Benefit Management Framework

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1. Introduction

This Benefit Management Framework (the Framework) enables a consistent approach to identifying, monitoring and evaluating the success of VicRoads investments. It provides a 'line of sight' from investment-level indicators to the benefits and outcomes that VicRoads and ultimately government aims to achieve.

This document comprises three sections:

- **Section 1** provides background to how the Framework was developed.
- **Section 2** provides the Framework. It includes two accompanying Appendices: Appendix 1 defines and describes commonly used indicators in the Framework; Appendix 2 describes output indicators commonly applied in asset management and how they link to outcome indicators.
- **Section 3** guides users in applying the Framework.

2. Background

This Framework is structured around the approach to investment management promoted by the Department of Treasury and Finance (DTF) across the Victorian Government and detailed in its *Investment Lifecycle and High Value High Risk Guidelines.*

Accordingly, the Framework complements the products developed through the application of the Victorian Government's *Investment Management Standard* (IMS)[1]. The IMS is a collection of practices supporting the functions which organisations undertake to improve how they operate and manage new investments – where an investment refers to a *commitment of the resources of an organisation with the expectation of receiving a benefit*. In VicRoads, this includes all activities which require resources (either in funding or staff time), in the development of projects, programs, policies or strategies.

> *"Investment is the commitment of the resources of an organization with the expectation of receiving a benefit."*

The IMS includes establishing the logic of investments and having community benefits identified upfront through the development of *Investment Logic Maps* (ILM) and *Benefit Management Plans* (BMP). Central to the IMS and to this Framework is the hierarchical alignment of investment-specific indicators, organisational benefits and broader government outcomes.

This hierarchical alignment enables a more effective evaluation and comparison of the contribution that all individual investments make to the organisation (VicRoads) level benefits and government (Victoria) level outcomes.

Figure 1 shows DTF's Benefits Framework. In this Figure, VicRoads would be the 'Organisation' and Victoria the 'Enterprise'.

- **Outcomes** reflect long-term outcomes sought at the highest level or by the Victorian Government.
- **Benefits** reflect the contribution that organisations make to broader government outcomes.
- **Key Performance Indicators** (KPIs or indicators) are the level of change that occurs as a result of an investment and reflect the contribution it makes to the benefits sought by organisation/s. (KPIs are supported by **measures** which are specific quantifiable units that can be used to assess and/or validate that an indicator has been met.)
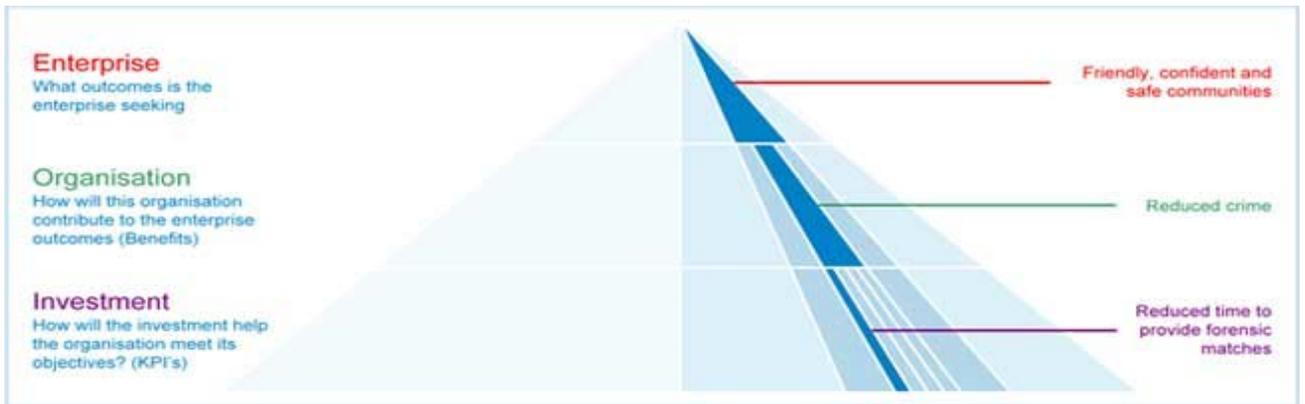
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[1] http://bit.ly/1BYIA9d

Figure 1: DTF Benefit Framework

2.1. Audience

The Benefit Management Framework provided in this document can be applied in a range of contexts across VicRoads. It is relevant to:

- Those with overarching responsibility for the investments made who need to clearly articulate how each investment contributes to the strategic intent of the organisation (typically Directors and Executive Directors).

- Those seeking approval for investment decisions (typically investment proposal writers and evaluators). This Framework will assist with structuring critical documents that effectively demonstrate that reasonable benefits for an investment are being claimed and were defined through a rigorous process.

- Those managing investments (typically policy / project managers) who need to ensure that the investments under their management deliver the benefits promised in the original investment proposal and who need to understand the expectations of those funding the investment.

2.2. Development of the Framework

The structure for this Framework is based on the benefit and outcome hierarchy developed by DTF. The following steps were used to populate and contextualise the hierarchy (illustrated in Figure 5 on page 9):

- A survey of VicRoads[2] and other Victorian Government strategies[3] and plans was undertaken in 2011 and assessed against the overarching objectives defined within the *Transport Integration Act 2010.* The Act was taken as a benchmark as it provides the platform to guide the Victorian transport portfolio. As a result of this survey, succinct statements of outcomes and benefits were defined.

- A further analysis of business cases and Benefit Management Plans (BMPs) provided information about indicators that could be used to measure the contribution made by the various investments delivered by VicRoads that contributed to organisation level benefits and broader Victorian government outcomes.

- This compilation of the hierarchy was then tested in structured workshops with representatives from the Network Improvements business area (currently Pipelines and Programs), Road User Services (currently Journey Services) and Department of Transport (currently Department of Economic Development Jobs Transport and Resources (DEDJTR)).

In 2012, this compilation was further consulted with then Major Projects, Technical and Information Services, Corporate Planning Policy, Road Safety and Network Access and Regional Services Division and the final set of indicators agreed upon. In 2013, a series of ILMs were developed for various interventions currently used for managing road and roadside assets in VicRoads. Findings from these ILMs provided a number of additional benefits and indicators which were then added to the suite of benefits and indicators in the Framework.

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[2] Some of these strategies included: VicRoads Strategic Direction 2010-12; Sustainability and Climate Change Strategy 2010-15; Roadside Management – A balanced approach 2011; Victoria's Arterial Bridges – Critical Links for Transport Efficiency (date unknown); Smart Roads – Connecting Communities, 2011; and VicRoads Road Safety Strategy: Arrive Alive 2008-2017.

[3] Some of the Government strategic documents included: National Transport Policy (Australian Transport Council 2010); Performance reporting of Transport Reform Outcomes (Curtain Monash Accident Research Centre 2011); and Transport Integration Act 2010 (Vic).

In 2015, the Framework was revised to align with the VicRoads Strategic Commitment (2015), ensuring the community and customers are central to the problem definition and benefit identification. The outcomes categories are also replaced with the outcome categories identified in the Strategic Commitment as these are the VicRoads agreed outcomes.

VicRoads will review this Framework every two years so it remains relevant and incorporates new industry innovation in benefit management.

2.3. Framework principles

The following overarching principles underpin the Framework:

1. **The Framework must be simple to understand and integrate into VicRoads activities.**

    If it is not understood, it will not be used.

2. **The Framework must be consistently applied across VicRoads.**

    If some investments do not apply the Framework, it weakens the effectiveness of the Framework in communicating the overall performance of individual interventions (programs / activities) and how they relate to the benefits that VicRoads is seeking to achieve.

3. **The Framework must clearly demonstrate how VicRoads investments contribute to the resulting benefits and strategic outcomes.**

    Ensuring a **clear line of sight** from any investment made (either to resolve a problem or to take an opportunity for improvement) to the benefits or outcomes achieved is essential when scoping proposals, policies or strategies.

4. **The Framework must identify only core information.**

    If data management and reporting becomes onerous, commitment to using the Framework will diminish. To avoid this, only information required by the Framework should be mandatory. (Refer to '10. Contact your data sources').

The following principles underpin the selection of individual indicators listed in this Framework.

