Pavement Management Strategic Plan

Asset Services

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Executive Summary

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 3,180 bridges, 3,500 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. The total pavement asset replacement value is $12.6 billion plus additional $8.1 billion for earthworks (figure current as of 30 June 2017). 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 Pavement Management Strategic Plan provides strategic direction for the determination of pavement maintenance and renewal requirements, where renewal includes both periodic resurfacing and pavement rehabilitation, to deliver value for money, achieve levels of service and define business outcomes.

This Pavement Management Strategic Plan was developed in parallel with the finalisation of the Asset Management Strategic Framework. Any changes in the Asset Management Strategic Framework may drive further updates of this Pavement Management Strategic Plan. Some of the overarching content within this document, particularly from Sections 1 and 2, is intended to be incorporated into the Asset Management Strategic Framework.

This strategic plan will undergo a major review every three years, to ensure alignment with the VicRoads Corporate Plan. However, it is expected that this first issue will be more of a living document, revised in the light of the developing improvement programme to be delivered by the Asset Management Transformation Project. Therefore, this strategic plan will be reviewed annually, for the next three years, to ensure it reflects the organisational needs and the dynamic changes to asset management practice within VicRoads.

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 Pavement Management Strategic Plan seeks to support the key objectives as part of VicRoads’ legislative responsibilities in the Road Management Act 2004 and the Transport Integration Act 2010.
To assist with explaining how asset management functions relate to the statutory obligations, priorities and interventions, 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 and have been adopted to guide the Pavement Management Strategic Plan.

Key elements to the successful implementation of this strategic plan include:

- Targeted scenario modelling to inform investment needs;
- A collaborative partnership approach between Asset Services and Regional Services;
- Taking an integrated systems approach to Asset Management;
- Annual reporting of technical performance measures; and
- Understanding the interdependency of cost, level of service and risk.

VicRoads will deliver core business activities to enable the realisation of the benefits associated with this strategic plan, as follows:

1. Adopt service focussed outcomes that support road safety, value creation, political and environmental objectives.
2. Collect data to inform evidence based decisions regarding investment options.
3. Adopt predictive modelling techniques to assess network wide costs and benefits for different investment scenarios.
4. Prepare business cases for funding consideration that reflect the risk and level of service outcomes for pre-defined investment scenarios
5. Apply risk management and balance with levels of service, for optimal outcomes, within the constraints of the available budget.
6. Allocate activity based funding to regions at a program level.
7. Leverage local expertise within regions for project level decision making, to empower accountable decision making and increase program efficiency.
8. Monitor performance to measure effectiveness of investment decisions, including output, service, access and financial performance metrics.
9. Deliver an annual works program that supports the pavement's program objectives and expected outcomes.
10. Manage delivery of works programs to achieve state-wide performance targets.
11. Adopt a learning culture to continually improve and evolve our planning processes.

VicRoads adopts a 10-year planning horizon to inform strategic decision making. For pavement and surfacing assets, VicRoads models ten year forward programs to inform investment decisions. A consistent approach to investment scenario modelling will be adopted. VicRoads pre-defined scenarios to be considered as a minimum are:

- Current Investment
- Holding Condition Investment
- Sustainable Investment

VicRoads uses these strategic modelling outputs to develop a more detailed four year forward program. This four year forward program is then developed into an annual delivery plan.
The Strategy and Policy Governance Committee will be accountable for approval of the Pavement Management Strategic Plan, as well as implementation oversight and subsequent evaluation of success. The Director Asset Services will be responsible for implementation, with the support of the Pavement Management Steering Committee and the Pavement Management Working Group.

Implementation of the Pavement Management Strategic Plan will assist VicRoads to improve organisation wide asset management planning and enable more robust investment decision making.

Section 7 of this strategic plan summarises planned improvement initiatives that will further enhance pavement management outcomes and, by extension, enable improved service levels for road users.
1. 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 3,180 bridges, 3,500 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. The total pavement asset replacement value of $20.7 billion as at 30 June 2017. 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 Pavement Management Strategic Plan has been prepared to detail VicRoads guidance for the development of pavement preservation programs, which balance cost, risk and levels of service. These pavement preservation programs cover 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 this strategic plan.

The Pavement Management Strategic Plan has been developed based on best practice and 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

1.1. Purpose

The Pavement Management Strategic Plan 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; and
- Evaluation of modelling scenarios to inform preservation investment needs.

1.2. Objectives

The Pavement Management Strategic Plan 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 informed decisions.

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1 Replacement value of pavements $12.6 billion and replacement value of earthworks $8.1 billion
The strategic plan also supports realisation of objectives within the Victorian Financial Management Act 1994 and associated amendments.

1.3. Expenditure Types
VicRoads invests in many different types of programs. To enable the effective integration of planning processes, it is critical to demonstrate alignment across the business. Figure 2 illustrates the alignment between VicRoads Sub-program Categories and Expenditure Types, including provision of pavement work activity examples for further context. The scope of this Pavement Management Strategic Plan document is shown by the red outline below.

For details regarding VicRoads Sub-programs, reference should be made to the current Roads Program Guidelines.

1.3.1. Expenditure Type Definitions
Further detail regarding Expenditure Type definitions and examples are provided below for context.

Operations
Operations expenditure is recurrent in nature and is required continuously to provide a service. Operations transactions are typically relatively small (immaterial) and have benefits which are expected to last less than 12 months. Operations expenditure excludes Maintenance.

Operations expenditure does not physically modify an asset. Operations expenditure includes service provision activities such as cleaning, grass cutting, utility service charges, hazard assessments, condition assessments, fault monitoring, network condition assessments and associated administrative and supervision costs.

In relation to commonly used terminology in the road industry, Routine Maintenance includes Operations service provision activities (as well as Maintenance work activities).
Maintenance

Maintenance expenditure is recurrent in nature and is required continuously to provide a service. Maintenance transactions are typically relatively small (immaterial) and have benefits which are expected to last less than 12 months. Maintenance expenditure excludes Operations expenses.

Maintenance expenditure will physically modify an asset. Maintenance expenditure includes work activities such as pothole patching, minor patching, major patching (<500 m²), edge break repair, shoulder grading, tree trimming, tightening / tensioning of asset elements and minor concrete patching. Maintenance expenditure also includes replacement of asset components where the expenditure is not considered material, such as guidepost replacement or light globe replacement.

In relation to commonly used terminology in the road industry, Routine Maintenance includes Maintenance work activities (as well as Operations service provision activities).

Renewal

Renewal expenditure is periodic in nature. Renewal includes expenditure on an existing asset or on replacing an existing asset to return the degraded service capability, of the asset, to its original designed capability or modern day equivalent. Renewal transactions are typically relatively large (material) in value compared with the value of the components of the asset being renewed and have benefits which are expected to last in excess of 12 months.

In relation to commonly used terminology in the road industry, Renewal works include periodic maintenance, resurfacing, major patching (≥500 m²), rehabilitation and asset replacement works considered material. Material Renewal expenditure is not to be captured as Maintenance, as Renewal benefits are expected to last in excess of 12 months.

Upgrade

Upgrade expenditure is discretionary in nature and is associated with improving service levels. Upgrade includes expenditure on an existing asset, which enhances the service capability or function (where an option existed for renewal without the enhanced capability or functionality).

In relation to commonly used terminology in the road industry, Upgrade works are often referred to as minor improvement works or Development works.

Expansion

Expansion expenditure is discretionary in nature and is associated with improving service levels. Expansion includes expenditure that extends the capacity of an existing asset or which creates new assets, to provide benefits to a new group of users.

In relation to commonly used terminology in the road industry, Expansion works are often referred to as major projects or Development works.

Upgrade and Expansion expenditure types are often reported together and referred to as Development works. Development expenditure will result in an immediate increase to operations and maintenance liabilities and an increase to future renewal liability, because of the increase in asset portfolio.

1.4. Asset Hierarchy

VicRoads has adopted an asset classification structure to group asset types, as illustrated in Figure 3. This grouping of asset types enables the efficient development of preservation strategic plans, to cover all asset types within the road infrastructure systems asset class. This strategic plan is focussed on flexible pavements and pavement surfacing (including sealed shoulders) and associated formation/subgrade. The scope of this strategic plan excludes rigid and unsealed pavements as well as pavement markings.
Figure 3: Asset Classification Structure for Road Infrastructure Assets
1.5. Definitions and Acronyms

**AMAF** – An acronym meaning Asset Management Accountability Framework. The AMAF was issued by the Victorian Department of Treasury and Finance in 2016. The AMAF outlines a series of principles and parameters which Responsible Bodies (e.g. VicRoads) and Accountable Officers (e.g. VicRoads CEO) must establish to comply with the mandatory requirements for attestation.

**Asset Management** – Asset Management is “the coordinated activity of an organization to realize value from assets” (ISO 55000:2014). Asset Management is “the combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner” (IPWEA IIMM 2015).


**ISO 55001** – ISO 55001 is a document that specifies the requirements for an integrated, effective management system for asset management.

Note: ISO 55001 defines requirements for an asset management system, in the same way as ISO 9001 specifies a quality management system, and ISO 14001 covers an environmental management system. ISO 55001 is not, therefore, a specification for an asset information management system (sometimes called “Enterprise Asset Management”. However, such software tools can be useful aids (‘enablers’) for information management and work control elements of good asset management.

**RMC** – An acronym meaning Road Maintenance Category. VicRoads assigns an RMC category to each road section to assist with managing risk and level of service criteria, for road sections with different function and use characteristics.

