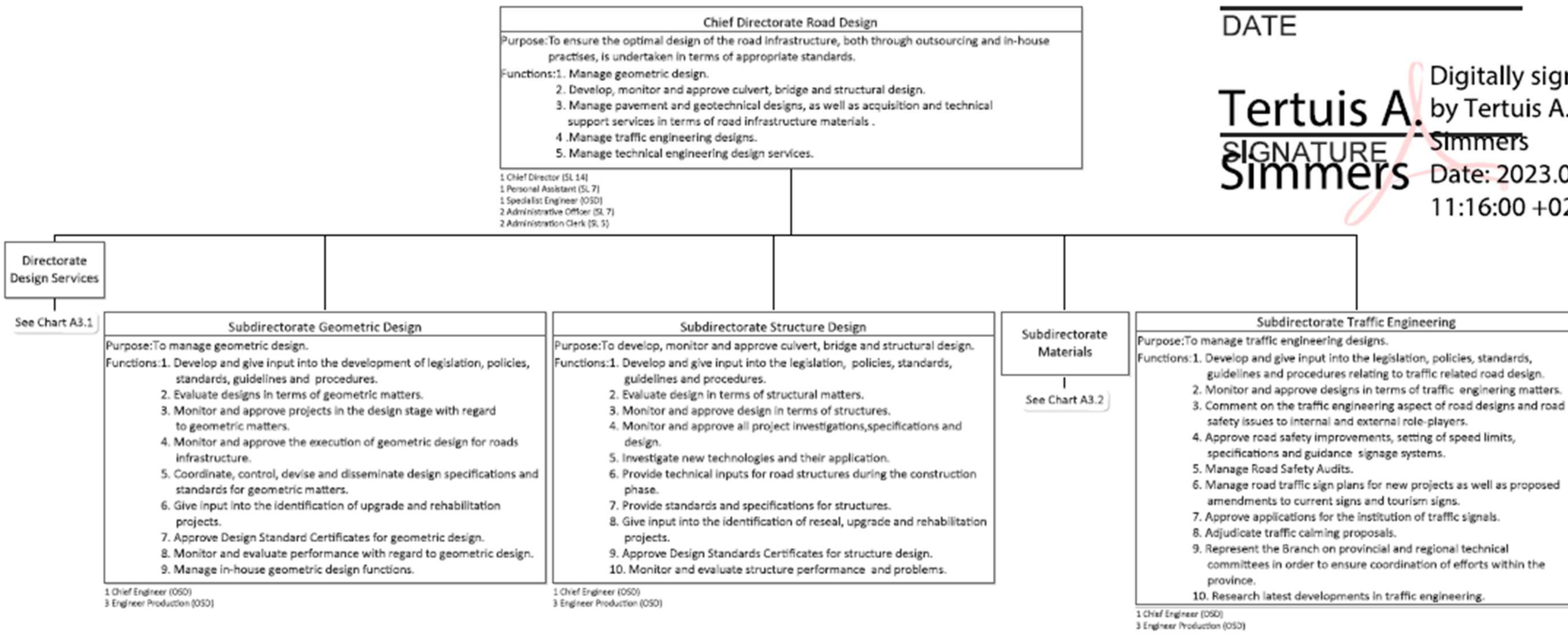
Chart A3

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:16:00 +02'00'



**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: SUBDIRECTORATE MATERIALS**

Chart A3.2

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers

SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:16:29 +02'00'

### Subdirectorate Materials

Purpose: To manage pavement and geotechnical designs, as well as acquisition and technical support services in terms of road infrastructure materials.

Functions:
1. Manage pavement and geotechnical designs.
2. Manage the acquisition of road infrastructure materials and research pertaining to new products, specifications and test methods.
3. Provide a technical support service in respect of quality control and management of road and bridge construction materials.

1 Chief Engineer (OSD)
4 Engineer Production (OSD)
2 Administrative Officer (SL 7)
1 Administration Clerk (SL 5)

### Division Materials Sourcing

Purpose: To manage the acquisition of road infrastrucutre materials and research pertaining to new products, specifications and test methods.

Functions:
1. Research, develop, evaluate and investigate new products, standard test methods and specification requirements.
2. Manage the sourcing of strategic road and bridge material.
3. Perform internal audits.