1. **Indicators must be relevant.**

    A good indicator will clearly identify how the investment contributes to the benefit being claimed. If this relationship is tenuous or unclear, the indicator fails the relevance test. In some instances, no practically assessable indicator or measure for an outcome may be available due to the short duration of evaluation or because the outcome is subtle or because the outcome relies on actions by several parties. In these cases, an indirect indicator (a *proxy*) may be utilised. Proxies should be carefully selected and be evidence-based so they are relevant.

2. **Indicators must be measurable.**

    If it is not possible to collect the required data or its collection would be prohibitively costly, the indicator must be reconsidered or the additional cost be incorporated into the investment plan. Indicators should also be directional (*positive*—an increase, or *negative*—a decrease) and should be able to measure the incremental change from the baseline to the target value over time.

3. **Indicators must be attributable.**

    The investment should be the most likely reason for a change in the indicator so that it can be **primarily** attributed it to an investment.

    In some cases, there will be multiple factors that have contributed to the achievement of the benefit. For example, a business development initiative may have contributed to an increased business activity in a particular location, in addition to the improved access provided by VicRoads investment. It may be necessary to contextualise the indicator to tighten the attribution and thus exclude external influences as far as possible.

    It is usually easy to attribute an indicator to a benefit and a benefit to an outcome but it is often difficult to attribute an investment level indicator to the desired outcome. How an individual indicator contributes to government outcomes can be sought from the outcome hierarchy (line of sight) provided in this Framework.

2.4. Using the Framework

This Framework applies to planning, prioritisation and evaluation of ALL investment decisions in VicRoads, which fits in the plan and learn phase of the VicRoads investment cycle (see Figure 2).

Figure 2: VicRoads Investment Cycle

Investment planning

The Framework provides a tool to help identify appropriate benefits (and associated outcomes) and key performance indicators which are critical elements of any investment development process (i.e. investment justification in the business case or an investment proposal).

It provides the investor a level of confidence that a particular proposal is worth investing in and makes sure the investor considers various strategic responses or directions that focus on achieving those benefits.

The identified benefits are captured in a Benefit Management Plan (BMP).

Investment evaluation – post completion

Once the benefits (and relevant KPIs) are identified and captured in a BMP, it becomes the basis for assessing effectiveness of that investment as part of post-completion evaluations.

Where a project, program or activity does not achieve the expected benefits and outcomes, lessons learnt from this process should be captured and used to inform future decision-making. However, it is important to note that some benefits achieved at an investment level (e.g. widening of a road) may have little impact on the overall road or transport network due to the scale of the benefit. Benefits may also be realised over different timeframes.

The VicRoads **Investment Evaluation Framework** (QD#2441936) provides guidance on how benefits identified using this Framework are utilised for any post-completion evaluation.

Investment prioritisation

The set of organisational benefits also provides a valuable input in selecting and prioritising investment proposals. The VicRoads **Investment Prioritisation Framework** (QD#2433569) outlines the approach that VicRoads uses to prioritise its investments. It focuses on the actual merit of each investment as the core criteria: the *cost*, *benefit*, and the *criticality* of the investment, so that resources are always allocated to investments that deliver the benefits / outcomes sought.

2.5. Strategic linkages

Linking Framework outcomes to Transport Integration Act 2010 objectives

Figure 3 shows how the highest level (strategic or government) outcomes link to the *Transport Integration Act 2010* objectives. Once you have applied the Framework to categorise benefits from your ILM and have identified relevant strategic outcomes relating to those benefits, Figure 3 can be used for identifying how your investment strategically links to objectives of the Act.

Note: A detailed analysis of Transport Integration Act objectives was undertaken to establish a common understanding of each objective and their relevance to VicRoads before identifying how these linked to the Framework outcomes. Four objectives of the Act were easily translated into resulting outcomes while two objectives –*Integration of transport and land use* and *Efficiency, coordination and reliability* – were considered as enablers supporting the first four outcomes. The links were then derived from this analysis.
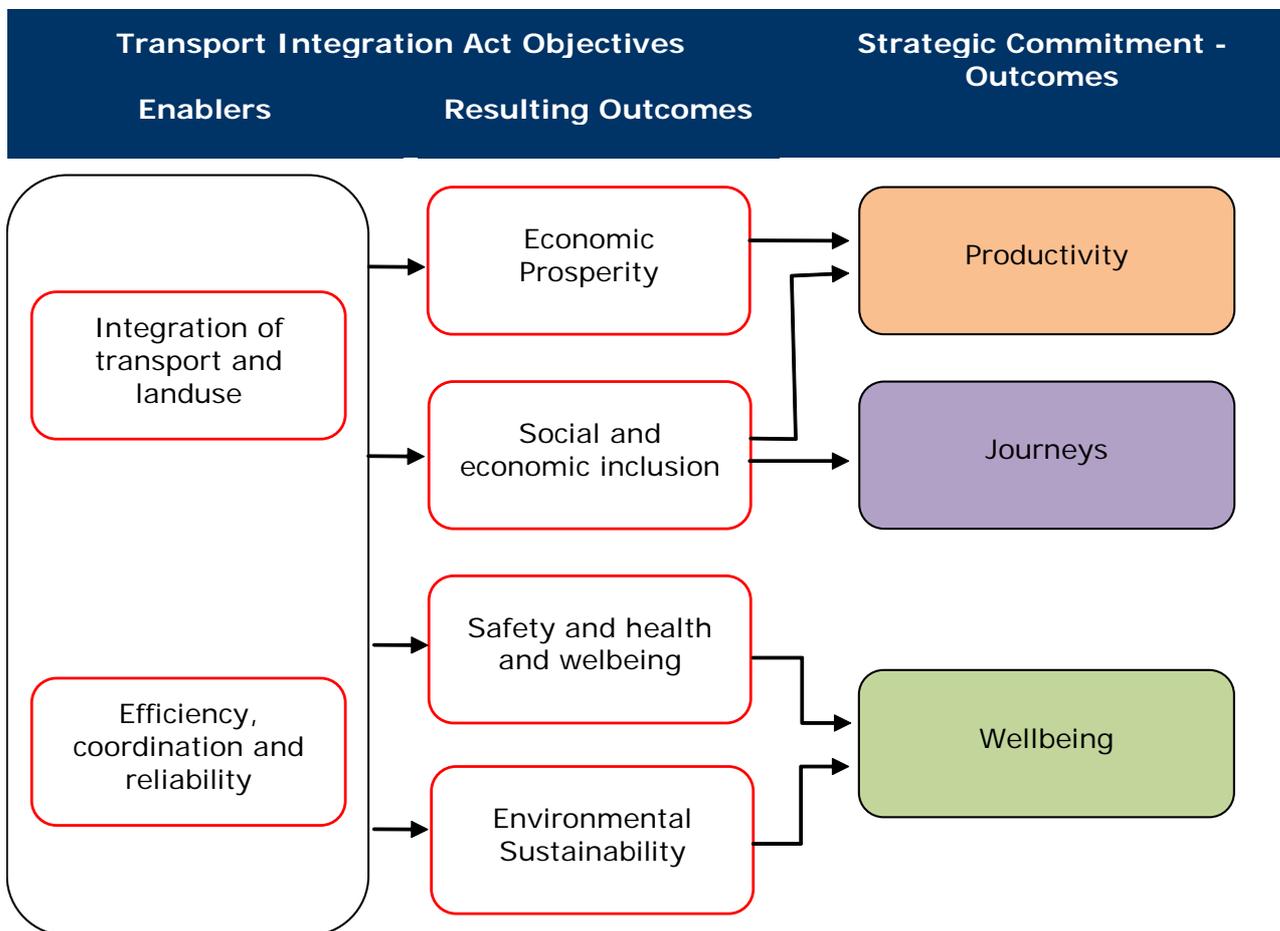
Figure 3: Transport Integration Act objectives and the VicRoads Strategic Outcomes

Linking Framework benefits to VicRoads Strategic Commitment and Portfolio Transport Outcomes Framework

VicRoads Strategic Commitment was developed in collaboration with all VicRoads staff in 2014 which sets the three desired outcome areas (Journeys, Wellbeing, and Productivity, with Customer and Community being the focus of all outcomes) that the organisation aims to work towards. The following figure is used to determine how the benefits achieved through specific investments, assessed against this Framework, contributes to the current VicRoads Strategic Outcomes.

The Department of Economic Development, Jobs, Transport and Resources has also developed a Transport Services Outcomes Framework (TSOF) which outlines three vision categories and eight outcomes areas underneath each vision.