**Rural** – ‘rural area’ means, in relation to a road, an area that is not an urban area as defined in the Road Management Act 2004. Refer definition of Urban below.

Further detail is provided in the Operational Responsibility for Public Roads (S 174) Code of Practice.

**Scenario** – A scenario is an investment option. Each scenario will result in a particular risk and level of service outcome. Scenarios are used to assist with making evidence based assessments of options to balance the interrelated asset management elements of cost, risk and service level.

**Urban** – has the same meaning as in section 3(1) of the Road Management Act 2004, as follows:

"urban area" means, in relation to a road, an area in which—

(a) a speed limit of 60 kilometres per hour or less applies not being a speed limit which applies only because of a temporary reason such as roadworks or a street event; or

(b) there are buildings on land next to the road, or there is street lighting, at intervals not exceeding 100 metres for—

(i) a distance of at least 500 metres; or

(ii) if the length of the road is less than 500 metres, over the length of the road;

Further detail is provided in the Operational Responsibility for Public Roads (S 174) Code of Practice.

**WPMS** – Works Performance Management System.
2. Strategic Alignment

2.1. VicRoads Priorities and Strategic Interventions

Victorian transport objectives are articulated in the Transport Integration Act 2010 (TIA). VicRoads is working with its 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

2.2. 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, as follows:

- (a) to provide and maintain, as part of a network of roads, roads for use by the community served by the road authority;
- (b) to manage the use of roads having regard to the principle that the primary purpose of a road is to be used by members of the public and that other uses are to be managed in a manner which minimises any adverse effect on the safe and efficient operation of the road and on the environment;
- (c) to manage traffic on roads in a manner that enhances the safe and efficient operation of roads;
- (ca) to design, construct, inspect, repair and maintain roads and road infrastructure;
- (d) to coordinate the installation of infrastructure on roads and the conduct of other works in such a way as to minimise, as far as is reasonably practicable, adverse impacts on the provision of utility or public transport services;
- (e) to undertake works and activities which promote the functions referred to in paragraphs (a), (b), (c) and (ca) and to undertake activities which promote the function in paragraph (d).
2.3. Hierarchy of Asset Management and Planning Documents

VicRoads is seeking alignment with the following industry asset management standards:

- ISO 55001: Asset management – Management systems – Requirements
- AMAF: Department of Treasury and Finance Asset Management Accountability Framework

To demonstrate the requirements of the above asset management standards, it is advantageous to demonstrate how core administrative instruments link together to deliver integrated planning outcomes. Figure 4 illustrates the VicRoads Hierarchy of Asset Management and Planning Documents. This document hierarchy does not include all administrative instruments required to administer whole of business asset management functions. Rather, it incorporates core documents considered necessary for VicRoads to conduct integrated business planning in accordance with the AMAF and ISO55001. This document hierarchy demonstrates how asset management planning documents link with the business area planning process and associated budget bid documentation.
Refer to Figure 5 for further detail.

Figure 4: VicRoads Asset Management and Planning Document Hierarchy
A number of the required Foundation and Strategic Planning documents shown in Figure 4 are under development, as part of the VicRoads Asset Management Transformation Project.

Figure 5 provides further detail regarding documents covered within Operations, Preservation and Development Strategies, in order to demonstrate how this document fits into the VicRoads Asset Management System (AMS). The Pavement Management Strategic Plan is one of a number of current and proposed Preservation Strategic Plans.

VicRoads develops separable Operations, Preservation and Development strategic plans in order to differentiate between different program objectives. It is important to note that operational business areas are expected to work together to identify opportunities to combine projects from different programs, which are in the same location, into combined projects that maximise delivery efficiencies.
3. Asset Management Principles

Asset Management comprises a number of interrelated functions spanning across the whole of the VicRoads business. To assist with explaining how asset management functions relate to VicRoads statutory obligations, priorities and interventions, VicRoads is in the process of developing a comprehensive Asset Management Framework that will further articulate asset management principles, as shown in Figure 6.

These asset management principles apply to all assets within the VicRoads portfolio. These asset management principles have been adopted to guide the Pavement Management Strategic Plan. This strategic plan further articulates how these asset management principles apply to management of the pavement portfolio.

The VicRoads Asset Management principles have been prepared to align and support wider Victorian Government initiatives.

3.1. Reinforce Road Safety

The wellbeing of the community is a key outcome for the Victorian Government. The Department of Environment, Land, Water and Planning (DELWP) has prepared the Metropolitan Planning Strategy that outlines objectives / principles that impact on wellbeing, including “Strong communities” and “Living and working locally”. In recognition of these objectives, the VicRoads Corporate Plan has the following key objective, “Improve the safety of the road system for all road users and reduce deaths and injuries”.

Accordingly, VicRoads commitment to wellbeing specifically targets improving safety of the transport system and minimising the risk of harm. Our asset management processes have been developed in consideration of supporting VicRoads and Victorian Government objectives.

Our risk management processes include inspections and hazards response frequency as outlined by the RMA and detailed within the VicRoads Road Management Plan. This strategic plan supports positive outcomes by targeting exposure risk (consideration of the highest trafficked roads carried on the highest order RMC roads) in conjunction with the magnitude of the risk (safety first principles) as well as encouraging positive journeys (minimising risk of unplanned maintenance). Where the available funding envelope is insufficient to adequately remove significant risks to road users in a timely manner, VicRoads manages risk exposure via provision of advisory signage, in accordance with the VicRoads Managing Pavements in Poor Condition Policy (Dec 2015).
3.2. Manage Risks for Customer Needs

The road network exists to support customer needs including the commuting needs of the general public, access by emergency services as well as wider economic benefits resulting from the movement of goods across the network. The Transport Integration Act and the Metropolitan Planning Strategy focus on increasing the competitiveness of Victorian Industry; improving access to work and education; social and economic participation; and a globally connected and competitive city.

In order to support these objectives, this strategic plan includes consideration of the criticality of risks and the potential impact on the desired network outcomes. The VicRoads Corporate Plan reflects the wider objectives specifically:

- Provide access to opportunities and support liveable thriving communities
- Promote economic prosperity through efficient and reliable movement of people and goods

A variety of risks exist across the network. Risks exist in the form of asset failures, cost escalations, breaches of level of service obligations, road safety risks, network availability risks etc. To manage these risks, management processes need to be strengthened to better integrate:

- Use of the Roads in Poor Condition Register;
- Maintenance of the Critical Risk Register;
- An understanding of the cost escalation implications and associated impact on cost of service delivery;
- Improved data capture and associated data analysis to support evidence based decision making;
- Improved understanding of asset performance and failure rates; and
- Setting of targets for technical service levels.

Identified risks have traditionally been managed by prioritising on an urgency basis whilst being aware of levels of service requirements, funding constraints and network demands.

The risk associated with unfunded defect repairs has been managed via temporary control measures including speed reductions and the installation of warning signs. The extent to which road users are exposed to such risks across the network will be minimised in accordance with safety first principles, within the available funding envelope.

The current process of Risk Management and Control is presented in summary form in Figure 7. Critical risks identified will be placed on a Critical Risk Register that will be considered during the development of optimised works programs.
3.3. Community Resilience

Infrastructure Resilience can be defined as the ability to survive an event in the face of complex, uncertain and changing circumstances; it is a way of thinking about both short-term cycles and long term trends. It includes the ability to reduce the magnitude and/or duration of disruptive events, and deliver target levels of service. VicRoads aims to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event.

Our experience informs us:

1. There are increasingly uncertain climatic factors and stretched infrastructure budgets.
2. Historically, timely maintenance and renewal programs are preferable to one-off major reconstruction programs.
3. The task of connecting people with goods and services is growing, and an ‘off-season’ doesn’t exist.
4. Works completed at night and/or during road closures may minimise community impact.

Our stakeholders require the network to provide connectivity and access as a core requirement. Continuity of service is essential. Network resilience includes the ability of an asset to “resist” an event and the asset management system’s ability to “restore” service after an interruption.

Our network is subjected to a number of environmental impacts as well as changing demand. VicRoads has adopted a long-term design approach to the creation of physical infrastructure. Notwithstanding the typically long useful lives of road infrastructure assets, some assets will be adversely impacted by the environment from time to time as follows:

- Localised flooding exceeding design standards
- Bushfires that exceed the scope of the bushfire management strategy
- Land use planning changing in advance of infrastructure planning to meet growing demand
Whilst our assets have some inbuilt ‘resistance’ to the environment, it is not feasible to build all infrastructure to withstand all environmental events. Accordingly, the ‘resistance’ of infrastructure needs to be relevant to the criticality of the asset, including potential service interruption disruption.

In some situations, the response to service disruptions may warrant a lower design standard as an interim measure to restore services, followed by more substantial disaster recovery works at a later date.

VicRoads response to network resilience issues may include:

- Applying knowledge and technology in:
  - Asset management
    - Strengthening asset management processes
    - Quantitative, risk-based analysis
  - Pavement and materials
    - Learning from past performance
    - Leveraging technical experience to inform resilient treatment selection
  - Network planning and access management
    - Route and corridor risk assessments

- Funding
  - Alternative funding scenarios
  - Provision of funding for ‘betterment’ of assets to mitigate against natural disaster events or changes in land use planning

- Delivery
  - Procurement models with works delivery partners to enhance restoration ability

3.4. Demand Management

VicRoads recognises that the environment that our customers use, the road network, has changed over time. Over the past couple of decades, a significant increase in vehicle traffic, particularly commercial traffic has been recorded. This reflects a long period of economic growth experienced in Australia. This growth has been experienced within the metropolitan areas of Victoria as well as parts of our rural network, such as in the South Western region.