1 Control Engineering Technologist (OSD)
3 Engineering Technologist (OSD)
1 Control Engineering Technician (OSD)
2 Engineering Technician Production (OSD)

### Division Materials Laboratory

Purpose: To provide a technical support service in respect of quality control and management of road and bridge construction materials.

Functions:
1. Monitor, maintain and ensure the quality control of all road and bridge construction materials.
2. Render advice, training and guidance in the provision of information regarding material related matters, as built data and standard specifications.
3. Manage and operate all laboratory software management systems.
4. Provide technical support in the design of road pavements.
5. Approve all mix designs for road pavement and concrete structures.
6. Manage and operate the Laboratory Quality Systems (Accreditation).
7. Serve on National Technical Committees in the provision of technical support and information on National Standards and Specifications, Standard Test Methods and Laboratory Proficiency Schemes.
8. Research and investigate new products, standard test methods and specification requirements.

1 Control Engineering Technologist (OSD)
2 Control Engineering Technician (OSD)
1 Engineering Technologist (OSD)
5 Engineering Technician Production (OSD)
17 Geo Technical Assistant (SL 5)
9 Laboratory Assistant (SL 3)

# DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: DIRECTORATE DESIGN SERVICES

Chart A3.1

## Directorate Design Services

Purpose: To manage technical engineering design services.

Functions:
1. Provide technical traffic engineering support and manage the design and implementation of Road Traffic Signs (Directional, Guidance and Tourism).
2. Provide technical traffic engineering support in order to optimise the road network with regard to operational parameters such as safety, capacity and traffic flow.
3. Provide technical traffic engineering and management support with regard to the management of abnormal loads and overload control weighbridges.
4. Provide engineering and management support with regard to geometrics and structures.
5. Provide survey, cadastral and expropriation plans, related data and information, for the maintenance and improvement of the Western Cape Provincial Road Network.

1 Director (SL 13)
1 Personal Assistant (SL 7)
1 Administrative Officer (SL 7)
1 Admin Clerk (Technical) (SL 5)

### Subdirectorate Traffic Signs

Purpose: To provide technical traffic engineering support and manage the design and implementation of Road Traffic Signs (Directional, Guidance and Tourism).

Functions:
1. Design signs using Traffsoft.
2. Represent the Roads Branch at National Route Numbering and Road Traffic Signs Committes and Regional Tourism Sign Liaison Committes meetings.
3. Conduct site investigations.
4. Liaise with manufacturers of signs.
5. Communicate with regional offices and field officers ensuring signs are installed in the correct position.
6. Liaise with planning directorate.
7. Review applications and determine if signs are warranted.

1 Control Engineering Technologist (OSD)
1 Engineering Technologist (OSD)
1 Control Engineering Technician (OSD)
3 Engineering Technician Production (OSD)

### Subdirectorate Traffic Engineering Support and Safety

Purpose: To provide technical traffic engineering support in order to optimise the road network with regard to operational parameters such as safety, capacity and traffic flow.

Functions:
1. Manage output of the Accident Data Centre.
2. Conduct road safety inspections, road accident inspections, road audits and report thereon.
3. Identify high frequency traffic locations.
4. Retrieve and analyse accident data.
5. Manage traffic signal designs and setting of speed limits on provincial roads.
6. Evaluate intersection control methods (4 way stop, traffic signals, roundabouts) and provide recommendations.
7. Plan, design, implement and make recommendations on traffic calming devices.

1 Control Engineering Technologist (OSD)
2 Engineering Technologist (OSD)
1 Control Engineering Technician (OSD)
2 Engineering Technician Production (OSD

### Subdirectorate Abnormal Loads and Weighbridges

Purpose: To provide technical traffic engineering and management support with regard to the management of abnormal loads and overload control weighbridges.

Functions:
1. Register vehicles used to carry abnormal loads in order to establish limits that may be allowed per permit.
2. Technically evaluate applications for abnormal load exemption permits.
3. Maintain the Abnormal Loads Vehicle Registation and Permit Issuing System in liaison with engineering and technical personnel from road authorities, traffic law enforcement personnel, transport consultants and abnormal loads haulers.
4. Monitor effectiveness of law enforcement by evauating monthly reports, establishing trends and making recommendations for improvements.
5. Liaise with Department of Community Safety in terms of the service level agreement.
6. Develop operational plans and weighbridge operation and reporting systems.
7. Manage planning and design phases of all weighbridges in the province.
8. Draft policies and implementation strategies and partake in long term strategic planning.

