



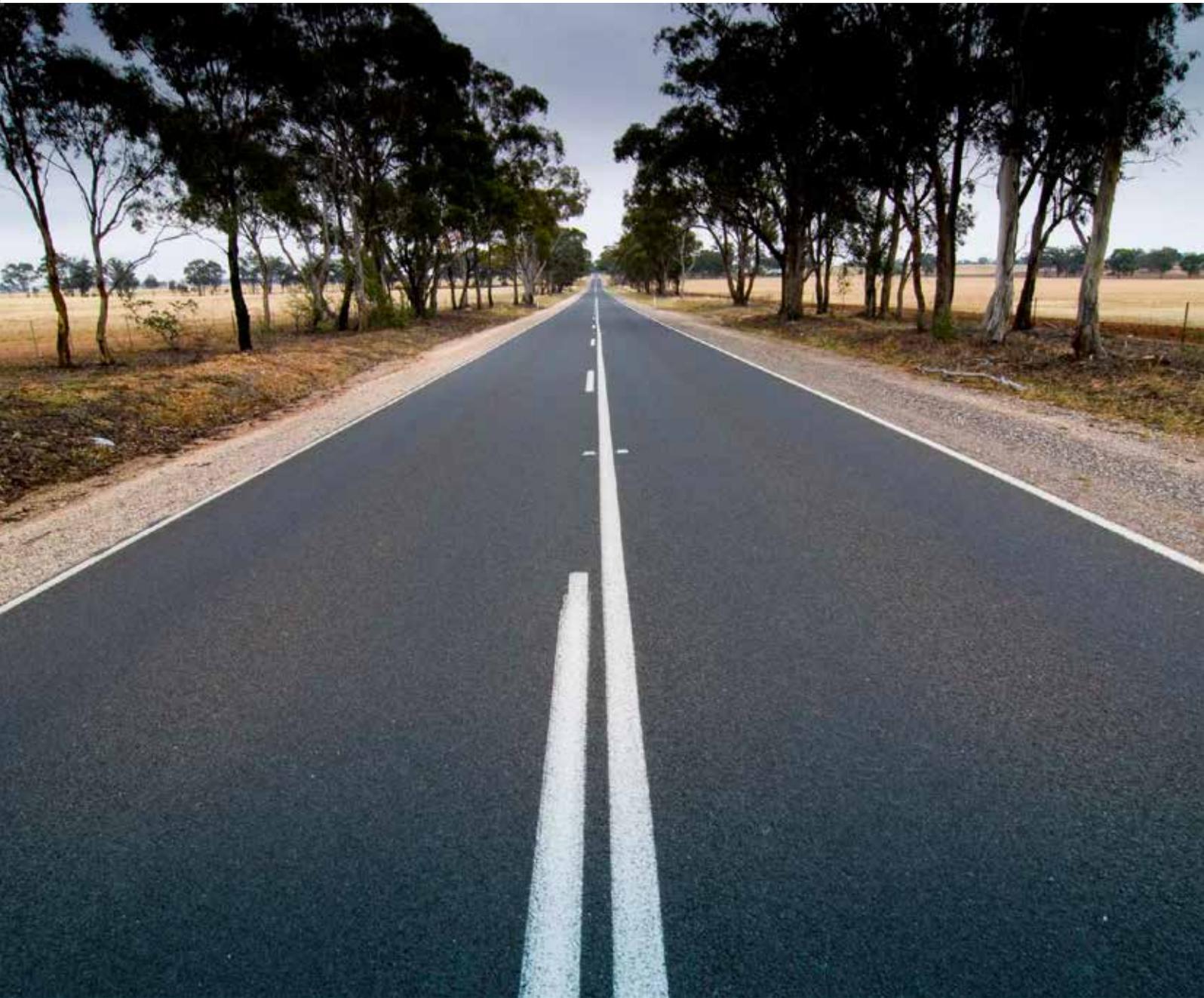
# Pavement Management Strategic Plan Overview

June 2017

[vicroads.vic.gov.au](http://vicroads.vic.gov.au)



This overview outlines the VicRoads approach for state-wide planning and management of pavement maintenance and renewal activities.



## Context

Victoria's arterial road and freeway network is a critical component of the State's economic infrastructure, generating and supporting significant economic and social benefits to the Victorian community.

Across Victoria there are approximately 25,000 carriageway kilometres of arterial roads and freeways, over 3180 bridges, 3500 other structures, more than 3,400 sets of traffic signals and other electrical systems such as street lighting and freeway management systems.