Victoria’s population is growing at more than 2% annually, and the number of additional vehicles registered is growing significantly every week. The impact of commercial vehicles must also be considered in the context of changes to permissible vehicle mass limits.

VicRoads commitment to productivity improvements is stated in the VicRoads Corporate Plan, which aligns to State and Federal objectives including Infrastructure Australia’s strategy to expand Australia’s productive capacity whilst improving Australia productivity.

Previous road maintenance and renewal investment models (supported by Federal funding for National highways) resulted in a consistent distribution of funding, across the state-wide arterial network, regardless of road function. This funding distribution model is no longer sustainable in an investment constrained environment. Our stakeholders, including customers and government, require a more cost effective approach to maintenance and renewal investment and the ability to measure and report outcomes.
The Pavement Management Strategic Plan has been developed to support these objectives, where an increasing emphasis has been placed on strategically important roads that carry the highest traffic volumes and carry the highest commercial vehicle volumes. This focus is central to the increased use of Road Maintenance Categories to inform renewal investment decisions.

3.5. Statutory Obligations
VicRoads is a statutory corporation that was established in its current structure under the Transport Integration Act in 2010. The Act provides that VicRoads' primary objective is to provide, operate and maintain the road system consistent with the vision statement in the Act and objectives which emphasise transport integration and sustainability. The statute also requires VicRoads to "...manage the road system in a manner which supports a sustainable Victoria by seeking to increase the share of public transport, walking and cycling trips as a proportion of all transport trips in Victoria".

As a road controlling agency, VicRoads is also required to operate under the RMA. The purpose of the RMA is to establish a coordinated management system for public roads that will promote safe and efficient state and local public road networks and the responsible use of our roads.

Our commitment addressing statutory obligations is inclusive of wellbeing of our workforce and the public in addition to environmental initiatives. Innovation is a constant in the way we approach workplace health and safety as well as environmental management.

3.6. Provision of Service Levels
VicRoads Corporate Plan clearly articulates the desire to put the customer at the heart of everything we do. Each of the five short term priorities are customer focused, including four that are directly impacted by this strategic plan as follows:

- Deliver more predictable journeys for our customers
- Efficient maintenance investment and delivery
- Safe speeds that are right for the road
- More freight, more efficiently with less impact

Identifying the performance metrics to deliver the required network outcomes is a fundamental activity. The inter-relationship between technical service levels, customer service levels, intervention criteria and standards is described in Section 5.5.

Service Levels are considered relative to the investment levels assessed and associated risk profile. VicRoads monitor, evaluate and report service level performance as part of core business functions.

3.7. Financial Sustainability
Prudent financial management is a fundamental requirement of VicRoads across the broad range of its operations. This is particularly important in long term investment decisions related to an asset portfolio worth $47.2 billion, including $12.6 billion of pavement assets plus additional $8.1 billion for earthworks (as at 30 June 2017).

Central to this is the ability to adequately balance:
- Service level
- Risk
- Cost

Understanding current and long term maintenance and renewal needs, relative to the performance and risk implications, is a key outcome of this Pavement Management Strategic Plan.

VicRoads has invested in data and data management systems to support effective decision making. Data that is timely, consistent and of a known information quality level is being used within a pavement management system to:

- Determine maintenance and renewal requirements for pavement and surfacing assets across the Victorian arterial network
- Develop candidate four year works programs, inclusive of prioritisation considerations
- Evaluate modelling scenarios to inform investment options

4. Core Pavement Management 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. The effective delivery of community services, through management of a portfolio of assets, requires integrated planning processes. 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.

The adoption of sophisticated management practices enables increased benefits to be realised. This strategic plan enables the realisation of Victorian transport objectives presented in Section 2.1, including moving more freight, more efficiently whilst delivering predictable journeys for our customers.

VicRoads plans for various investment scenarios, such that the associated risk and service level outcomes are relayed to government to enable evidence based decision making. Each year the Victorian government assesses submissions received from VicRoads and makes budget allocation decisions. VicRoads then manages their portfolio of assets to minimise whole of life costs, within the constraints of available budget.

VicRoads delivers a number of core pavement management business activities. Table 1 illustrates the alignment between the whole of portfolio asset management principles, as detailed in Section 3, and more specific pavement management business activities which VicRoads uses to guide planning, investment decisions and asset management processes.
<table>
<thead>
<tr>
<th>Pavement Management Core Business Activities</th>
<th>VicRoads Asset Management Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adopt service focussed outcomes that support road safety, value creation, political and environmental objectives.</td>
<td>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 ✔</td>
</tr>
<tr>
<td>2. Collect data to inform evidence based decisions regarding investment options.</td>
<td>✔ ✔</td>
</tr>
<tr>
<td>3. Adopt predictive modelling techniques to assess network wide costs and benefits for different investment scenarios.</td>
<td>✔</td>
</tr>
<tr>
<td>4. Prepare business cases for funding consideration that reflect the risk and level of service outcomes for pre-defined investment scenarios</td>
<td>✔ ✔ ✔</td>
</tr>
<tr>
<td>5. Apply risk management and balance with levels of service, for optimal outcomes, within the constraints of the available budget.</td>
<td>✔ ✔ ✔</td>
</tr>
<tr>
<td>6. Allocate activity based funding to regions at a program level.</td>
<td>✔ ✔</td>
</tr>
<tr>
<td>7. Leverage local expertise within regions for project level decision making, to empower accountable decision making and increase program efficiency.</td>
<td>✔ ✔</td>
</tr>
<tr>
<td>8. Monitor performance to measure effectiveness of investment decisions, including output, service, access and financial performance metrics.</td>
<td>✔ ✔ ✔</td>
</tr>
<tr>
<td>9. Deliver an annual works program that supports the pavement’s program objectives and expected outcomes.</td>
<td>✔ ✔ ✔</td>
</tr>
<tr>
<td>10. Manage delivery of works programs to achieve state-wide performance targets.</td>
<td>✔ ✔ ✔</td>
</tr>
<tr>
<td>11. Adopt a learning culture to continually improve and evolve our planning processes.</td>
<td>✔</td>
</tr>
</tbody>
</table>
4.1. Core Pavement Management Business Activity #1

*Adopt service focussed outcomes that support road safety, value creation, political and environmental objectives.*

VicRoads is required to support the delivery of Victorian Government objectives. These objectives are broad ranging and the levels of service reflect the commitment VicRoads is making to Government and VicRoads organisational objectives. This mature approach to asset management planning enables VicRoads to proactively provide evidence based information in support of investment requirements required to deliver agreed service levels.

VicRoads understands that to achieve service focussed outcomes, planning around service levels is required. As such, this Pavement Management Strategic Plan describes how VicRoads:

- Aligns Government and VicRoads objectives to Asset Management principles.
- Monitors, evaluates and reports technical service levels, to quantify network outcomes.
- Assesses risk outcomes and investment needs to achieve service level options.

Figure 9 is a schematic, that demonstrates organisational objectives and service level considerations inform the assets required delivering services and ultimately, the budget required to achieve the desired service levels.

![Organisation Management Diagram](image)

**Figure 9 : VicRoads Asset Management Planning Approach**

4.2. Core Pavement Management Business Activity #2

*Collect data to inform evidence based decisions regarding investment options.*

Effective asset management planning relies upon current, accurate and consistently collected data. VicRoads has invested in annual surface condition assessments across the arterial network for more than a decade. These network wide condition assessments collect critical data, to inform evidence based decision making, as follows:

- Roughness
- Rutting
- Surface cracking
- Texture
- Loss of aggregate
- Maintenance Patching
- Deformation
- Binder condition
- Skid resistance (partial network)
- Deflection (project level only)
These parameters are collected and reported across a two or three-year cycle. All data collected is managed centrally and subjected to validation protocols to ensure that the data is fit for purpose to support decision making processes. Figure 10 illustrates the VicRoads pavement data collection program.

![Figure 10 - Co-ordinated Data Collection Program](image)

4.3. Core Pavement Management Business Activity #3

**Adopt predictive modelling techniques to assess network wide costs and benefits for different investment scenarios.**

VicRoads uses a pavement management system (PMS) to enhance management of the pavement asset. The PMS incorporates inventory data, deterioration models, road usage data, functional classification of road sections, climate and terrain data, treatment options, costing data and intervention levels linked to technical service levels.

The PMS predicts the condition of the network into the future, based on investment and treatment intervention options. This enables VicRoads to determine and demonstrate the levels of service that result from different investment options. The PMS demonstrates the quantity of service gap and provides knowledge of the quantity of projects that meet the treatment criteria each year.

The PMS enables VicRoads to conduct:

- Complex modelling – Conduct detailed analyses of cost and service level trade-offs for different scenarios.
- Strategic analysis – Determine the future condition of the road network and analyse the predicted performance consequences of different investment options and management approaches.
- Tactical analysis – generate candidate project lists for work programs across a selected road network.
4.3.1. Deterioration Models
VicRoads has adopted Austroads deterioration models as the primary models to predict future network performance. These Austroads deterioration models are based on more than a decade of empirical data collected and analysed as part of the Austroads Long Term Pavement Performance project. In addition to the Austroads deterioration models, PMS is capable of accommodating further models such as probabilistic models and remaining structural life. The implementation allows a degree of flexibility for the user to calibrate and adjust the models. The adoption of this approach allows VicRoads to realise the benefits associated with tried and tested modelling criteria, to inform evidence based cost, risk and service level trade-off analyses.