1 Control Engineering Technologist (OSD)
1 Engineering Technologist (OSD)
1 Control Engineering Technician (OSD)
2 Engineering Technician Production (OSD)

### Subdirectorate Design Support Services

Purpose: To provide engineering and management support with regard to geometrics and structures.

Functions:
1. Provide engineering and management support with regard to geometrics.
2. Provide engineering and management support with regard to structures.

1 Control Engineering Technologist (OSD)
2 Engineering Technologist (OSD)
2 Control Engineering Technician (OSD)
4 Engineering Technician Production (OS)
1 Technical Assistant (SL 5)

### Subdirectorate Survey and Mapping

Purpose: To provide survey, cadastral and expropriation plans, related data and information, for the maintenance and improvement of the Western Cape Provincial Road Network.

Functions:
1. Provide field survey service for areas of investigation, road design and the staking and setting out of construction projects.
2. Compile and provide survey plans for information and planning purposes.
3. Quality control survey plans and data to ensure compliance with prescribed TMH11 standards (outsourced and in-house).
4. Provide sketches and extracts and survey information for expropriation purposes.
5. Quality control of expropriation sketches and data to ensure compliance with prescribed standards (outsourced and in-house).
6. Provide information and techncial expertise regarding survey and expropriation to the private public sectors.
7. Compile cadastral data in digital format for mapping and expropriation.
8. Quality control of cadastral compilation and calculation to ensure compliance with prescribed standards (outsources and in-house).
9. Manage survey quotes submitted by private sector.
10. Manage the maintenance of survey and expropriation records, Survey Equipment Store and Survey data in Plan Room.

1 Professional Surveyor (OSD)
1 Control Survey Technician (OSD)
6 Survey Technician (OSD)

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:17:14 +02'00'

# DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: CHIEF DIRECTORATE ROAD CONTRACTS

Chart A4

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers

SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:21:47 +02'00'

### Chief Directorate Road Contracts

Purpose: To ensure the outsourcing of road construction and maintenance contracts is undertaken in terms of relevant legislation, departmental strategies and specifications.

Functions:
1. Manage capital construction and capital maintenance contracts in Region 1.
2. Manage capital construction and capital maintenance contracts in Region 2.
3. Implement and manage routine road maintenance and weighbridge contracts.
4. Coordinate strategic, technical and administrative aspects of construction and maintenance contracts.
5. Provide operational and administrative support in terms of contract management.

1 Chief Director (SL 14)
1 Personal Assistant (SL 7)
1 Specialist Engineer (OSD)

### Subdirectorate Construction & Maintenance Contracts (Region 1)

Purpose: To manage capital construction and capital maintenance contracts in Region 1.

Functions:
1. Manage contractual input in tender and contract documentation.
2. Manage technical input in appointment of contractors.
3. Manage construction and capital maintenance projects.
4. Report on construction and capital maintenance contracts.

1 Chief Engineer (OSD)
3 Engineer Production (OSD)

### Directorate Road Contract Services

Purpose: To implement and manage routine road maintenance and weighbridge contracts.

Functions:
1. Manage contractual input in tender and contract documentation.
2. Manage technical input in appointments of contractors.
3. Manage routine road maintenance.
4. Manage weighbridge operation contracts.
5. Report on Non-Capital contracts.

1 Director (SL 13)
1 Personal Assistant (SL 7)
2 Control Engineering Technologist (OSD)
2 Engineering Technologist (OSD)
6 Engineering Technician (OSD)

### Subdirectorate Construction & Maintenance Contracts (Region 2)

Purpose: To manage capital construction and capital maintenance contracts in Region 2.

Functions:
1. Manage contractual input in tender and contract documentation.
2. Manage technical input in appointment of contractors.
3. Manage construction and capital maintenance projects.
4. Report on construction and capital maintenance contracts.

1 Chief Engineer (OSD)
3 Engineer Production (OSD)

### Subdirectorate Road Contract Facilitation and Development

Purpose: To coordinate strategic, technical and administrative aspects of construction and maintenance contracts.