Figure 4 below demonstrates how the BMF benefits align with the Strategic Commitment outcomes and TSOF vision. Once you have used this Framework to categorise benefits from your ILM, this figure can be useful in ensuring consistency and accuracy when identifying the strategic linkages for your investment within the business case.
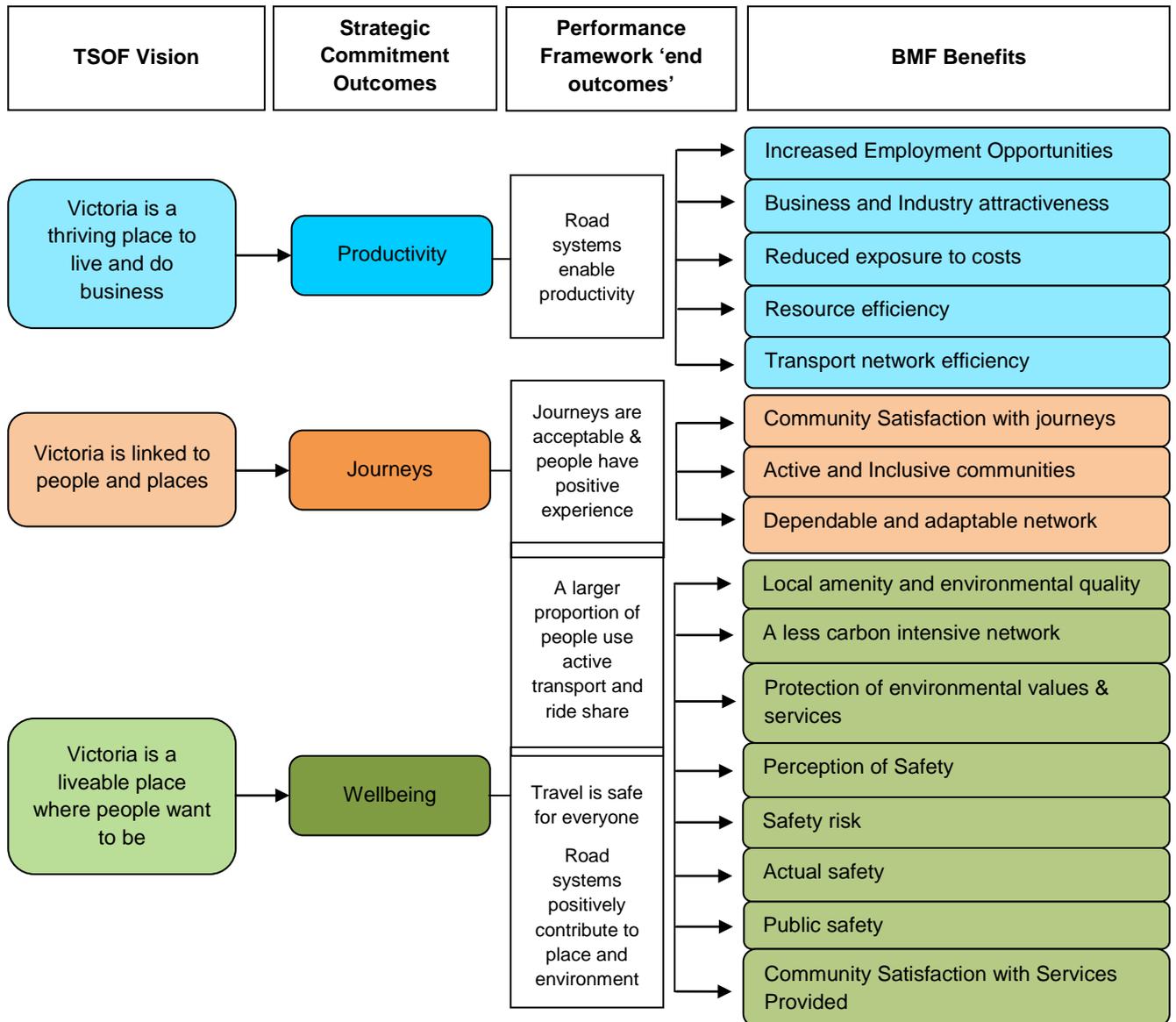
Figure 4: Transport Outcomes Framework vision aligned with Strategic Commitment outcomes, draft Performance Framework and BMF benefits.

3. The Benefit Framework

The following diagram (Figure 5), is based on the DTF Benefit Framework and represents the benefits that VicRoads is seeking from various investments (the outer circle), the outcomes as articulated in VicRoads Strategic Commitment (the middle circle). The inner circle implies the focus of customers and community as it is central to all outcomes being produced.

Each benefit identified within an investment-level ILM should normally sit within the outer circle. Each coloured 'wedge' fans out to depict a series of relevant indicators for each benefit type. These wedges are described separately in the following pages.
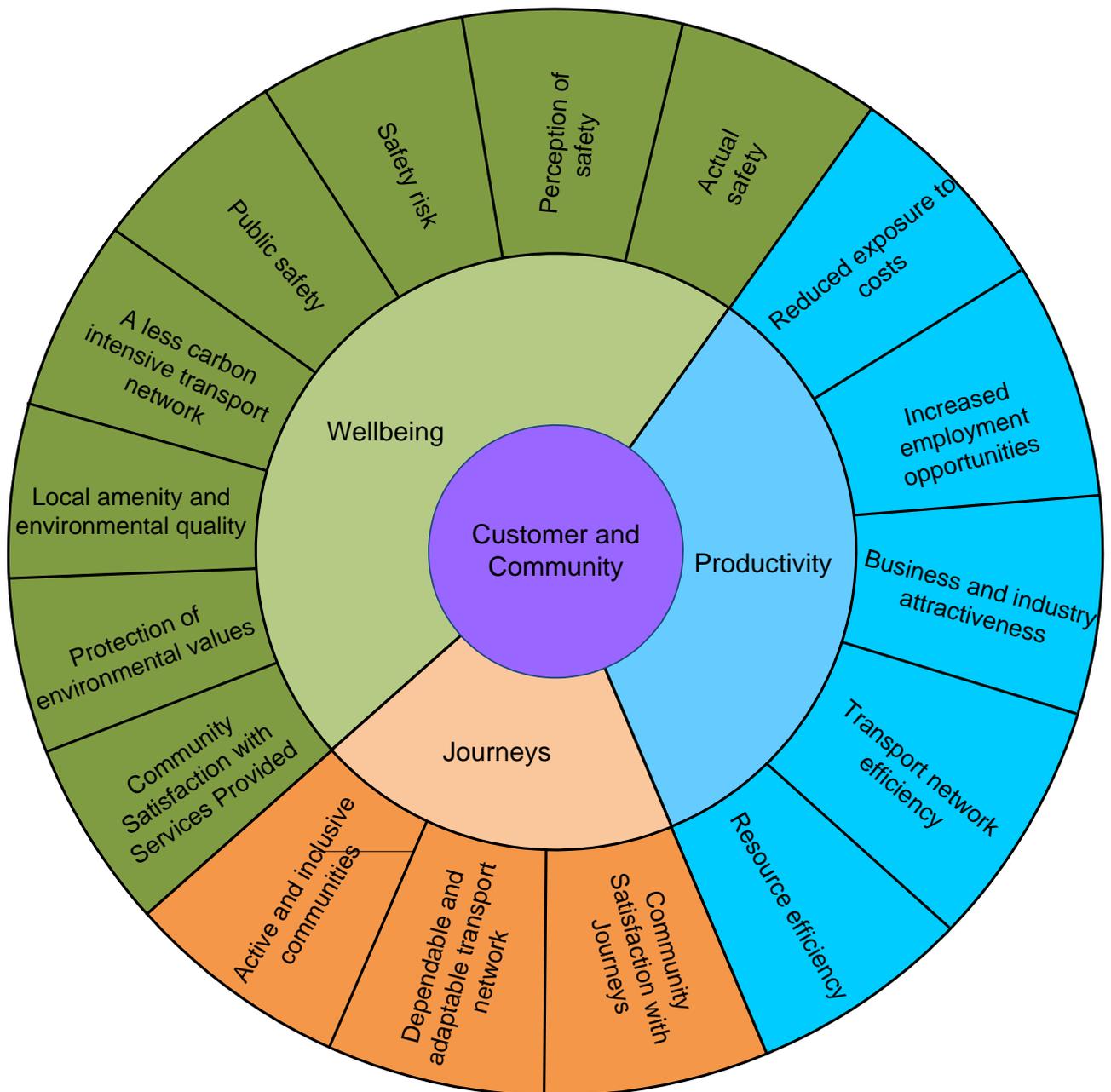
Figure 5: Overview of VicRoads Benefit Management Framework

3.1. Definition of Government level outcomes

The outcomes categories are identified from the VicRoads current Strategic Commitment.