The key deterioration models implemented include:

- cracking progression model
- rut depth progression model
- roughness progression model
- loss of aggregate
- maintenance patching
- texture

4.3.2. Intervention Levels
Intervention levels are set to trigger treatment options within PMS analyses. For any given treatment option, different intervention levels are set depending on the functional classification of the road section. This functional classification aligns with the Road Maintenance Categories, as is described in further detail in Section 5.5.3.

4.3.3. Treatment Selection
A range of typical renewal treatment types, that are appropriate for application across the Victorian arterial road network, are built into the PMS. As the cost of treatments can vary in different geographic regions, and also for different treatment types, unit rate costs are used for each combination of VicRoads Region and treatment option.

The PMS enables evaluation of the condition of a pavement section against the intervention (trigger) criteria, and generates a treatment option when the criteria are met. The treatments generated on a single road section over the analysis period are considered a strategy. Several strategies can be generated for a given road section, depending on the way the triggers are defined, as illustrated in Figure 11.
4.3.4. Optimisation

The PMS tool enables optimisation of conditions, road user costs, safety (in the future), maintenance costs or to the specific intervention triggers. The software has built in functionality to enable analysis of the minimum network preservation cost (i.e. minimum budget required) as well as optimisation functionality to analyse a critical path of optimised treatments throughout the analysis period, and across budget categories or sub-networks. The user can customise their optimisation models. Similarly, the user can choose which parameter/parameters are the most important for the optimisation (e.g. the desire to achieve the lowest network level roughness, rutting, cracking or a combination of these). The existing objective function, used to optimise the PMS analyses, is an overall pavement condition index. Future objective functions are expected to include road user costs and safety variables.

For each investment scenario analysed, the PMS selects a strategy for each road section in such a manner that it meets (or at least approaches as close as possible) the optimisation target for each segment of road for each year of the analysis. When a constrained budget is modelled, the selected strategies must meet a dual target, namely (1) achieving the best overall condition (2) not exceeding the available funding envelope.

PMS optimisation is achieved by executing pre-defined scenarios. Additional scenarios may be modelled to allow more detailed analysis of the benefits that can be realised. The outcomes of the state-wide investment scenario modelling are used to inform key VicRoads planning documents and processes as follows:

- Road Asset Management Plan (not developed at the time of writing this strategic plan)
- Business Cases (e.g. VicRoads 2017/2018 Better Roads for More Communities)
- Determining program level allocations and technical service level targets.

Where Regional Services also choose to conduct PMS modelling, for specific regional networks, the outcomes are typically used to inform effective and efficient development of renewal programs within the constraints of the program level allocations advised by Asset Services. This modelling will supplement the candidate treatment sites provided by Asset Services, to better inform project level decision making.
4.4. Core Pavement Management Business Activity #4

Prepare business cases for funding consideration that reflect the risk and level of service outcomes for pre-defined investment scenarios.

Long term asset management planning requires the consideration of risks at the same time as understanding how levels of service are impacted by investment levels. VicRoads recognises that assets deteriorate over time; assets need to be managed and maintained to deliver the required levels of service; and assets require funding to operate and be renewed to provide reliability of service.

In 2017 VicRoads prepared a multi-year Business Case, Better Roads for More Communities, which outlines network outcomes resulting from a range of investment scenarios. This Business Case will be periodically updated as required, as part of the VicRoads annual business planning cycle, and submitted to the Victorian government to assist with informing investment needs for the Victorian pavement asset portfolio.

A consistent approach to the investment scenarios is required over time. As detailed in Section 5.3, the three VicRoads pre-defined scenarios to be considered as a minimum are:

- Current Investment
- Holding Condition Investment
- Sustainable Investment

Business cases will be prepared that are consistent in the presentation of level of service opportunities relative to investment levels and associated risks. VicRoads business cases will have a 10-year outlook and outline investment opportunities for a four year period. This transparency will increase confidence in VicRoads operations from planning through to delivery.

4.5. Core Pavement Management Business Activity #5

Apply risk management and balance with levels of service, for optimal outcomes, within the constraints of the available budget.

VicRoads uses predictive analytics to forecast future asset and service performance. Forecasts include an understanding of service performance, cost escalations and asset risk profiles. The investment scenarios modelled within the PMS inform the VicRoads Road Asset Management Plan (to be developed) and VicRoads Pavement Business Cases. This documentation shall demonstrate the trade-off between costs, risk and service level for each scenario. As part of the annual business planning cycle, these key VicRoads planning documents will be made available to assist the Victorian government with making informed decisions regarding investment needs of the Victorian arterial pavement network.

Annually, a budget allocation is provided to VicRoads for the maintenance and renewal of pavement assets. The budget provided will not necessarily resemble the funding profile identified in one of the scenarios analysed during the annual business planning cycle. Accordingly, VicRoads conducts further analyses to ensure more granular budget allocations and performance metric targets are provided to Regional Services, to drive optimal outcomes within the available state-wide funding envelope.
4.6. Core Pavement Management Business Activity #6

Allocate activity based funding to regions at program level.

Asset Services fulfil a vital role in the coordination of the pavement maintenance and renewal investment planning. Asset Services has developed a multi-year business case that outlines funding requirements pertinent to the investment scenarios presented. This 10-year business case is subject to revision and update to reflect network changes and delivery outcomes.

A draft four year program is extracted from the 10-year plan, which Asset Services utilises to create an initial list of candidate treatment sites. Funding levels for pavement maintenance and renewal investment across the state and between the regions is the result of extensive analysis of available datasets to optimise performance metrics aligned to the Asset Management Objectives.

Asset Services allocates pavement maintenance and renewal funds to each of the seven Regions, typically at a program level. Asset Services also provides the list of candidate treatment sites to Regional Services, to assist regions with efficient project level decision making aligned to state-wide technical service level targets. Although program level allocations to Regions are the norm for VicRoads, project level allocation may be required at times to ensure political commitments are monitored for reporting purposes. Figure 12 illustrates how central network planning by Asset Services integrates with Regional activities, such that delivery of programs is aligned to strategic network planning.
4.7. Core Pavement Management Business Activity #7

**Leverage local expertise within regions for project level decision making, to empower accountable decision making and increase program efficiency.**

Partnership between Asset Services and the seven Regions is critical to ensure the program delivers the required outcomes. Collaboration with the regions enables:

- Local and dynamic pavement asset needs to be considered, that may not have been identified from the network wide analysis;
- Consideration of enhanced local datasets, such as escalating routine maintenance costs, where any efficiency savings can be immediately reinvested;
- Co-ordination and packaging of regionally managed projects, such as drainage and line marking, to realise efficiency opportunities;
- Co-ordination with minor upgrade programs or other network improvements (e.g. road safety programs) that are delivered by the regions; and
- Consideration of imminent or future network demand changes, which would increase service delivery risk on a criticality basis.

VicRoads has seven regions consisting of two metropolitan and five rural regions. Each Region is required to develop maintenance and renewal programs, at the project level. A core input to the pavement and surfacing renewal programs is the candidate list of project sites, generated from the state-wide PMS modelling. Regions may also choose to conduct their own PMS modelling to supplement the candidate treatment sites provided by Asset Services. As part of refining and updating the four year works programs, Regions are required to provide feedback to Asset Services regarding the state-wide PMS candidate list. This enables Asset Services to learn from Regional experience and modify state wide PMS parameters and variables overtime, to ensure more effective modelling outputs.

The Regions are encouraged to complement Asset Services program level decision making via the adoption of robust project level decision supporting tools. Wherever practicable, these regional tools should be configured to align with the organisational metrics such as:

- Pavement materials;
- Deterioration profiles;
- Intervention levels used for state-wide modelling;
- Maintenance industry capability and work effects achievable;
- Maintenance costs, and
- Environment.
4.8. Core Pavement Management Business Activity #8

Monitor performance to measure effectiveness of investment decisions, including output, service, access and financial performance metrics.

Monitoring, evaluation and the transparent reporting of a range of metrics is critical to the evaluation of the effectiveness of investment decisions. Within this strategic plan, VicRoads has set a number of technical performance measures as per the following categories:

- Output;
- Service;
- Access; and
- Financial.

These performance measures are detailed in Section 5.5.2. The reporting mechanism will vary depending on the measure. An annual network report will be provided to the VicRoads Executive, to ensure top management is aware of network performance being achieved. This annual reporting will also be available to the public via the VicRoads corporate website.

Targets for each performance measure will be determined prior to the end of the 2018 calendar year. VicRoads will explore opportunities to incorporate a sub-set of these performance measures into central government strategies and annual reporting to the Department of Treasury and Finance.

4.9. Core Pavement Management Business Activity #9

Deliver an annual works program that supports the pavement program objectives and expected outcomes.

VicRoads employs a number of maintenance delivery mechanisms to deliver the physical works across the state. These mechanisms include:

- Service Level Agreements
- Alliance Agreements
- Individual program and project contracts

Maintenance and renewal projects are delivered by Regional Services. The individual projects are selected in line with the program objectives. Achievement reporting is required to characterise the outcomes of the physical works to evaluate the effectiveness of the annual works program against the expected outcomes.

Network condition is dynamic and Regional Services play a key role in information management and maintaining the currency of the network attributes. Timing and accurate feedback loops are an essential element of delivery of the annual works program.
4.10. Core Pavement Management Business Activity #10

**Manage delivery of works programs to achieve state-wide performance targets.**

To ensure alignment across VicRoads business areas, the performance measures within this strategic plan will be developed as a collaborative effort from Asset Services and Regional Services. This will include the setting of Region specific targets to inform the development of the four year works programs. These Regional performance measure targets will provide guidance to Regional Services regarding post-delivery expectations, to achieve the state-wide performance measure targets.