Functions:
1. Develop and manage the strategic implementation of the contracts.
2. Coordinate pro-forma contract documentation.
3. Perform statistical analysis of contractual data.
4. Liaise nationally and provincially on contract documentation issues.

1 Chief Engineer (OSD)
1 Engineer Production (OSD)

### Division Operational Support

Purpose: To provide operational and administrative support in terms of contract management

Functions:
1. Manage all payments to consulting engineers, contractors and other private sector entitities (e.g. Eskom, Telkom) as well as transfer payments to local municipalities.
2. Monitor cash-flow to and actual expenditure of municipal capital projects and contributions from local authorities and other entities towards capital projects.
3. Ensure completeness and quality of contractor guarantees, consultant fee claims and payment certificates of contractors.
4. Provide the support during the tender process by preparing advertisement, tender documentation, award letters and safeguarding all tender submissions during the tender evaluation and bid adjudication process.

1 Assistant Director (SL 9)
2 Administrative Officer (SL 7)
4 Administration Clerk (SL 5)

Chart A5

# DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: CHIEF DIRECTORATE DEPARTMENTAL OPERATIONS

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:22:10 +02'00'

## Chief Directorate Road Departmental Operations

Purpose: To ensure the provision of in-house civil and mechanical engineering operations is optimally undertaken in terms of relevant legislation and Departmental strategies.

Functions:
1. Coordinate and facilitate all technical, administrative and work processes and systems in the Regions and District Municipalities (DMs).
2. Manage mechanical engineering services.
3. Manage, develop and implement work processes across the civil and material interface to improve delivery in terms of quality, productivity, risk, time and cost.
4. Manage and protect the provincially proclaimed road network in Region 1.
5. Manage and protect the provincially proclaimed road network in Region 2.

1 Chief Director (SL 14)
1 Personal Assistant (SL 7)
1 Specialist Engineer (OSD)

### Directorate Regional Roads Services

See Chart A5.

### Subdirectorate Mechanical Services

See Chart A5.1

### Subdirectorate Construction and Maintenance

Purpose: To manage, develop and implement work processes across the civil and material interface to improve delivery in terms of quality, productivity, risk, time and cost.

Functions:
1. Develop strategic policy in terms of work processes:
   - control quality of delivery
   - monitor productivity
   - optimise risk management of delivery projects and programmes
   - control delivery time-lines of delivery projects and programmes.
2. Collate all technical reporting submitted to the Branch from the regions.
3. Coordinate technical aspects across the regions.

1 Chief Engineer (OSD)

### Subdirectorate Regional Roads Management Region 1

See Chart A5.2

### Subdirectorate Regional Roads Management Region 2

See Chart A5.3

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: SUBDIRECTORATE MECHANICAL SERVICES**

Chart A5.2

Current Date 1/25/2023

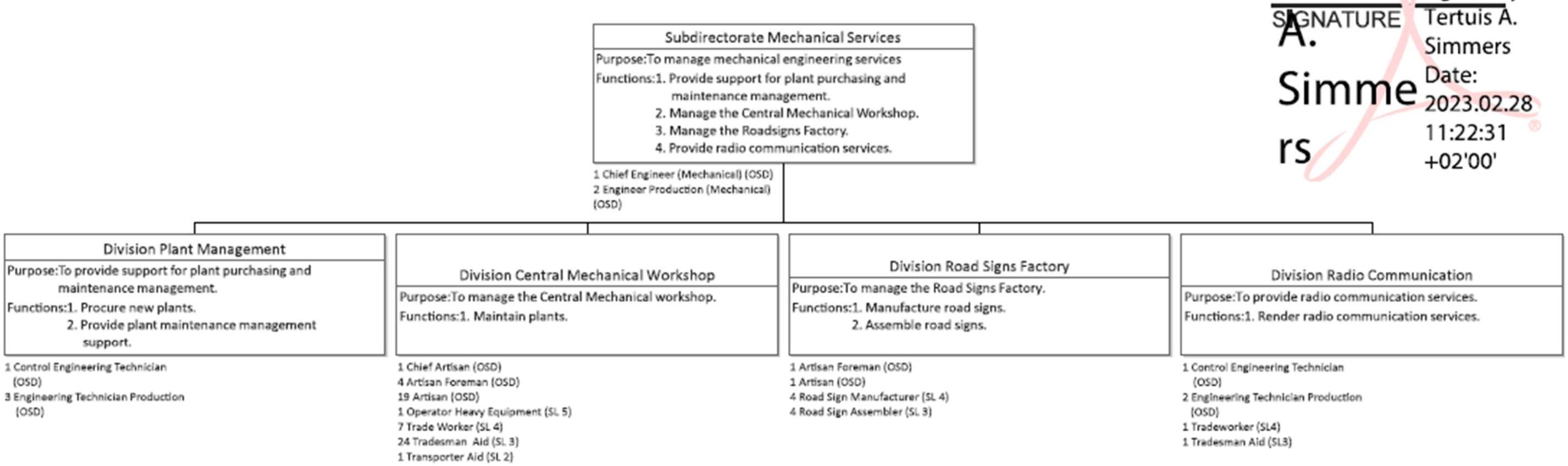
APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:22:31 +02'00'