Journeys
Journeys refer to enabling integrated transport choices and making journeys pleasant and predictable.

Wellbeing
Wellbeing refers to improving road safety, amenity and environmental outcomes.

Productivity
Productivity refers to strengthening the economy through better use of roads and connections with land use.

3.2. Definition of the benefits and indicators

Benefit definitions are included after the line of sight figure for each outcome.

> Definitions of indicators are provided in **Appendix 1**.

4. Productivity
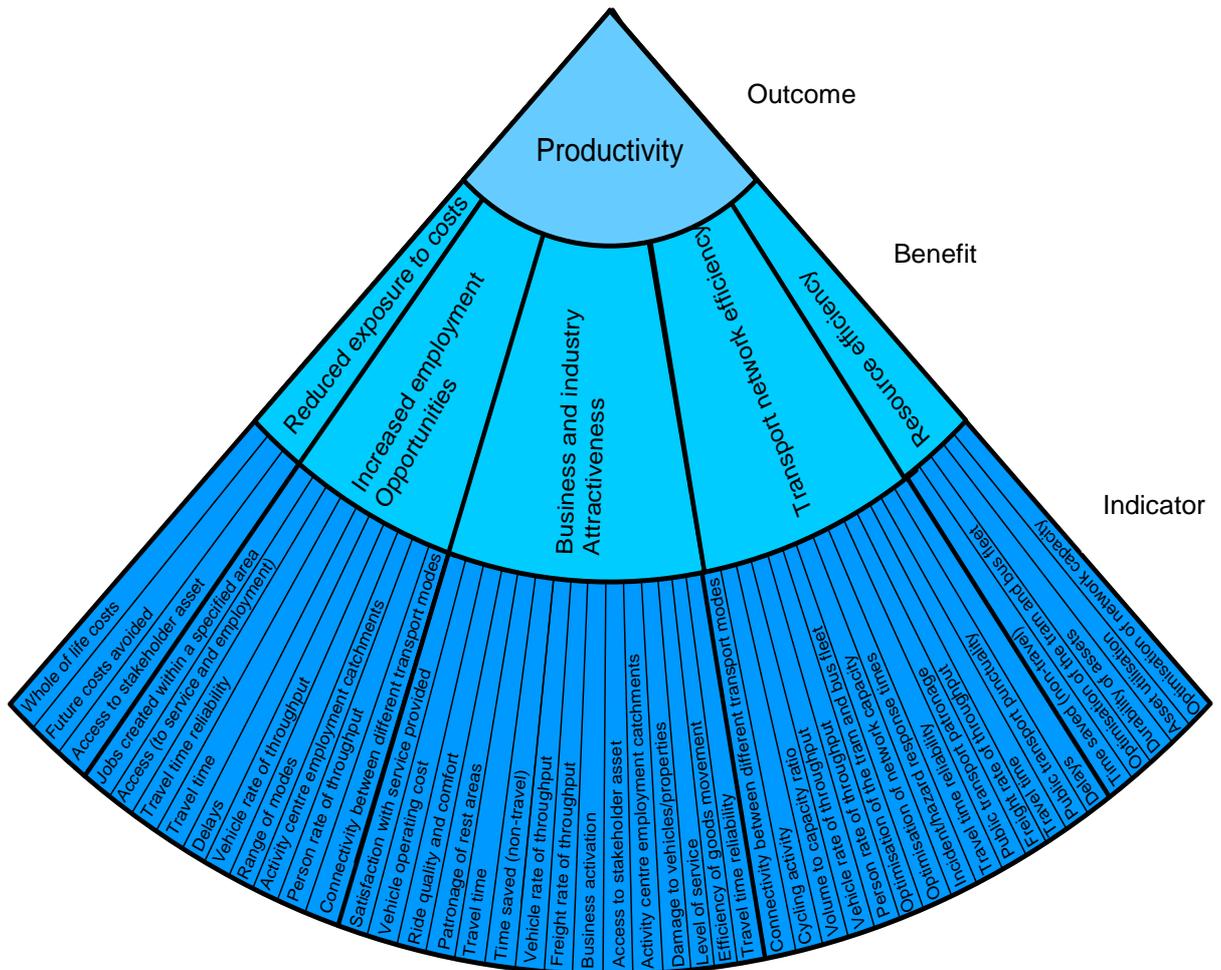
Figure 6: Line of sight for Productivity outcome

Reduced exposure to costs

Reduced Exposure to Costs refers to the reduction in costs to government (and therefore to the community). This would be due to investments which reduce future direct costs to government and can include less maintenance costs, operating costs, administration costs (including legal costs) or future (significantly increased) capital costs.

This benefit is *not* about cost savings directly to individuals and businesses, such as travel time or vehicle operating costs (these benefits are captured by the Productivity and Economic Growth outcome).

Increased employment opportunities

Employment Opportunities refers to increased employment opportunities from better access provided in a particular location, or from enabling individuals to reach jobs not previously easily accessible.

Business and industry attractiveness

Business and Industry Attractiveness refers to increasing the attractiveness of a place to business or industry. This is often achieved by relieving constraints on freight movement or business access and includes all commercial and business activity such as tourism or professional services.

Transport network efficiency

Transport Network Efficiency refers to the efficiency of the transport network. Network efficiency is increased when people and/or freight can move between destinations faster with fewer delays and /or more reliably.

Resource efficiency

Resource Efficiency refers to using existing (non-financial) resources (including assets) more efficiently. Examples of inefficient use of an asset include an Intelligence Transport System (ITS) that is not functioning correctly (or is obsolete) or a road that is not optimally utilised.

Definitions of indicators are provided in **Appendix 1.**

Resource efficiency

Table 1: Measures and data contacts for Productivity indicators

Indicator	Measures	Data Contacts
Activity centre employment catchments	Distance travelled to access an activity centre within a specified number of minutes	Information Access / Projects
Access to stakeholder asset	Time taken to access asset. Cost of accessing asset	Project specific
Access (to services and employment)	% of population within a given number of minutes of services and employment. Number of people able to reach a certain destination in a certain time. Average time to access services and employment from different locations. ARRB accessibility metrics (by number of opportunities accessible within a certain time by different modes)	Information Access ARRB
Asset utilisation	Availability / downtime of assets (e.g. electrical equipment). Number of uses or % of time asset or system is used	Project specific
Business activation	Number of Expression of Interest for new businesses within a specified area. The value of investment within a specified area	Project specific / Council
Connectivity between different transport modes	Average variability in minutes of road based public transport travel. Proportion of services that are 'on time" or service punctuality Distance between collection and drop off facilities. Pedestrian travel time between modes	PTV Project specific
Cycling activity	Cyclists per hour during a specified time period	Information Access
Damage to vehicle / properties	Claims for damage to vehicles / properties	Project specific
Delays	Minutes of delay (per kilometre travelled or total) Number of signal cycles taken to clear intersection	Information Access Project specific
Durability of assets	Design life and/or service life of an asset / system. Time required for an asset/system to reach end of life / replacement Structures with high likelihood of requiring a load limit in the next 2/4/6 years (S rating)	Project specific Technical Services
Efficiency of goods movement	$ per tonne per km or average tonnes per km. Tonnage per trucks / number of trucks per total tonnage movement	Information Access
Freight rate of throughput	Number of trucks per hour on a section of a road during a specified time period. Tonnes per hour	Information Access
Future costs avoided	Cost of legal claims. Operational costs (e.g. incident management costs). Cost for maintenance (e.g. repair, emergency works, rehabilitation)	Project specific

| Indicator	Measures	Data Contacts
Incident / hazard response times	Average response time in minutes. % of incidents attended or cleared within 15mins % of hazards managed within Road Management Plan response times	Road Operations Project specific
Jobs created within a specified area	Square kilometres of retail and commercial floor space	Project specific / Council
Level of Service	Level of service rating (A to F)	Project specific
Optimisation of the tram and bus fleet	Number of additional tram and bus services run on specified routes	PTV
Optimization of network capacity	% of capacity used (e.g. of road, bus lane, tram lane, rail line).	Information Access
Optimization of network capacity	Number of trains per hour	PTV
Patronage of rest areas	Number of spaces at rest areas utilised by heavy vehicles during specified times	Project specific
Person rate of throughput	Persons per hour	Information Access
Public transport patronage	Number of patrons during a specified time period on tram / bus or both on specified routes or corridors	PTV
Public transport punctuality	% of trams or buses considered 'on-time'	PTV
Range of modes	Number of transport options available to a passenger within a specified distance of their home or work	Project specific
Ride quality and comfort	International Roughness Index (IRI) Heavy Articulated Truck Index (HATI)	Project specific
Satisfaction with service provided	% of business / industry members satisfied with VicRoads' operations. Number of complaints	Project specific
Time saved (non-travel)	Time in minutes by business / industry. Number of transactions required by business / industry	Project specific
Travel time	Travel time in minutes from a specific origin to destination during a specified time period	Information Access
Travel time reliability	Average variability in minutes from origin to destination	Information Access
Vehicle operating cost	$ (including fuel, lubricating oils, tyres, vehicle depreciation, repairs and maintenance)	Information Access
Vehicle rate of throughput	Vehicles per hour	Information Access