VicRoads regional delivery models will be configured to maximise the realisation of efficiency opportunities. By cascading the state-wide performance targets to the Regional Services, greater clarity for the Regional Services is provided. In this environment, Regional Services are better positioned to manage delivery of the annual works programs by bundling / packaging projects from different programs, such as drainage or line marking projects. Additionally, Regional Services can commence early preparation works for future annual programs. For example, shoulder reinstatement, drainage reinstatement, vegetation clearing, culvert clearing, etc. can all be undertaken in preparation for future pavement works programs.

4.11. Core Pavement Management Business Activity #11

**Adopt a learning culture to continually improve and evolve our planning processes.**

VicRoads embraces continuous improvement as an integral aspect of this Pavement Management Strategic Plan. Continuous improvement of processes, personnel and technology is a primary way to ensure the asset portfolio enables delivery of community services safely, effectively and efficiently.

The VicRoads Asset Management Strategic Framework (under development at the time of writing this strategic plan) provides overarching guidance regarding whole of organisation continuous improvement priorities. There are several improvement opportunities already underway or planned, as summarised in Section 7.
5. Pavement Management Investment Decision Making Principles

VicRoads adopts a range of processes to balance cost, risk and service levels. This section provides an overview of the key considerations used to make informed investment decisions for pavement maintenance and renewal programs. Figure 13 outlines key criteria which inform our investment decision making criteria.

![Decision Making Model Overview](image)

5.1. Investment Drivers

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

- Safety
- Economic Benefits
- Functionality
- Network Preservation
- Whole of Life Costing
- Capacity
- Quality
- Responsiveness
5.2. Planning Horizons
The Victorian arterial road network has been developed over more than a century. The network needs, to meet required levels of service, are not homogenous. As such, the asset investment needs will vary in a non-linear manner across the state.

Assets deteriorate over time as a result of network use and environmental factors. The impacts of the environmental factors are relatively well understood, but climate impacts are somewhat unpredictable.

Road pavements are long life assets, provided that appropriate asset preservation activates are undertaken in a timely manner. The pavement structure can have a useful life of decades, whilst pavement surfacing typically has a useful life of 10 to 15 years.

The expected useful life of a pavement and pavement surfacing assets is impacted by our customers using the road network. The actual useful life of a pavement or pavement surfacing varies on a road by road basis, depending on the type and quality of construction, traffic, drainage and environmental factors. Asset consumption is greatest from commercial vehicles, with the impact of a single commercial vehicle being equivalent to approximately 2,000 to 10,000 passenger vehicles.

VicRoads has adopted a minimum 10-year investment horizon for strategic decision making. This will provide sufficient confidence that annual variations in performance, cost and risk can be considered appropriately whilst noting the uncertainty related to future network demand and environmental changes. VicRoads uses these strategic modelling outputs to develop a more detailed four year forward program. This four year forward program is then developed into an annual delivery plan.

5.3. 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. Scenario modelling enables the evaluation of alternative options for network level investment. For pavement and surfacing assets, VicRoads uses predictive tools and techniques to model the following different investment scenarios as a minimum:

1. **Current Investment** – assumes the current level of funding is maintained over the 10-year planning horizon, with a nominal CPI increase each year. This investment considers any efficiency targets that may be in place from central government. This investment level is unlikely to realise additional benefits related to road safety and predictable journeys for our customers.

2. **Holding Condition Investment** – assesses the level of funding required to hold the network condition at the current level of service. This option will typically hold the residual maintenance and renewal liability in year 0 at a similar level in year 10. This investment level is likely to realise moderate additional benefits related to road safety and predictable journeys for our customers.

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. This investment level provides the opportunity for Victorian Government objectives such as efficiency, road safety and journey benefits to be maximised.

Additional scenarios may be modelled, at a state-wide or regional level, to allow more detailed analysis of the benefits that can be realised. 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 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, as outlined in Section 5.5.3. 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, as outlined in Section 5.4, 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.

5.3.1. **Current Investment Scenario**

**Investment:** The current investment scenario presumes that the funding envelope available, over the 10-year planning horizon, will be relatively static. The funding envelope available in the current year (year 0) is taken as the base level of investment for years 1 to 10, with minor adjustments accounting for:

- Annual CPI increase – increases funding envelope year on year
- Known efficiency targets – decreases funding envelope year on year

**Level of Service:** At the time of writing this strategic plan, the current funding envelope was less than what is required to hold the network at current technical service levels. As such, this scenario will result in the ongoing deterioration of the Victorian arterial network, resulting in:

- a reduction in the network service levels provided to road users over time
- an increasing maintenance and renewal liability over time

**Risk:** The deteriorating level of service resulting from the current investment scenario presents increased risk to Government, VicRoads and the community utilising the Victorian arterial road network.

**Community Outcomes:** The deteriorating level of service and the increased risk associated with the current investment scenario is likely to result in community dissatisfaction.

5.3.2. **Holding Condition Investment Scenario**

**Investment:** The holding condition investment scenario forecasts that the funding envelope available, over the 10-year planning horizon, will be sufficient to keep current service levels at the same level. The funding envelope available in the current year (year 0) has no impact on future years. Rather, the required funding envelope for the holding condition investment scenario is determined based on a needs assessment against agreed intervention levels, aligned to technical service levels.
At the time of writing this strategic plan, the current funding envelope was less than what is required to hold the network at current technical service levels. As such, this scenario will result in an increase in the required investment level for year 1, with required investment in subsequent years fluctuating depending on service need.

**Level of Service:** This scenario will result in the network service levels remaining relatively constant year on year, resulting in a relatively constant maintenance and renewal liability over time.

**Risk:** The constant level of service resulting from the holding condition investment scenario results in a relatively static risk profile to Government, VicRoads and the community utilising the Victorian arterial road network.

Presuming an appropriate level of flexibility in program level allocations, for various maintenance and renewal work activities, there is scope to marginally reduce risk levels through targeted work activity allocations.

**Community Outcomes:** The relatively stable level of service and associated risk profile associated with the holding condition investment scenario is likely to result in localised pockets of improved community sentiment, with contrasting localised pockets of continued and increasing community dissatisfaction. A community survey of a representative sample, covering road users across the entire state, is expected to produce average results similar to current community sentiment.

### 5.3.3. Sustainable Investment Scenario

**Investment:** The sustainable investment scenario forecasts that the funding envelope available, over the 10-year planning horizon, will be sufficient to improve current service levels such that the current maintenance and renewal liability is reduced to nil after 10 years. The funding envelope available in the current year (year 0) has no impact on outer years. This scenario provides a desirable long term value for money outcome, by optimising investment needs to achieve target service levels at lowest life cycle cost. The investment level is expected to fluctuate year on year, in line with forecast network performance.

**Level of Service:** This scenario will result in the network service levels improving over time, such that technical service level targets will be entirely achieved on or before year 10 of the planning horizon. All speed restrictions and advisory signage service reductions will be removed from the network.

**Risk:** The improving level of service resulting from the sustainable investment scenario results in decreased levels of risk to Government, VicRoads and the community utilising the Victorian arterial road network.

**Community Outcomes:** The improving level of service and associated risk profile associated with the sustainable investment scenario is likely to result in improved community sentiment, provided community expectations are appropriately managed via communication and engagement.
5.4. Road Maintenance Categories

VicRoads manages the roads for which it has responsibility under the RMA in accordance with the VicRoads Road Management Plan.

The Road Management Plan references an RMC for each road section that VicRoads is responsible for. The nominated RMC for each road section has been determined according to an assessment of risk, taking into account factors such as road classification, road type, and traffic volume and traffic type.

Road Maintenance Categories also 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.

VicRoads uses Road Maintenance Categories to assist with prioritisation of maintenance and renewal investment on the road network. To improve the granularity of the network scenario modelling, RMC categories “4” and “5” have been subdivided as presented in Table 2.

![Table 2: Road Maintenance Categories and definitions](image)

Table 2: Road Maintenance Categories and definitions

<table>
<thead>
<tr>
<th>Road Management Category*</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Metropolitan Freeway</td>
</tr>
<tr>
<td>2</td>
<td>Major Urban Arterial or Rural Freeway</td>
</tr>
<tr>
<td>3</td>
<td>Urban Arterial or Major Rural Arterial</td>
</tr>
<tr>
<td>4.1</td>
<td>Rural Arterial that connects major regional centres</td>
</tr>
<tr>
<td>4.2</td>
<td>Rural Arterial carrying moderate traffic</td>
</tr>
<tr>
<td>5.1</td>
<td>Rural Arterial carrying low traffic</td>
</tr>
<tr>
<td>5.2</td>
<td>Rural Arterial carrying very low traffic</td>
</tr>
</tbody>
</table>

* Road Management Categories 4 and 5 have each been split into two sub-categories to provide greater granularity, in accordance with the VicRoads 2017 Better Roads for More Communities Business Case.

5.5. 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.

The arterial network is vital infrastructure that supports Victorian Government objectives. Our approach to maintenance and renewal planning incorporates consideration of needs of customers and Government priorities, including:

- Economic development across the region via consideration of freight/business outcomes;
- Multimodal transport outcomes by considering public transport;
- Supporting tourism outcomes including tourism operators and visitors to the region;
- Protection and consideration of vulnerable road users including pedestrians and motorcyclists; and
- Enhanced road safety outcomes that reduce road trauma.

Establishing maintenance and renewal standards requires an understanding of customer expectations, government priorities, the effectiveness of maintenance interventions and the performance characteristics of the asset portfolio. 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 cover the following metric categories:

- Output measures
- Service measures
- Access measures and
- Financial measures.