This complex asset base puts VicRoads as one of Victoria's largest asset managers, with an estimated total pavement asset replacement value of \$12.9 billion plus addition \$8.0 billion for earthworks (figure current as of 30 June 2016). The movement of goods and people made possible by a road network creates wealth for individuals and corporations, and supports the delivery of services that aid social cohesion and economic development.

VicRoads is responsible for the planning, management and operation of the arterial road network on behalf of the Victorian Government. Agility and responsiveness are required to enable VicRoads to respond to dynamic conditions.

This document has been prepared as an overview to the key elements of the VicRoads Pavement Management Strategic Plan for the determination of pavement maintenance and renewal requirements, where renewal includes both periodic resurfacing and pavement rehabilitation. Targeted scenario modelling to inform investment needs is a key element of the strategic plan.

This Pavement Management Strategic Plan has been developed based on best practice guidance from ISO 55000, including:

- Taking an integrated systems approach to Asset Management;
- Taking a strategic direction for the management of the pavement assets;
- Taking a Full Life Cycle View (whole of life); and
- Understanding the interdependency of cost, level of service and risk.

## Scope

This overview is to be applied by VicRoads and parties acting on VicRoads behalf, when:

- Determining maintenance and renewal requirements for pavement and surfacing assets across the Victorian arterial network
- Developing forward works programs inclusive of prioritisation considerations
- Evaluation of modelling scenarios to inform investment needs

This overview is a condensed version of the VicRoads Pavement Management Strategy that provides greater detail and presents supporting technical parameters.

## Objectives

The Pavement Management Strategy seeks to support the key objectives as part of VicRoads' legislative responsibilities in the Road Management Act 2004 and the Transport Integration Act 2010:

- Manage the asset portfolio to reinforce road safety;
- Optimise funding allocation to meet VicRoads strategic objectives;
- Enhance Pavement Management regime to meet service delivery needs; and
- Provide accessibility of data and information to make inform decisions.

## Strategic Alignment

### 1. VicRoads Priorities and Strategic Interventions

Victorian transport objectives are articulated in the Transport Integration Act 2010 (TIA). VicRoads is working with our transport partners in the Department of Economic Development, Jobs, Transport and Resources (DEDJTR), Transport For Victoria (TFV), Public Transport Victoria (PTV), Local Government and others to identify transport priorities and the role transport plays in creating movement and place. This high level transport collaboration has been translated into five priorities for VicRoads as follows:

- Deliver more predictable journeys for our customers
- Efficient maintenance investment and delivery
- Drive digital engagement and transactions online
- Safe speeds that are right for the road
- Move more freight, more efficiently with less impact.

VicRoads has identified three strategic interventions to assist in achieving the above priorities, as follows:

- Smarter journeys
- Better use of existing roads
- Improved roads and places.

### 2. VicRoads Management Responsibilities

In addition to the TIA objectives, VicRoads has specific management responsibilities under the Road Management Act 2004 (RMA). The RMA articulates the role of a road authority in performing road management functions. Specifically the RMA states that a road authority has general functions that include:

- Providing and maintaining a network of roads for use by the community;
- To design, build, inspect, fix and maintain roads and road infrastructure;
- To undertake works and activities that minimise impacts on the safe and efficient operation of the road, including on road public transport.

## Asset Management Principles

Asset Management comprises a number of interrelated functions cutting across the whole of the VicRoads business. To assist with explaining how asset management functions relate to the statutory obligations, priorities and interventions above, VicRoads is in the process of developing a comprehensive Asset Management Strategic Framework that will articulate asset management principles, as shown in Figure 1.

These asset management principles apply to all assets within the VicRoads portfolio. These asset management principles have been adopted to guide the Pavement Management Strategy. This Pavement Management Strategy further articulates how these asset management principles apply to management of the pavement and surfacing asset portfolio.