Indicator	Measures	Data Contacts
Volume to capacity ratio	Number of persons per hour on a section of the road and maximum number of persons per hour capable of being carried in motor vehicles along the section of the road. Number of vehicles per hour that travel along a section of the road and maximum number of vehicles per hour capable of travelling along the section of the road	Information Access
Whole of life cost	Cost in dollars	Project specific

Example

Steps	Example
Take one initial benefit from your ILM	More competitive industries
Match this benefit with the Framework	Business and industry attractiveness
Select an indicator from the Framework and add to the ILM	Travel time
Contextualise the indicator and add to the BMP	**Reduction in** travel times **between Ballarat West Growth area and Ballarat West Employment zone**
Select a relevant measure from the Framework	Travel time in minutes from a specific origin to destination during a specified time period
Contextualise a measure to add to the BMP	Travel time in minutes between **Ballarat West Growth area to Ballarat West Employment zone during the interpeak period**
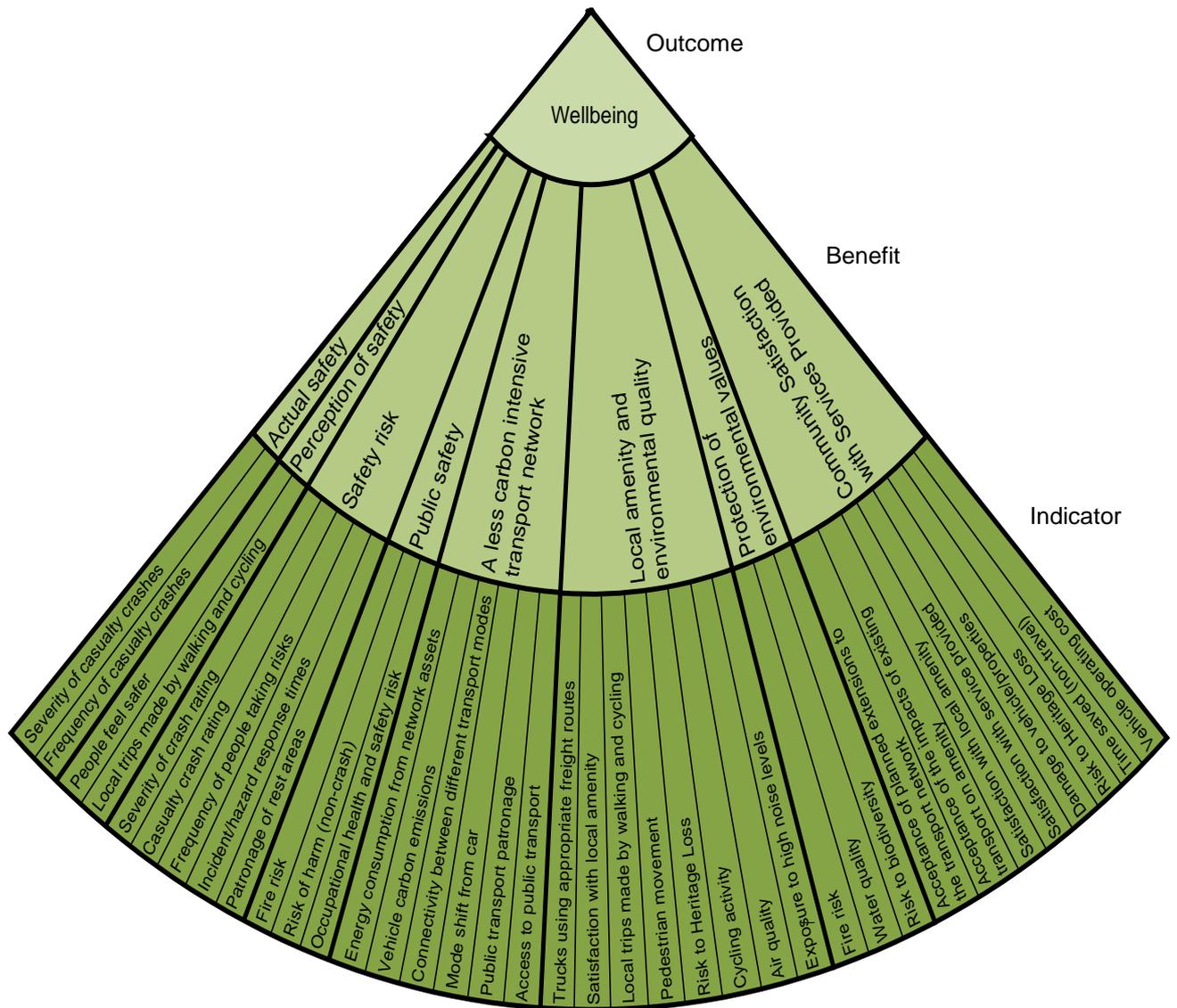
Figure 7: Line of sight for Wellbeing outcome

5. Wellbeing

Actual safety

Actual Safety is the level of road safety achieved by addressing a known crash history.

Perception of safety

Perception of Safety is the 'sense' of feeling safe/unsafe by members of the community. This benefit should be used where community members perceive that a risk to safety exists but no crash history or measurable safety risk is present.

Safety risk

Safety Risk is the road safety risk present in a given location. This benefit should be used where a known or measurable safety risk exists but there is no crash history. For example, the risk of injury from overhanging branches along the roadside.

Public safety

Public Safety refers to the safety of the community posed by factors other than road crashes (perceived, risk or actual factors). This can include community harm from fires on unmanaged roadsides or the indirect impact of a road accident on the community, such as the impact of a chemical spill from a truck roll over or a community risk from a lack of street lighting.

A less carbon intensive transport network

A Less Carbon Intensive Transport Network refers to reducing the carbon footprint of the transport network (as a whole). Note this does *not* include air quality (which is captured under Community Health *and Wellbeing).*

Local Amenity and Environmental Quality

Local Amenity and Environmental Quality refers to the levels of amenity and environmental quality in local areas. *Amenity* includes features of a place which make for a comfortable and pleasant life. *Environmental quality* refers to how the local environment impacts people (such as through noise and air pollution) and not on the natural environment (which is captured by the Environmental Sustainability outcome).

Protection of environmental values

Protection of Environmental Values refers to biodiversity and other ecological impacts (such as water quality). This is *not* about mitigating negative environmental impacts of an investment (which are captured as disbenefits).

Community satisfaction with services provided

Community satisfaction with services provided may refer to the satisfaction experienced with the level of service of a road (or road network) or a direct customer service, usually measured through direct customer feedback.