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. VicRoads is committed to continuous improvement, including a focus on development of an integrated performance monitoring regime. The VicRoads performance monitoring regime will be further developed over the next two years, including input from Transport For Victoria (TFV) to collaboratively define and agree service levels and performance metric targets.

5.5.1. Customer Service Levels
There are a broad range of stakeholders who have a vested interest in the way in which the Victorian Road Network operates. Stakeholders include:

- General public including commuters
- Government Agencies
- Public transport operators
- Freight industry including transport companies and owner operators
- Tourism businesses
- Maintenance contractors
- Local and regional advocacy groups (e.g. RACV, Bicycle Victoria, etc.)
- Emergency services (Police, SES, CFA, etc.)
- Road safety professionals
- Cyclists
- Motorcyclists

The perspective of the stakeholders varies but common expectations include the following:

- A safe environment free from hazards;
- Access within and between communities;
- Coordinated and integrated maintenance;
- Proactive and effective communications resulting in minimal unplanned disruption; and
- Provision of resilient roads that maintain access for communities and emergency services in all weather and environmental conditions.
At the time of writing this strategic plan, VicRoads did not have a set of defined Customer Service Levels. Research is conducted that provides an insight into customer expectations and levels of satisfaction. Independent research\(^2\) of our customers indicates that:

- Almost 90% of the Victorian population consider freeways and arterials as being “somewhat important” or “very important” in daily commuting
- Reducing congestion and road safety were the top two investment priorities for all Victorian geographic location groups.
- 75% of respondents indicated that VicRoads arterials are “very congested” or “somewhat congested”
- 80% of respondents indicated that investment should be directed to existing infrastructure rather than new roads

Further detail is available within the Customer Needs Survey however there is general alignment in the customer responses regardless of respondent location.

### 5.5.2. Technical Service Levels

VicRoads is moving towards utilising a balanced set of performance metrics within the following categories:

- Output measures
- Service measures
- Access measures and
- Financial measures.

The performance metrics used to describe the Technical Service Levels will be used for a range of different business purposes, including:

- Informing Renewal Investment Decisions
- Organisational Reporting to the VicRoads Executive
- Whole of Government Assurance Reporting

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 18.

Technical service levels can also be described as performance measures. Any performance measure is made up of both a ‘description’ of how the metric will be measured and a ‘target’ providing a goal to drive investment decision making. This Pavement Management Strategic Plan documents the suite of performance measures that will be monitored by VicRoads going forward; however, it does not detail the targets to be adopted. Targets will be set in the future, as part of this new performance monitoring regime, as VicRoads beds down monitoring processes and better understands the investment required to achieve specified outcomes.

The setup of this new performance monitoring regime will be overseen by the Pavement Management Steering Committee and will initially include an evaluation of historical performance where practicable, ideally

\(^2\) Ipsos Customer Needs Survey 2015
looking back four years. These historical performance trends will provide empirical evidence to inform the setting of achievable targets.

VicRoads has chosen to adopt a number of the performance metrics included within the *Austroads Data Standard for Road Management and Investment in Australia and New Zealand (2017)*, supplemented by a range of metrics developed specifically to meet VicRoads needs. The following tables summarise the technical service levels to be used to manage the pavement and surfacing asset portfolio.

VicRoads will monitor and evaluate the performance metrics in Tables 3 to 6. VicRoads will report annually to the VicRoads Executive regarding the network performance achieved in the preceding year. A sub-set of these performance measures are reported to the Victorian Expenditure Review Sub-Committee (ERSC), including the setting of annual targets, as follows:

- Output Technical Performance Measures: PO-5, PO-6 and PO-7

### Table 3: Output Technical Performance Measures

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Description</th>
<th>Measure</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO-1</td>
<td>Resurfacing coverage across sealed network</td>
<td>The area of the sealed pavement network resurfaced (i.e. sprayed seal and thin asphalt), expressed as a percentage of the total sealed network area at the start of the financial year.</td>
<td>%</td>
<td>5.1</td>
</tr>
<tr>
<td>PO-2</td>
<td>Reseal coverage across sealed network</td>
<td>The area of the sealed pavement network resurfaced with a sprayed seal, expressed as a percentage of the total sealed network area covered by sprayed seal at start of the year.</td>
<td>%</td>
<td>New KPI</td>
</tr>
<tr>
<td>PO-3</td>
<td>Asphalt resurfacing coverage across sealed network</td>
<td>The area of the sealed pavement network resurfaced with a thin asphalt treatment, expressed as a percentage of the total sealed network area covered by asphalt at start of the financial year.</td>
<td>%</td>
<td>New KPI</td>
</tr>
<tr>
<td>PO-4</td>
<td>Pavement rehabilitation network coverage</td>
<td>The area of the sealed pavement network rehabilitated, expressed as a percentage of the total sealed network area at the start of the financial year.</td>
<td>%</td>
<td>0.4</td>
</tr>
<tr>
<td>PO-5</td>
<td>(ERSC Report) Road area treated: high strategic priority roads</td>
<td>Total square meters of renewal treatment, including rehabilitation and resurfacing, delivered within the financial year on Road Maintenance Category 1, 2 and 3 roads</td>
<td>( m^2 \times 10^3 )</td>
<td>New KPI</td>
</tr>
<tr>
<td>PO-6</td>
<td>(ERSC Report) Road area treated: medium strategic priority roads</td>
<td>Total square meters of renewal treatment, including rehabilitation and resurfacing, delivered within the financial year on Road Maintenance Category 4.1 and 4.2 roads</td>
<td>( m^2 \times 10^3 )</td>
<td>New KPI</td>
</tr>
<tr>
<td>PO-7</td>
<td>(ERSC Report) Road area treated: low strategic priority roads</td>
<td>Total square meters of renewal treatment, including rehabilitation and resurfacing, delivered within the financial year on Road Maintenance Category 5.1 and 5.2 roads</td>
<td>( m^2 \times 10^3 )</td>
<td>New KPI</td>
</tr>
</tbody>
</table>
### Table 4: Service Technical Performance Measures

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Description</th>
<th>Measure</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS-1</td>
<td>Level of Service for rural network</td>
<td>Network length within intervention levels, including roughness, rutting and cracking, measured as a percentage of total road network length</td>
<td>%</td>
<td>New KPI</td>
</tr>
<tr>
<td>PS-2</td>
<td>Level of service for urban network</td>
<td>Network length within intervention levels, including roughness, rutting and cracking, measured as a percentage of total road network length</td>
<td>%</td>
<td>New KPI</td>
</tr>
<tr>
<td>PS-3</td>
<td>Rural roughness intervention level</td>
<td>(ERSC Report) Road length meeting roughness standard: regional</td>
<td>%</td>
<td>95.6</td>
</tr>
<tr>
<td>PS-4</td>
<td>Urban roughness intervention level</td>
<td>(ERSC Report) Road length meeting roughness standard: metropolitan</td>
<td>%</td>
<td>92.6</td>
</tr>
<tr>
<td>PS-5</td>
<td>Rural rutting intervention level</td>
<td>(ERSC Report) Road length meeting rutting standard: regional</td>
<td>%</td>
<td>97.4</td>
</tr>
<tr>
<td>PS-6</td>
<td>Urban rutting intervention level</td>
<td>(ERSC Report) Road length meeting rutting standard: metropolitan</td>
<td>%</td>
<td>95.6</td>
</tr>
<tr>
<td>PS-7</td>
<td>Rural cracking intervention level</td>
<td>(ERSC Report) Road length meeting cracking standard: regional</td>
<td>%</td>
<td>98.7</td>
</tr>
<tr>
<td>PS-8</td>
<td>Urban cracking intervention level</td>
<td>(ERSC Report) Road length meeting cracking standard: metropolitan</td>
<td>%</td>
<td>88.7</td>
</tr>
</tbody>
</table>

### Table 5: Access Technical Performance Measures

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Description</th>
<th>Measure</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA-1</td>
<td>Speed Restriction service reduction</td>
<td>Length of network with speed restrictions, measured quarterly.</td>
<td>Km</td>
<td>New KPI</td>
</tr>
<tr>
<td>PA-2</td>
<td>Advisory Signage service reduction</td>
<td>Length of network with advisory warning signage, measured quarterly.</td>
<td>Km</td>
<td>New KPI</td>
</tr>
<tr>
<td>Number</td>
<td>Name</td>
<td>Description</td>
<td>Measure</td>
<td>Current</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td>-------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>PF-1</td>
<td>Pavement Capital Spend – Renewals</td>
<td>Renewal capital is expenditure on an existing asset or on replacing an existing asset, which returns the service capability of the asset up to that which it had originally (e.g. resurfacing or resheeting a material section of the road network, replacing a material section of a drainage network with pipes of the same capacity). Measured as a three-year rolling average of historical capital spend, excluding upgrade and expansion capital expenditure. NOTE: Historical definitions of road network maintenance expenditure covered both maintenance and renewal. Renewal expenditure (Capex) is not considered maintenance expenditure (Opex).</td>
<td>$ x10^3</td>
<td>New KPI</td>
</tr>
<tr>
<td>PF-2</td>
<td>Pavement Recurrent Spend – Maintenance</td>
<td>Maintenance is recurrent expenditure, which is regularly required as part of the anticipated schedule of works required to ensure that the asset achieves its useful life and provides the required level of service (e.g. defect patching, guard rail tensioning). Measured as a three-year rolling average of historical recurrent spend, excluding operations and depreciation expenditure. NOTE: Historical definitions of road maintenance expenditure covered both maintenance and renewal. Maintenance expenditure (Opex) excludes renewal expenditure (Capex).</td>
<td>$ x10^3</td>
<td>New KPI</td>
</tr>
<tr>
<td>PF-3</td>
<td>Asset Renewal Funding Ratio</td>
<td>The ratio of asset renewal and replacement expenditure for a period relative to the asset renewal and replacement expenditure identified as warranted in an asset management plan for the same period. It assesses the entity's asset renewal and replacement performance. NOTE: Where an entity does not yet have a reliable forecast of renewal requirements, it should cautiously adopt the Asset Sustainability Ratio as a substitute.</td>
<td>%</td>
<td>New KPI</td>
</tr>
<tr>
<td>PF-4</td>
<td>Asset Sustainability Ratio</td>
<td>The ratio of asset replacement expenditure relative to depreciation for a period. It measures whether assets are being renewed at the rate they are wearing out.</td>
<td>%</td>
<td>New KPI</td>
</tr>
</tbody>
</table>
5.5.3. Intervention Criteria