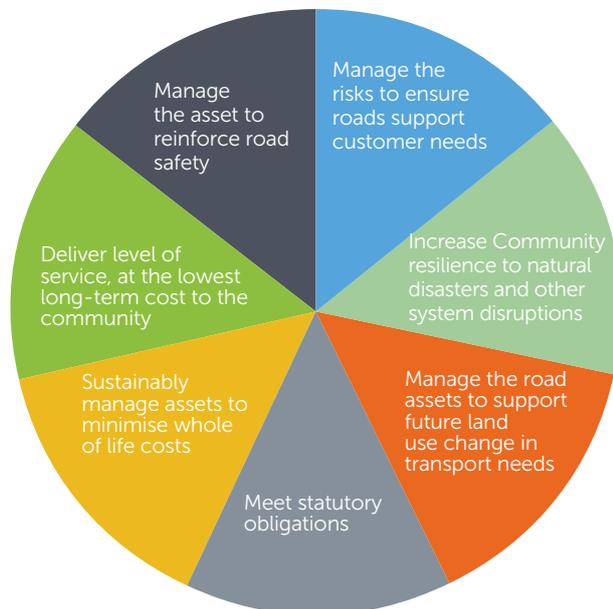


Figure 1 - VicRoads Asset Management Principles

### Pavement Management Core Business Activities

The purpose of assets is to enable the provision of services to the community. VicRoads is tasked with managing infrastructure assets to provide community services. Within the constraints of available budget, VicRoads manages their portfolio of assets to minimise whole of life costs.

Pavement and surfacing assets are high value and asset failure presents high risk to service provision. As such, VicRoads adopts sophisticated pavement management practices to achieve best value.

Table 2 demonstrates the alignment between the whole of portfolio asset management principles above and more specific pavement management principles which VicRoads uses to guide planning, investment decisions and asset management practices.

### VicRoads Asset Management Principles

Pavement Management Core Business Activities	Manage the asset to reinforce road safety	Manage the risks to ensure roads support customer needs	Increase Community resilience to natural disasters and other system disruptions	Manage the road assets to support future land use change in transport needs	Meet statutory obligations	Sustainably manage assets to minimise whole of life costs	Deliver level of service, at the lowest long-term cost to the community
Deliver service focussed outcomes that support value creation, road safety, political and environmental objectives.	✓	✓		✓	✓	✓	✓
Collect data to inform evidence based decisions regarding investment options.	✓	✓		✓		✓	✓
Adopt a ten year planning horizon for strategic decision making.			✓	✓		✓	
Adopt predictive modelling techniques to assess network wide costs and benefits for different investment scenarios.			✓			✓	
Prepare business cases for funding consideration that reflect the risk and level of service outcomes for pre-defined investment scenarios	✓	✓	✓		✓	✓	✓
Apply risk management and balance with levels of service, for optimal outcomes, within the constraints of the available budget.	✓	✓			✓	✓	✓
Allocate activity based funding to regions at a program level.			✓	✓		✓	
Leverage local expertise within regions for project level decision making, to empower accountable decision making and increase program efficiency.	✓	✓					✓
Monitor performance to measure effectiveness of investment decisions, including output, service, access and financial performance metrics.			✓		✓	✓	✓
Deliver an annual works program that supports the pavement's program objectives and expected outcomes.	✓	✓	✓			✓	✓
Manage delivery of works programs to achieve state-wide performance targets.			✓	✓	✓		✓
Adopt a learning culture to continually improve and evolve our planning processes.				✓			✓

Table 1: Alignment of Pavement Management Core Business Activities to VicRoads Asset Management Principles

## Investment Decision Making Principles for Pavement Management

### 1. Investment Drivers

The VicRoads Pavement Management Strategy focusses on maintenance and renewal programs for surfacing and pavement assets, for which core drivers of investment include:

- Network Preservation
- Safety
- Whole of Life Costing
- Capacity
- Functionality
- Quality
- Responsiveness

### 2. Road Maintenance Categories

Table 2: Road Maintenance Categories and definitions

Road Maintenance Category*	Description
1	Metropolitan Freeway
2	Major Urban Arterial or Rural Freeway
3	Urban Arterial or Major Rural Arterial
4.1	Rural Arterial that connects major regional centres
4.2	Rural Arterial carrying moderate traffic
5.1	Rural Arterial carrying low traffic
5.2	Rural Arterial carrying very low traffic

\* Road Maintenance Categories 4 and 5 have each been split into two sub-categories to provide greater granularity to facilitate VicRoads 2017 Better Roads for More Communities Business Case..

VicRoads uses Road Maintenance Categories to assist with prioritisation of maintenance and renewal investment on the road network. Road Maintenance Categories use key factors such as route connectivity and access, traffic volumes, number of commercial vehicles/principal freight network, tourist priority route and public transport to establish relative functional classification levels.

### 3. Levels of Service

Assets exist primarily to support the delivery of services to customers. Road users have expectations that the network supports safe and comfortable journeys for people and goods. Our customers intuitively understand the need for different levels of service that reflect the different road categories and how the roads are used.