SIGNATURE



**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: REGIONAL ROADS MANAGEMENT REGION 1**

Chart A5.3

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:22:54 +02'00'

**Subdirectorate Regional Road Management ( Region 1)**

Purpose:To manage and protect the provincially proclaimed road network in Region 1.

Functions:1. Render road maintenance services.
2. Render construction and specialised road maintenance services.

1 Chief Engineer (OSD)
2 Engineer Production (OSD)
1 Control Engineering Technologist (OSD)
1 Admin Officer (SL 7)
1 Admin Clerk (SL 5)

**Division Routine Maintenance**

Purpose:To render road maintenance services.

Functions:1. Perform blading of gravel roads.
2. Perform spot regravel.
3. Perform routine maintenance.
4. Perform draining and structure repairs.
5. Perform surface patching on roads.

.

1 Engineering Technologist (OSD)
4 Regional Foreman (SL 7)
7 Area Foreman (SL 6)
25 Road Worker Supervisor (SL 4)
250 Road Worker (SL 2)

**Division Construction and Specialised Maintenance**

Purpose:To render construction and specialised road maintenance services.

Functions:1. Reseal and regravel roads in the region.
2. Upgrade, rehabilitate and reconstruct roads in the region.
3. Perform drainage and structure reconstruction.
4. Manage the District Municipality acting as agents for road construction in the region.
5. Repair roads during flood disasters.
6. Perform road marking.
7. Maintain road camps and rest places.

1 Engineering Technologist (OSD)
1 Regional Foreman (SL 7)
2 Operator: Heavy Equipment (SL 5)
3 Specialised Operator Grader (SL 5)
21 Operator (SL 4)
13 Road Worker Supervisor (SL 4)
76 Road Worker (SL 3)
2 Transporter Aid (SL 2)

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT: REGIONAL ROADS MANAGEMENT REGION 2**

Chart A5.4

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

SIGNATURE

Tertuis A. Simmers

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:23:19 +02'00'

### Subdirectorate Regional Roads Management ( Region 2)

Purpose:To manage and protect the provincially proclaimed road network in Region 2.

Functions:1. Render road maintenance services.
2. Render construction and specialised road maintenance services.

1 Chief Engineer (OSD)
2 Engineer Production (OSD)
1 Control Engineering Technologist (OSD)
1 Admin Officer (SL 7)
1 Admin Clerk (SL 5)

### Division Routine Maintenance

Purpose:To render road maintenance services.

Functions:1. Perform blading of gravel roads.
2. Perform spot regravel.
3. Perform routine maintenance.
4. Perform draining and structure repairs.
5. Perform surface patching on roads.

1 Engineering Technologist (OSD)
4 Regional Foreman (SL 7)
3 Area Foreman (SL 6)
19 Road Worker Supervisor (SL 4)
190 Road Worker (SL 3)

### Division Construction and Specialised Maintenance

Purpose:To render construction and specialised road maintenance services.

Functions:1. Reseal and regravel roads in the region.
2. Upgrade, rehabilitate and reconstruct roads in the region.
3. Perform drainage and structure reconstruction.
4. Manage the District Municipality acting as agents for road construction in the region.
5. Repair roads during flood disasters.
6. Perform road marking.
7. Maintain road camps and rest places.