VicRoads has a range of technical intervention criteria that are used to both trigger treatments in network level scenario modelling as well as monitor and report performance in the context of Technical Service Levels. The primary technical intervention criteria used to manage pavement and surfacing assets are as follows:

1. **Roughness** – a measured condition of the longitudinal smoothness of the road. This condition affects safety, road user costs, sensitive freight and VicRoads routine maintenance costs.

2. **Rutting** – a measured condition of the transverse shape of the road. This condition affects safety, road user costs (indirectly), sensitive freight and VicRoads routine maintenance costs.

3. **Cracking** – a measured condition of the extent of cracking of the road surface. This condition affects waterproofness, road user costs (indirectly) and VicRoads routine maintenance costs and is key criteria used to inform network preservation performance metrics.

4. **Loss of Aggregate** – a measure of amount of stone lost from the road surface. This measure affects skid resistance of the road.

5. **Maintenance Patching** – a measure of the extent of patching, which is a proxy for identifying low strength pavement. This measure affects whole of life pavement costs.

6. **Loss of Texture** – a measure of the extent of surface macrotexture between bituminous layer and top of surfacing aggregate. This measure affects road safety as a result of loss of macrotexture and associated increase of the risk of aquaplaning.

These intervention criteria are specific, measureable and able to be monitored over time. VicRoads have monitored and reported these intervention criteria over more than a decade, including reporting of trends at Regional level. This provides a framework for benchmarking against future targets, for assessment of the effectiveness of the delivered program.

Intervention Levels are used to trigger specific renewal activities within sophisticated Pavement Management System models. In recognition of different customer needs and associated differences in road use and function across the Victorian arterial network, VicRoads has 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 is using a PMS to assist with modelling various investment scenarios (refer Section 4.3). Figure 19 lists the intervention levels used within the state-wide PMS modelling tool.

<table>
<thead>
<tr>
<th>RMC Category</th>
<th>Periodic Intervention Resurfacing criteria</th>
<th>Renewal Intervention Rehabilitation criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Level 1</td>
<td>2.9 IRI roughness 10 -12mm rutting &gt;10% cracking</td>
<td>3.4 IRI roughness &gt;12mm rutting No limit</td>
</tr>
<tr>
<td>Service Level 2</td>
<td>3.0 IRI roughness 10 -12mm rutting &gt;10% cracking</td>
<td>3.8 IRI roughness &gt;12mm rutting No limit</td>
</tr>
<tr>
<td>Service Level 3</td>
<td>3.0 IRI roughness 12 -15mm rutting &gt;20% cracking</td>
<td>3.8 IRI roughness &gt;15mm rutting No limit</td>
</tr>
<tr>
<td>Service Level 4</td>
<td>3.4 IRI roughness 12 -15mm rutting &gt;20% cracking</td>
<td>4.2 IRI roughness &gt;15mm rutting No limit</td>
</tr>
<tr>
<td>Service Level 5</td>
<td>3.8 IRI roughness 12 -15mm rutting &gt;20% cracking</td>
<td>4.6 IRI roughness &gt;15mm rutting No limit</td>
</tr>
</tbody>
</table>

*Figure 19: Indicative Network Wide Intervention Criteria*
Maintenance and renewal of the road network is essential to the delivery of the Victoria Government’s objectives. Generally speaking, there are two types of work activities adopted across the network, as follows:

- **Maintenance**
  - Often referred to as **routine maintenance**, comprises short term day to day work activities to address minor defects such as fixing potholes and identified defects.

- **Renewal** – inclusive of both periodic and rehabilitation treatments
  - **periodic** involves resurfacing to prevent water infiltrating the pavement structure and to improve the surface friction of the pavement surface.
  - **rehabilitation** involves a more significant treatment to improve the structural condition of the pavement and bring the pavement surface back to an acceptable condition.

VicRoads analytical modelling includes both periodic and rehabilitation renewal activities across the entire network. As described above, the scalable intervention criteria, by Road Maintenance Category, reflect the differing service levels related to differing requirements across the network. These intervention levels are configured as part of the state-wide PMS scenario modelling.

Network wide scenario modelling provides guidance on expected future performance across the whole of the Victorian arterial road network. VicRoads are committed to inclusion of feedback from across the State using local network knowledge. Regional modelling allows for the consideration of:

- network performance models representative of local materials, climate, demand etc.
- local network condition including routine maintenance costs and surface inspection rating
- available maintenance methods and industry capacity
- delivery efficiencies and regional co-ordination (i.e. road safety or improvement projects).

### 5.5.4. **Standards**

Road network standards have been developed and are applicable to the VicRoads arterial road network. These network configuration considerations include geometric standards such as horizontal and vertical geometry, lane width, seal width, shoulder requirements, etc. In consideration of the existing network portfolio, any deficiencies in road network standards present an opportunity to improve to level of service to road users.

Any deficiencies in road network standards are generally not remediated via maintenance or renewal programs. As such, road network standards are not considered as part of analytical scenario modelling for pavement and surfacing assets. Accordingly, this Pavement Management Strategic Plan does not address deficiencies in existing network standards. Rather, deficiencies in road network standards are typically considered within Development strategies and within the VicRoads Improving the Network Sub-program.
6. **Business Area Planning**

VicRoads has developed a comprehensive approach to investment related to asset preservation. By adopting the corporate Asset Management Principles for the management of pavement assets, greater transparency in the annual planning function has been achieved. Vertical alignment of the performance metrics provides clarity to the regions of the outcomes.

The VicRoads approach to business area planning is best described as “balanced”. This Pavement Management Strategic Plan outlines many of the key business activities that are required to deliver the various outcomes expected.

Commitment and overall direction of the Pavement Management Strategic Plan is provided by the VicRoads Director of Asset Services. Asset Services conducts strategic planning functions for all arterial roads across the Victorian network. These functions:

- Feed up to the Department of Treasury and Finance to inform central government investment decisions, including the associated risk and service level implications; and
- Feed down to VicRoads regions to provide budget allocation advice, including performance measure targets to inform program development and delivery.

Regions conduct tactical planning functions for arterial roads within regional delegation. These functions:

- Feed up into strategic planning documents managed by Asset Services; and
- Feed down to operational delivery services, also managed within Regions.

6.1. **Strategic Planning Overview**

In 2016/17 a comprehensive business case was prepared by Asset Services, which outlined options for the long-term preservation of the pavement asset portfolio. This business case represented a step change in documentation of strategic planning practices for VicRoads. This business case outlined the community outcomes, risk and service level trade-off for a range of investment scenarios.

The development of this business case represents a step towards a more mature and sustainable strategic planning model for VicRoads, as shown in Figure 4 of Section 2.3. VicRoads intends to further evolve the current strategic planning model for the management of the pavement assets portfolio (and other asset types). As part of the continuous improvement journey, and to drive more sustainable strategic planning processes, VicRoads will develop other key documents in the future as follows:

- **Roads Asset Management Plan**
  - Prepared by Asset Services
  - Financial, risk and performance component updated annually
  - Scope to include all Preservation, Operations and Development programs
  - Inputs based on standard templates, to enable efficient collation, such as:
    - Regional Maintenance and Renewal Plans
    - Development and Operations forecasts from Planning and Programs
  - Forms a key input into budget bids, such as Business Cases
• **Maintenance and Renewal Plans**
  - Prepared by Regions
  - Financial, risk and performance component updated annually
  - Scope to include Preservation programs only
  - Based on a standard template developed by Asset Services
  - Forms a key input into the Roads Asset Management Plan

• **Business Cases**
  - Prepared by Asset Services
  - Informed by robust Asset Management Plans
  - Developed / updated on an as needs basis
  - May form key document submitted to Transport for Victoria annually

### 6.2. Annual Planning Process Integration

The integration of planning functions between Asset Services and Regions ensures a “balanced” approach to management of Victorian arterial pavement portfolio. This collaboration ensures a bottom-up needs based perspective is incorporated into forward programs, while still ensuring alignment with broader state-wide strategic planning goals. This co-created solution generates more value than either an isolated top-down or bottom-up approach to business planning. Examples of how this balanced approach enables realisation of value to business area planning, are as follows:

- Providing indicative budget allocation advice to Regional Services for multiple years, enables Regions to plan and develop maintenance and renewal programs with greater confidence.
- Setting, monitoring and reporting performance measures, which are common across the organisation, provides alignment between strategic and tactical planning functions.
- Providing templates for data and information exchange supports rolling up and cascading of Regional reporting, creating information management and reporting efficiencies.
- Providing long term objectives that promote continuity of regional programs for efficiency gains. That is, Regions have greater surety of direction and develop indicative multi-year programs with preparatory works undertaken prior to renewal treatments.
- Enabling the Regions to complement central analytical modelling, with more detailed local modelling, to increase the resolution of the four year works programs. This is possible as the regions have additional local knowledge related to materials and pavements performance, maintenance contractor ability and capacity; routine maintenance activity levels; and network changes inclusive of works underway.
- Ensuring that Regional Services provide feedback to the central Asset Services team, so that the state-wide PMS scenario modelling is incrementally improved over time.
- Development of multi-year programs enable opportunities for packaging and bundling of works, both within preservation programs and also across development programs (e.g. minor improvement, safety and renewal projects), by collaboratively altering project timing to realise procurement efficiencies.
- By cascading indicative candidate site lists from state-wide PMS modelling to Regional Services, this will allow Regional Services to conduct targeted site inspection, supplemented by local knowledge.
- Consideration of end to end processes allows alignment of timing for network data collection surveys, data validation and RAS upload, PMS modelling, budget allocation and performance measure target advice, site assessments, program development and delivery.
Figure 21 below demonstrates the planning interdependency of the Asset Services and Regional Services teams.
6.3. Annual Planning Timing

There are several stakeholders and external requirements that influence business area planning. These include:

- Department of Treasury and Finance business case requirements
- Victorian Government Budget requirements and time frames
- Victorian Government Capital and Recurrent budget guidelines
- Road network condition data updates
- Regional planning and procurement requirements
- VicRoads delivery models
- The impact of climate on the delivery of physical works
- Pavement renewal works (inclusive of both periodic resurfacing and pavement rehabilitation) are funded on annual basis coinciding with the financial year. At the time Asset Services pass on annual allocation advice to Regional Services, the expected funding envelope for four years is also advised. That is, one year lock in and a further three years indicative allocation advice is provided to Regional Services. This allows Regional Services to conduct tactical planning functions with confidence and promotes more efficient development of the four year works programs. Central to the Annual Planning Process is the release of VicRoads Program Guidelines. Asset Services will also provide guidance regarding target outcomes, data exchange protocols and any other key considerations. An indicative timeline for Regional annual business planning is presented in Figure 22.
6.4. Annual Performance Monitoring

For every dollar spent on the Victorian arterial road network, there is a contribution to managing or improving service levels. That is, investment of funds results in a consequential change in network performance. Furthermore, the network performance naturally deteriorates over time as a result of road use and environmental factors.

For businesses responsible for large asset portfolios used to deliver core services, it is prudent to measure performance so that an informed assessment can be made of investment efficiency and effectiveness. As detailed in Section 5.5.2 of this strategic plan, VicRoads has adopted a range of technical service levels to allow consistent measurement of performance over time. These technical performance measures are categorised as follows:

- Output measures;
- Service measures;
- Access measures; and
- Financial measures.
VicRoads will prepare an Annual Performance Report, covering all performance measures in Section 5.5.2, in order to transparently report network performance to stakeholders. Stakeholders to whom this annual performance report will be distributed include the following as a minimum:

- VicRoads Executive
- Asset Services
- Regional Services

The Annual Performance Report, or sections of it, may also be used to assist with assurance reporting to other government agencies and advocacy groups such as:

- Transport For Victoria (TFV)
- Department of Environment, Land, Water and Planning (DELWP)
- Department of Treasury and Finance (DTF)
- Victorian Auditor General’s Office (VAGO)
- Royal Automobile Club of Victoria (RACV)

The first version of the Annual Performance Report (i.e. 2017) will:

- Clearly define all performance measures, to remove potential ambiguities
- Assess current and historical (minimum four years) performance; and
- Exclude the setting and assessment of targets.

This first version will be a critical document to inform VicRoads of performance and assist with the task of setting targets for each performance measure. The second and subsequent versions of this Annual Performance Report will include an evaluation of each performance measure against agreed targets.
7. **Pavement Management Improvement Plan**

VicRoads embraces continuous improvement as an integral aspect of this Pavement Management Strategic Plan. Continuous improvement of processes, personnel and technology is a primary way to ensure the asset portfolio enables delivery of community services safely, effectively and efficiently.

The VicRoads Asset Management Strategic Framework (under development at the time of writing this strategic plan) gives overarching guidance for whole of organisation continuous improvement priorities.

7.1.1. **Pavement Management Improvement Action List**

VicRoads is currently undertaking and planning various improvement initiatives to further enhance pavement management processes and associated road user outcomes. The Pavement Management Improvement Action List is provided in Appendix A. Any changes, additions or reprioritisation of improvement initiatives within the pavement management improvement plan will be under the oversight of the VicRoads Asset Management Transformation Project.

7.1.2. **Governance**

To ensure clear accountabilities and responsibilities for implementation, governance is critical. There are differing levels of governance associated with implementation of this Pavement Management Strategic Plan, as follows:

- **Strategy and Policy Governance Committee** – accountable for approval of the Pavement Management Strategic Plan, as well as implementation oversight and subsequent evaluation of success;
- **Director Asset Services** – responsible for development, update and implementation of the Pavement Management Strategic Plan, including collaboration with Regional Services as well as the broader integration with improvement initiatives being delivered by the Asset Management Transformation Project;
- **Pavement Management Steering Committee** – responsible for making technical decisions regarding pavement management practices, such as setting intervention levels, evaluating and reporting on technical performance measures and targets; and
- **Pavement Management Working Group** – responsible for making recommendations to the Pavement Management Steering Committee, regarding technical decisions related to pavement management practices.

Terms of Reference will be further developed to provide greater transparency and clarity of function. In consideration of other asset type groups, as outlined in Figure 3, the governance structure outlined above may be further streamlined in the future in accordance with recommendations from the Asset Management Transformation Project.

7.1.3. **Monitoring and Review**

This strategic plan will undergo a major review every three years, to ensure alignment with the VicRoads Corporate Plan. However, it is expected that this first issue will be more of a living document, revised in the light of the developing improvement programme to be delivered by the Asset Management Transformation Project. Therefore, this strategic plan will be reviewed annually, for the next three years, to ensure it reflects the organisational needs and the dynamic changes to asset management practice within VicRoads.

The improvement opportunities within this strategic plan will be prioritised by the Asset Management Transformation Project and an action plan implemented.
Appendix A – Pavement Management Improvement Action List

Timelines in Table 7 will be regularly reviewed by the Asset Management Transformation Project, to ensure alignment with the TFV Asset Management Strategy and VicRoads Asset Management Strategic Framework (under development at the time of writing this strategic plan).

Table 7: Pavement Management Improvement Actions – Indicative Timeline Only

<table>
<thead>
<tr>
<th>No.</th>
<th>Task</th>
<th>Responsibility</th>
<th>Indicative Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Embedment of the Asset Services team to improve co-ordination of centralised asset management functions.</td>
<td>Director Asset Services</td>
<td>Ongoing</td>
</tr>
<tr>
<td>P2</td>
<td>Establishment of the Transport Analytics Portal to enhance system integration, data management, reporting and analytical capability.</td>
<td>Chief Information Officer</td>
<td>Dec 2018</td>
</tr>
<tr>
<td>P3</td>
<td>Establishment of an Asset Management Transformation Project to manage implementation of business change.</td>
<td>Director Asset Services</td>
<td>Dec 2017</td>
</tr>
<tr>
<td>P4</td>
<td>Enhancement of predictive tools and planning processes, for scenario modelling, to inform network investment needs (supported by regional capability for project level).</td>
<td>Asset Services</td>
<td>Ongoing</td>
</tr>
<tr>
<td>P5</td>
<td>Development of a comprehensive suite of technical service standards, linked to intervention levels.</td>
<td>Asset Services</td>
<td>Dec 2018</td>
</tr>
<tr>
<td>P6</td>
<td>Monitoring, evaluation and reporting of technical performance measures, reported annually to VicRoads Executive.</td>
<td>Asset Services</td>
<td>Dec 2018</td>
</tr>
<tr>
<td>P7</td>
<td>Targets set and agreed with VicRoads Executive for technical performance measures.</td>
<td>Asset Services</td>
<td>June 2019</td>
</tr>
<tr>
<td>P8</td>
<td>Preparation of evidence based business cases, with a 10 year planning horizon, to support budget bids.</td>
<td>Asset Services</td>
<td>As required</td>
</tr>
<tr>
<td>P9</td>
<td>Review of the Pavement Management Strategic Plan to reflect adopted technical service standards and associated targets.</td>
<td>Asset Services</td>
<td>June 2018</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>No.</th>
<th>Task</th>
<th>Responsibility</th>
<th>Indicative Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>P10</td>
<td>Development of Regional Maintenance and Renewal Plan (Annual updates of financial, risk and performance components).</td>
<td>Regional Services</td>
<td>June 2019</td>
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<tr>
<td>P12</td>
<td>Integration of preservation programs into the Programs and Pipelines forward plans, including review and update of program structure and program guidelines aligned to asset management expenditure types.</td>
<td>Asset Services</td>
<td>Dec 2017</td>
</tr>
<tr>
<td>P13</td>
<td>Update of the VicRoads Capitalisation Policy, to incorporate activity based guidance.</td>
<td>Asset Services and Finance</td>
<td>June 2019</td>
</tr>
<tr>
<td>P14</td>
<td>Undertake customer engagement to understand customer expectations and gain community involvement in asset service and maintenance priorities.</td>
<td>Asset Services</td>
<td>Aug 2018</td>
</tr>
</tbody>
</table>