> Definitions of indicators are provided in **Appendix 1.**

A less carbon intensive transport network

Table 2: Measures and data contacts for Wellbeing indicators

Indicator	Measures	Data Contacts
Access to public transport	Minutes of delay between origin and access point	Information Access
Acceptance of planned extensions to the transport network	% of community members who accept planned expansions of the transport network	Project specific
Acceptance of the impacts of existing transport on amenity	% of community members who accept of the impacts of existing transport on amenity	Project specific
Air quality	Vehicle emissions by gas type. Level of toxins (e.g. Benzene, toluene or formaldehyde). Number of complaints regarding air quality. Number of dwellings with predicted concentrations of nitrogen dioxide above 263ug/m3 (1hour) and/or PM10 above 60ug/m3 (24hour) - using VicRoads Quality Screening Tool.	Project specific
Casualty crash rating	Risk using exposure, crash reduction factors, ANRAM or 'Safe System' compliance. Frequency of conflict points.	Information Access
Connectivity between different transport modes	Average variability in minutes of road based public transport travel. Pedestrian travel time between modes. Distance between collection and drop off facilities. Proportion of services that are 'on time' or service punctuality	Information Access Project specific PTV
Cycling activity	Cyclists per hour during a specified time period.	Information Access
Damage to vehicles / properties	Claims for damage to vehicles	Project specific
Energy consumption from network assets	MJ/year.	Project specific
Exposure to high noise levels	Number of dwellings experiencing above noise levels above 55dB, 60dB, 65dB and 70dB. Number of complaints received by VicRoads.	Environmental Services Project specific
Fire risk	Fire risk rating (fuel load)	Project specific
Frequency of casualty crashes	Number of casualty crashes by location (intersection or road length).4 Number of casualty crashes by type (intersection, run of road, rollover).4 Number of casualty crashes by user (pedestrian, heavy vehicle, public transport).4 Number of casualty crashes per 100million vehicle kms travelled.	Road Crash Information System (RCIS)/Information Access (for VKT)

| Indicator	Measures	Data Contacts
Frequency of people taking risks	Number of people taking risks (visual count).	Project specific
Incident /hazard response times	Average response time in minutes. % if incidents attended or cleared within 15 mins. % of hazards managed within Road Management Plan response times.	Road Operations Project specific
Local trips made by walking and cycling	% local trips made by walking and cycling. Number of road crossings within 20m of crossing facility.	Information Access Project specific
Mode shift from car	% of or number of trips made by bicycle or foot previously made by car. % of or number of trips made by tram or bus previously made by car.	DEDJTR
Occupational health and safety risk	Level of risk asses using Safe Work Methods Statements (SWMS).	Project specific
Patronage of rest areas	Number of spaces at rest areas utilised by heavy vehicles during specified times.	Project specific
Pedestrian movement	Pedestrians per hour during a specified time period.	Information Access
People feel safer	% of people who feel safer. % pedestrians using the crossing facility of the total crossing within 20m of the facility. Safety complaints received.	Project specific
Public transport patronage	Number of patrons during a specified time period on tram / bus or both on specified routes or corridors.	PTV
Risk to biodiversity	Stakeholder complaints. Number of different species present. Number of targeted fauna species using fauna sensitive road design structure. Number of flora and/or fauna. Pest complaints or sightings. Size if areas affected by pests. Number of properties affected by pests.	Project specific
Risk of harm (no-crash)	Level of water pollution (oil, heavy metals and other chemicals). Number of complaints regarding water pollutions.	Project specific
Risk to Heritage Loss	Number of sites under threat.	Project specific
Satisfaction with local amenity	% of community members satisfied with VicRoads' operations. Number of complaints.	Project specific
Satisfaction with service provided	% of business / industry members satisfied with VicRoads' operations. Number of complaints	Project specific

Indicator	Measures	Data Contacts
Severity of casualty crashes	Number of fatality crashes and serious injury crashes by location (intersection or road length). Number of fatality crashes and serious injury crashes by type intersection (run-off road, rollover). Number of fatality crashes and serious injury crashes by user (pedestrian, heavy vehicle, public transport).	Road Crash Information System (RCIS)/Information Access (for VKT)
Severity of crash rating	Risk using exposure, crash reduction factors, ANRAM or 'Safe System' compliance. Frequency of conflict points.	Project specific
Time saved (non-travel)	Time in minutes by business / industry. Number of transactions required by business / industry.	Project specific
Trucks using appropriate freight routes	% of trucks using appropriate freight routes. Number of trucks using appropriate freight routes.	Information Access
Vehicle carbon emissions	Number of tonnes of carbon dioxide or other greenhouse gases saved (calculated using VKT, carbon content in fuel and fuel efficiencies).	Information Access
Vehicle operating cost	$ (including fuel, lubricating oils, tyres, vehicle depreciation, repairs and maintenance).	Information Access
Water quality	Pollutant loads per hectare (pollutants of most interest are suspended solids, hydrocarbons, zinc, copper, lead, chromium).	Project specific

Example

Steps	Example
Take one initial benefit from your ILM	Improved safety
Match this benefit with the Framework	Actual safety
Select an indicator from the Framework and add to the ILM	Frequency of casualty crashes
Contextualise the indicator and add to the BMP	Reduction in the frequency of casualty crashes on **length of Hallam Road to be duplicated**
Select a relevant measure from the Framework	Number of casualty crashes per 100million vehicle kms travelled
Contextualise a measure to add to the BMP	Number of casualty crashes on **Hallam Road** per 100m vehicle kilometres travelled

6. Journeys
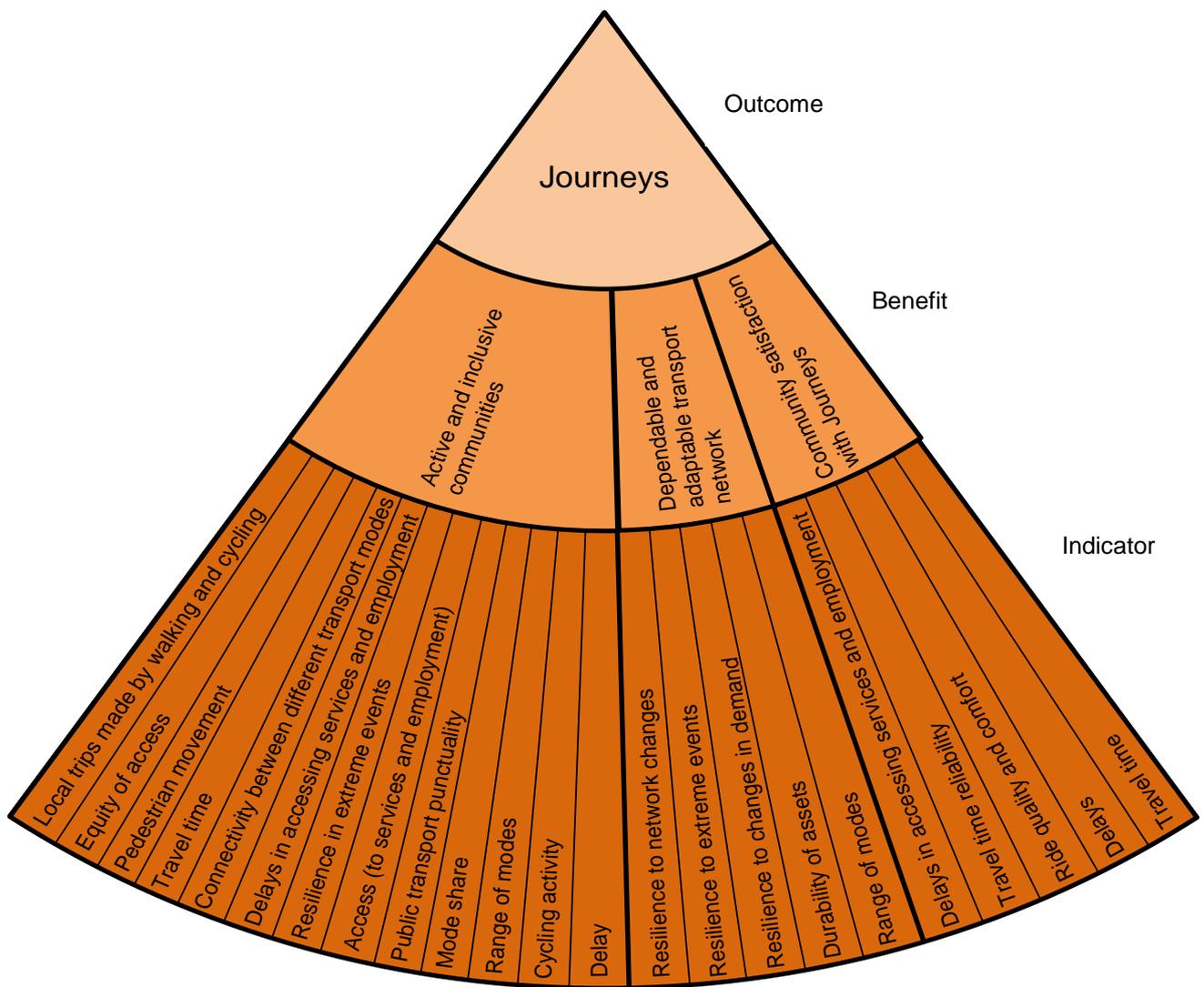
Figure 8: Line of sight for Journeys outcome

Active and Inclusive Communities

Active and Inclusive Communities refers to physical activity (such as walking and cycling), equity (such as reducing disadvantage and exclusion caused by transport inequity), and social participation (such as people participating in community groups, events and activities).