1 Engineering Technologist(OSD)
1 Regional Foreman (SL 7)
1 Area Foreman(SL 6)
1 Operator: Heavy Equipment (SL 5)
2 Specialised Operator Grader (SL 5)
8 Operator (SL4)
3 Operator Roadmarker (SL 4)
1 Transporter Aid (SL 2)
3 Road Worker Supervisor (SL 4)
24 Road Worker (SL3)
1 Camp Maintenance Supervisor (SL 4)

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT:**
**DIRECTORATE REGIONAL ROADS SERVICES**

Chart A5.1

APPROVED BY MEC
MR T SIMMERS

Current Date 1/25/2023

DATE

Tertuis A. Simmers — Digitally signed by Tertuis A. Simmers Date: 2023.02.28 11:23:49 +02'00'

SIGNATURE

## Directorate Regional Roads Services

Purpose: To coordinate and facilitate all technical, administrative and work processes and systems in the Regions and District Municipalities (DMs).

Functions:
1. Render general support services for mechanical services.
2. Render general support services for Region 1.
3. Render general support services for Region 2.
4. Coordinate, develop and implement work procresses and systems to improve, assure, monitor and control costs for delivery.
5. Coordinate and facilitate compliance with Occupational Health and Safety matters in the Branch.

1 Director
1 Personal Assistant (SL 7)
1 Costing Officer (SL 7)

### Subdirectorate Mechanical Support Services

A5.1.1

### Subdirectorate General Support Services Region 1

A5.1.2

### Subdirectorate General Support Services Region 2

A5.1.3

### Division Works Planning and Quality Control

1 Control Engineering Technologist (OSD)
2 Engineering Technologist (OSD)
2 Quality Controller (SL 8)

### Division Occupational Health and Safety

1 Occupational Health and Safety Coordinator (SL9)
3 OHAS Officer (SL8)

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT:**
**SUBDIRECTORATE MECHANICAL SUPPORT SERVICES**

Chart A5.1.1

Current Date 2/28/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 12:31:25 +02'00'

**Subdirectorate Mechanical Support Services**

Purpose: To render general support services for Mechanical Services.

Functions:
1. Render a supply chain management and fleet administration service.
2. Render financial and management accounting service.
3. Render a human resource and general support service.

1 Deputy Director (SL 11)

**Division SCM and Fleet Administration**

Purpose: To render a supply chain management and fleet administration service.

Functions:
1. Render a supply chain management service.
2. Render a fleet administrative support service.

1 Assistant Director (SL 9)
1 SCM Officer (SL 8)
1 Chief SCM Clerk (SL 7)
1 Admin Officer Fleet Admin (SL 7)
1 Admin Clerk Fleet Procurement (SL 5)
3 Admin Clerk Fleet Maintenance (SL 5)
4 SCM Clerk (SL 5)
1 Store Clerk (SL 5)
2 Store Assistant (SL 2)

**Section Management and Financial Accounting**

Purpose: To render financial and management accounting service.

Functions:
1. Render a financial accounting service.
2. Render a management accounting service.

1 State Accountant (SL 8)
1 Accounting Clerk (SL 5)
1 Accounting Clerk: Costing (SL 5)
1 Data Capturer (SL 4)

**Section HR and General Support Services**

Purpose: Render a human resource and general support service.

Functions:
1. Coordinate human resource matters.
2. Render general support services

1 Administrative Officer (SL 8)
1 Admin Clerk: Workshop (SL 5)
2 Administration Clerk (SL 5)
1 Receptionist (SL 4)
1 Driver with secondary functions (SL 4)
1 Cleaner (SL 2)

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT:**
**SUBDIRECTORATE GENERAL SUPPORT SERVICES REGION 1**

Chart A5.1.2

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers

SIGNATURE

Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:24:37 +02'00'

**Subdirectorate General Support Services Region 1**

Purpose: To render general support services for Region 1.

Functions:
1. Render a management and financial accounting service.
2. Render a supply chain management service.
3. Render a human resource and general office support service.

1 Deputy Director (SL 11)

**Division Management and Financial Accounting**

Purpose: To render a management and financial accounting service.

Functions:
1. Render a management accounting service.
2. Render a financial accounting service.

1 Assistant Director: Finance (SL 9)
1 State Accountant: Management Accounting (SL 8)
1 State Accountant: Financial Accounting (SL 7)
2 Accounting Clerk: Payments (SL5)
2 Accounting Clerk: Costing (SL 5)
1 Data Capturer (SL 4)

**Division Supply Chain Managment**

Purpose: To render a supply chain management service.