Our commitment to customer levels of service will be supported by measureable technical service standards and intervention criteria across the Road Maintenance Categories. The technical service standards documented within the Pavement Management Strategic Plan will cover output, service, access and financial performance metrics. The vertical transparency between the customer levels of service and the technical service standards will drive our program development tasks and will support our annual monitoring, evaluation and reporting tasks.

The range of performance metrics available can be used to monitor, evaluate and report performance of the pavement portfolio. The number of performance metrics used will vary, depending on the business purpose, as is outlined in Figure 2.



Figure 2 – Business Uses of Technical Service Levels

The primary technical intervention criteria used to manage pavement and surfacing assets are roughness, rutting and cracking. In recognition of different customer needs and associated differences in road use and function across the Victorian arterial network, VicRoads have adopted scalable intervention levels based on the Road Maintenance Category definitions. Each combination of treatment option, Road Maintenance Category and Intervention Criteria has an intervention level set.

VicRoads has used a pavement management system to assist with modelling various investment scenarios (refer section 5). Figure 3 lists the interim intervention levels used to trigger treatments within the modelling tool.

	Periodic Intervention resurfacing criteria	Renewal intervention rehabilitation criteria
Service level 1	2.9 IRI roughness 10-12mm rutting >10% cracking	3.4 IRI roughness >12mm rutting No limit
Service level 2	3.0 IRI roughness 10-12mm rutting >10% cracking	3.8 IRI roughness >12mm rutting No limit
Service level 3	3.0 IRI roughness 12-15mm rutting >20% cracking	3.8 IRI roughness >15mm rutting No limit
Service level 4	3.4 IRI roughness 12-15mm rutting >20% cracking	4.2 IRI roughness >15mm rutting No limit
Service level 5	3.8 IRI roughness 12-15mm rutting >20% cracking	4.6 IRI roughness >15mm rutting No limit

Figure 3 – Indicative Network Wide Intervention Criteria

#### 4. Planning Horizons

VicRoads adopts a ten year planning horizon to inform strategic decision making. For pavement and surfacing assets, VicRoads models ten year forward programs to inform investment decision making.

VicRoads uses these strategic modelling outputs to develop a more detailed three year forward program. This three year forward program is then developed into an annual delivery plan



Figure 4 – 10 Year Investment Horizon

#### 5. Scenarios

Investment decision making requires a balancing of cost, risk and level of service. That is, different levels of investment will produce different risk profiles and service outcomes. For pavement and surfacing assets, VicRoads uses predictive tools and techniques to model different investment scenarios, as follows:

1. Current Investment – assumes the current level of funding is maintained over the ten year planning horizon, with a nominal CPI increase each year. Considers any efficiency targets that may be in place from central government.
2. Holding Investment – assesses the level of funding required to hold the network condition at the current level of service. This option will hold the residual maintenance and renewal liability in year 0 at the same level in year 10.
3. Sustainable Investment – assesses the level of funding required to hold the network in current condition plus investment required to address any maintenance and renewal liability. Investment at this level will result in zero maintenance and renewal liability in year 10.

The investment level required for each of these scenarios, along with the associated risk and level of service outcomes, are used to inform business cases and annual planning processes. Central government uses this information to make an informed decision regarding the annual budget allocation for pavement and surfacing programs. VicRoads then allocates funding to program delivery, in a manner that maximises efficiency and limits risk.

Each of the investment scenarios above assesses benefits and costs associated with treatment options, across the whole of the VicRoads arterial road network. The treatment options modelled are triggered when condition deteriorates beyond a specified intervention level. To ensure investment is targeted at areas of greatest need, intervention levels are set on a sliding scale depending on the relative strategic importance of the road. Road Maintenance Categories are adopted to assist with assigning a level of importance to a road and by extension assist with modelling the most efficient use of available funding and management of risk.

## Current Improvements

VicRoads is currently undertaking the following improvement initiatives to further enhance pavement management outcomes.

- Embedment of the Asset Services team to improve co-ordination of centralised asset management functions.
- Establishment of the Transport Analytics Program to enhance system integration, data management, reporting and analytical capability.
- Enhancement of predictive tools and planning processes, for scenario modelling, to inform network investment needs (supported by regional capability for project level).
- Preparation of evidence based business cases, with a 10 year planning horizon, to inform the annual planning cycle.
- Development and monitoring of a comprehensive suite of technical service standards and intervention levels.
- Establishment of an Asset Management Transformation Program to manage implementation of business change.