Dependable and Adaptable Transport Network

Dependable and Adaptable Transport Network refers the ability to depend on the network over time and through changes. This includes changes in road user demands and constraints, changing technology or extreme climatic events.

Community Satisfaction with Journeys

Community Satisfaction with journeys refers to the extent to which community members are satisfied with undertaking the journey provided in terms of comfort, delays in commutes or travel time and reliability with journeys undertaken by the community.

Definitions of indicators are provided in **Appendix 1.**

Table 3: Measures and data contacts for Journeys indicators

Indicator	Measures	Data Contacts
Access (to services and employment)	% of population within a given number of minutes of employment ARRB accessibility metrics (by number of opportunities accessible within a certain time by different modes) Average time to access employment from different locations	Information Access Project specific Information Access
Connectivity between different transport modes	Average variability in minutes of road based public transport travel. Pedestrian travel time between modes Distance between collection and drop off facilities Proportion of services that are 'on time" or service punctuality	Project specific Information Access PTV
Cycling activity	Cyclists per hour during a specified time period	Information Access
Delays	Minutes of delay (per kilometre travelled or total). Number of signal cycles taken to clear intersection	Information Access
Delays in accessing services and employment	% of community members satisfied with access to services and employment	Project specific
Equity of access	Number of DDA-compliant sites. New trips made by individuals at risk of social exclusion. Portion of household budgets devoted to transport	Project specific DEDJTR
Durability of assets	Design life and/or service life of an asset / system. Time required for an asset/system to reach end of life / replacement Structures with high likelihood of requiring a load limit in the next 2/4/6 years (S rating)	Project specific Technical Services
Local trips made by walking and cycling	% of local trips made by walking and cycling Number of road crossings within 20m of crossing facility	Information Access Project specific
Mode share	% of mode share	DEDJTR
Pedestrian movement	Pedestrians per hour during a specified time period	Information Access
Public transport punctuality	% of trams or buses considered 'on-time'	PTV
Range of modes	Number of transport options available to a passenger within a specified distance of their home or work	Project specific
Resilience in extreme events	% or number of road closures during extreme events. Time to return original functionality	Project specific

Resilience to network changes	Amount of additional network capacity (with additional lanes or route alternatives). Amount of unused capacity	Project specific
Resilience to changes in demand	Amount of additional network capacity. Amount of additional load capacity % of road network able to accommodate heavier trucks	Project specific Information Access
Ride quality and comfort	International Roughness Index (IRI) Heavy Articulated Truck Index (HATI)	Project specific
Travel time	Travel time in minutes from a specific origin to destination during a specified time period	Information Access
Travel time reliability	Average variability in minutes from origin to destination	Information Access

Example

Steps	Example
Take one initial benefit from your ILM	Improved local community satisfaction with journeys
Match this benefit with the Framework	Community satisfaction
Select an indicator from the Framework and add to the ILM	Delays in accessing services and employment
Contextualise the indicator and add to the BMP	Reduction in delays in accessing services and employment **within Dandenong CAD during peak hour**
Select a relevant measure from the Framework	% of community members satisfied with access to services and employment
Contextualise a measure to add to the BMP	% of **Dandenong CAD** community members satisfied with access to services and employment **during peak hour**

7. How to use this Framework

## 7.1. Issue identification (listening to the community's needs)

A first step of problem definition includes identifying relevant issues of a place or the region. A good understanding of the local context, particularly, the key factors and influences that may affect broader government outcomes is important. This information can be obtained by:

- Directly engaging with the community or key stakeholders
- Accessing information from Council or Stakeholder plans and publications
- Accessing any available market research
- Accessing existing VicRoads knowledge and data on issues previously identified

To ensure that customers and the community are central to defining problems-benefits-options it is important that the community input process is included at various stages of the Investment Management approach, such as:

- Seeking direct community feedback to identify the list of issues in the regions before the problem statements are identified
- Engagement with a group of community/stakeholder representatives used to prioritise issues and/or problem statements
- Engaging with community groups or stakeholders to test range of interventions and later solutions.

Figure 9 highlights the broad concept of different types of engagement approaches that can be applied at different stages of the investment development process.
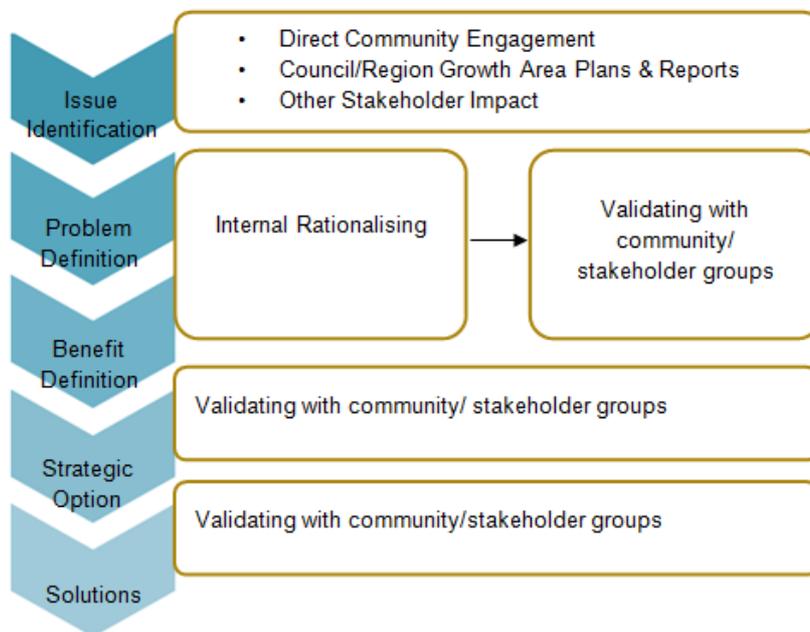
Figure 9: Example of community engagement stages

For further guidance on community and stakeholder engagement, please refer to Communication and Stakeholder Engagement Guide (QD#3344410) or contact the Community and Stakeholder Engagement team.

7.2. Defining Problems

The use of the term 'problem' in this document should be interpreted to cover a range of issues, deficiencies and challenges and not only focus on negatives. Problems can also be expressed as constraints on opportunities *National Guidelines for Transport System Management (2016)* and should be derived from the issues identified through the process outlines in Section 7.1*.*

Problem identification and assessment is an iterative process that will cycle through:

- − identifying the problem as it is currently understood

- − identifying and collecting all relevant data and evidence

- − analysing the available data and refining the problem statement (validating, rejecting or redefining the problem).

Once key issues are identified, one approach to defining and rationalising problem statements require undertaking a root cause analysis through a problem trajectory. The trajectory aims to identify the fundamental **cause** (what is broken) of a problem and the resultant consequences (**effect**) as a causal interpretation. This simply requires one continuously asking the "why" and "so what" questions to derive a clear cause and consequence picture.

7.3. Prioritising problems

Problem statements should be prioritised based on the scale and extent of the impact, cost and urgency of resolving it. The urgency is considered as the risk to the government or the community of not resolving the problems. The priorities need to be tested with key stakeholders and community groups.

The completion of this step should result in clear statements of problems and documented evidence of their scale and extent, causes and effects, the cost of resolving the problem and priority.

7.4. Using Investment Logic Maps for defining and prioritising problems

7.4.1. What is an Investment Logic Map?

An Investment Logic Map (ILM) is tool to assist in defining, rationalising and prioritising investment problems, benefits, responses and solution.

The ILM focuses on the problems or issues that an investment will try to address, the measureable benefits that can be achieved by resolving the problems and the most effective responses or solutions to resolve the problems while maximising the benefits. ILM uses the 'cause and effect' analysis process in rationalising and validating problems statements.