Functions:
1. Render an acquisition and contract management service.
2. Render a logistic and asset management service.

1 Assistant Director: SCM (SL 9)
1 SCM Officer (SL 8)
1 Chief SCM Clerk: (SL 7)
2 SCM Clerk: Movable Assets (SL 5)
2 SCM Clerk: Posting (SL 5)
2 SCM Clerk: Orders (SL 5)
2 SCM Clerk: Transit (SL 5)
1 SCM Clerk (SL 5)
1 SCM Clerk Fuel (SL 5)
1 Store Clerk (SL 5)
4 Store Assistant (SL 2)
1 Store Assistant Fuel (SL 2)
1 Truck Driver Fuel Supply (SL 4)
1 Fuel Supply Assistant (SL 2 )

**Division Human Resource and General Office Support**

Purpose: To render a human resource and general office support service.

Functions:
1. Coordinate human resource matters.
2. Render a project administration support service.
3. Render cleaning services.
4. Render general office administration services

1 Assistant Director (SL 9)
2 Chief Admin Clerk (SL 7)
1 Administration Clerk (SL 5)
7 Administration Clerk: HR (SL 5)
2 Admin Clerk: Workshop (SL 5)
1 Receptionist (SL 4)
1 Registry Clerk (SL 5)
2 Office Assistant (SL 2)
1 Driver with secondary functions (SL4)
2 Cleaner (SL 2)

**DEPARTMENT OF INFRASTRUCTURE: ORGANISATION AND ESTABLISHMENT:**
**SUBDIRECTORATE GENERAL SUPPORT SERVICES REGION 2**

Chart A5.1.3

Current Date 1/25/2023

APPROVED BY MEC
MR T SIMMERS

DATE

Tertuis A. Simmers
SIGNATURE
Digitally signed by Tertuis A. Simmers
Date: 2023.02.28 11:25:06 +02'00'

### Subdirectorate General Support Services Region 2

Purpose: To render general support services for Region 2.

Functions:
1. Render a management and financial accounting service.
2. Render a supply chain management service.
3. Render a human resource and general office support service.

1 Deputy Director (SL 11)

### Division Management and Financial Accounting

Purpose: To render a management and financial accounting service.

Functions:
1. Render a management accounting service.
2. Render a financial accounting service.

1 Assistant Director: Finance (SL 9)
1 State Accountant: Management Accounting (SL 8)
1 State Accountant: Financial Accounting (SL 7)
1 Accounting Clerk: Payments SL 5)
1 Accounting Clerk: Costing (SL 5)
1 Data Capturer (SL 4)

### Division Supply Chain Managment

Purpose: To render a supply management service.

Functions:
1. Render an acquisition and contract management service.
2. Render a logistic and asset management service.

1 Assistant Director: SCM (SL 9)
1 SCM Officer (SL 8)
1 Chief SCM Clerk (SL 7)
1 SCM Clerk: Movable Assets (SL 5)
1 SCM Clerk: Posting (SL 5)
1 SCM Clerk: Orders (SL 5)
1 SCM Clerk: Transit (SL 5)
1 SCM Clerk (SL 5)
1 Store Clerk (SL 5)
1 Store Assistant (SL 2)

### Division Human Resource and General Office Support

Purpose: To render a general human resource and general office support service.

Functions:
1. Coordinate human resource matters.
2. Render a project administration support service.
3. Render a cleaning services.
4. Render general office administration services

1 Assistant Director (SL 9)
2 Chief Admin Clerk (SL 7)
1 Admin Clerk (SL 5)
4 Admin Clerk: HR (SL5)
2 Admin Clerk: Workshop (SL 5)
1 Receptionist (SL 4)
1 Registry Clerk (SL 5)
1 Driver with secondary functions (SL 4)
2 Cleaner (SL 2)

**Contact Person**

Email: **infrastructure@westerncape.gov.za**

**Tel:** +27 21 483 5400

**Department of Infrastructure**

**Branch: Transport Infrastructure**

**Chief Directorate: Road Programme Management**

**Acting Chief Director and Specialist Engineer: Melanie K Hofmeyr**

www.westerncape.gov.za

Western Cape
Government