There are four steps involved in the ILM process as shown in the next page:

| PROBLEM	BENEFIT	STRATEGIC REPONSE	SOLUTION
Define the problem/s that need to be addressed Validate the problem is real Specify the benefits that will result from addressing the problem	Identify the KPIs, measures and targets that any investment will need to deliver Specify how the delivery of the benefits will be measured and reported	Explore the interventions that might be taken to address the problem and deliver the benefits Identify and evaluate a mix of strategic responses. This could include infrastructure, policy or other reform options	Identify project options that could implement the strategic response Decide and scope the one considered most suitable

The ILM is captured diagrammatically in a single page representing the underlying rationale behind an investment. The one pager ILM format is shown below.
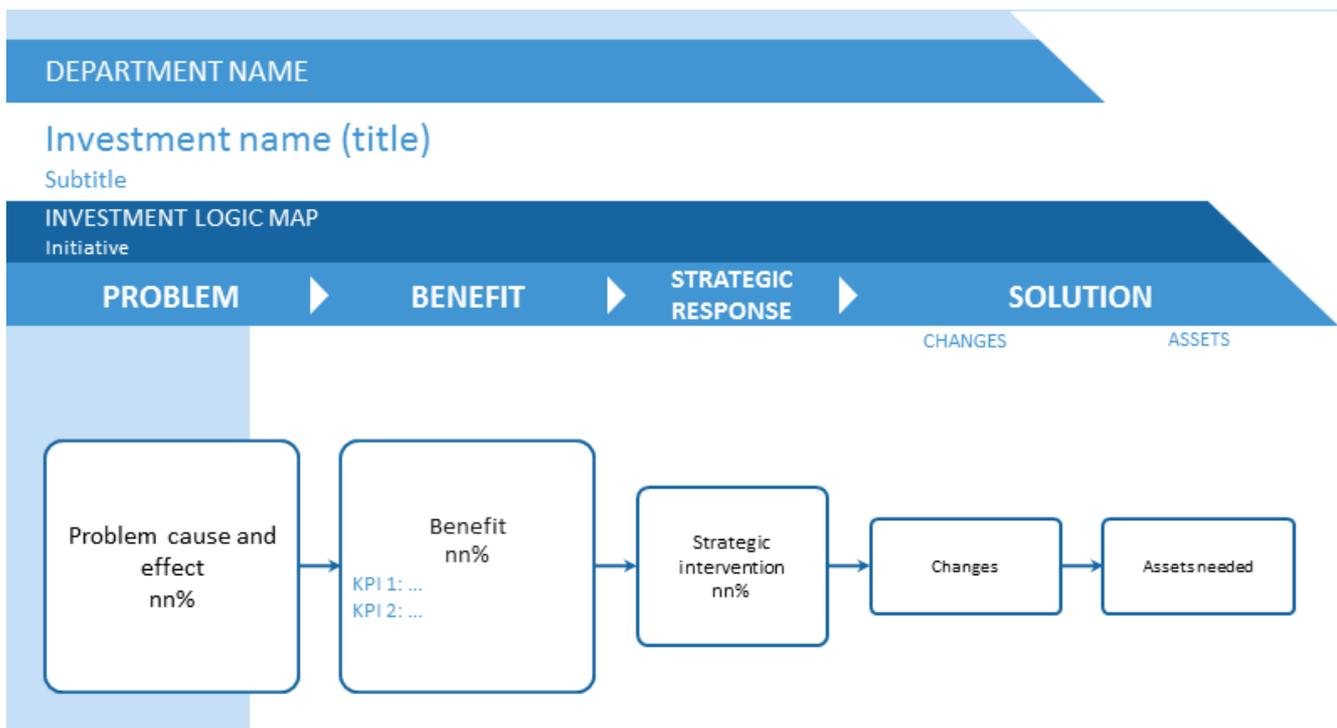
Figure 10: Investment Logic Map template

The ILM processes uses root cause analysis to rationalise the statements and seeks to have relevant data and evidence at each stage of the investment. Central to the success of an ILM are the following attributes:

- **Informed discussion** – ILMs require the participation of the investor and those people with the most information on the topic; usually a group of five to 10 people. The information on the topics should be obtained via the processes outlined under section 7.1 (Issue Identification).

- **Decision-making** – ILM practices are structured to address a sequence of decisions that are central to the potential investment.

- **Plain English** – An ILM tells the story of an investment in simple concepts and language so it can be understood by a general audience.

- **Evidence based** – Each statement in an ILM must be supported by evidence.

- **Two-hour limit** – ILM discussions are limited to two-hours; short enough to obtain the time commitment of senior stakeholders (e.g. Directors) but long enough to extract an agreed investment story.

- **48 hours review** – The 48 hours following an ILM discussion is used to conclude the ILM. During this time the first version of the investment story is circulated and any outstanding matters resolved.

- **Facilitated** – A independent facilitator is recommended who is responsible for:

  - extracting and telling the investment story in a way that maximises its value to the organisation and expresses it in plain language and concepts
  - obtaining the agreement of all participants to the investment story
  - making sure that each statement is supported by evidence.
  - The facilitator is usually not an expert on the problem or the solution but the one who facilitates the capture of the information from the experts in the room.

7.4.2. Who should be involved in an ILM process?

To make an ILM workshop effective it is important that the following people participate in the workshop:

- People with sound knowledge of the local issues

- experts with best practice knowledge of strategies and investment planning

- those with access to appropriate data sets to confirm identified problems and benefits

- People with relevant accountability for the emerging investment (the investor) to ensure critical decisions are made during the workshop

- People with the most knowledge of the intended proposal

- The person/people who will be responsible for writing the investment proposal. This person should also be responsible in recording the conversation in the ILM workshops to ensure there is a level of consistency throughout the process.

7.4.3. How should ILMs be developed?

How to develop an ILM depends on the estimated investment involved in the initiative or activity. Guidance on how to define problems through the ILM process is provided in **QD#1371416**.

- For investments over $10 million, a 2-hour workshop by an accredited ILM facilitator who is independent of the project/program/activity is required.

- For investments from $2–$10 million, an independent trained staff member may run the two-hour workshop. The staff member should be trained as a facilitator for ILMs and cannot facilitate a project/program/activity they are working on.

- For investments under $2 million, the ILM can be developed outside a workshop by a staff member trained in the Investment Management Approach.

For all investments not facilitated by a trained facilitator, the investment owner should seek feedback from a trained or accredited facilitator through an independent review.

A summary of all issues identified through Section 7.1 should be shared with ILM's participants prior to the ILM workshop.

Generally one workshop is recommended for each stage of the ILM as described in Section 4.1 (a total of four workshops). However, the size and complexity of the problems would determine if some of these workshops can be combined. For large or complex investments four workshops are usually recommended to derive enough detail for the initiative. For small investments, it is possible to extract the foundation logic to the level that will be required in a single workshop. The first step (problem definition stage) however, is critical for all investments as it defines whether the initiative should proceed to the next stage.

It should be noted that the initial ILM workshop only allows sufficient time to identify benefits at a very high level. These benefits are then further enhanced at the second stage of the process, which includes

developing a Benefit Management Plan (See 9.3 below). Once the benefits are enhanced, the ILM can be updated so the BMP and ILM are consistent.

7.4.4. When should ILMs be developed?

The ILM process includes four stages. The first two stages (problem and benefit definition) should be undertaken well in advance to allow for evidence to be collected to substantiate the statements before proceeding to later stages. The first and second stage of the ILM (problem definition) could be undertaken 12-18 months in advance of fully developed initiatives. However, the information captured at this early stage will need to reviewed if the initiative proceeds further in development stage and as more data or evidence becomes available.

7.4.5. When can an ILM be revised?

Problems and priorities may change overtime and/or in light of other developments. For example, the development of a transport initiative on another part of the network or the introduction of road tolls may reduce the extent and scale of a problem. Similarly, unexpected population changes over time or a new housing development may increase the scale of the problem and require problems to be prioritised.

The investor, which is usually the relevant Business Area Manager is the owner of the ILMs. It is the responsibility of the investor to review and keep the information updated in the ILMs. The ILMs should be revised when new evidence substantiating the problems and benefits is uncovered or a cost effective and better practice approach to resolving the problems is identified.

For more information on how to create a logic map, see the [Department of Treasury and Finance website](#)[4] and refer to the VicRoads 'Roads Program' Guidelines for its policy on the use of ILMs.

The *'Manage Investments'* page on the VNet also includes direct links to tools and guidance on how to define problems through the Investment Logic Mapping Process and how to review an ILM to ensure that the projects are on the right path. The vNet also includes templates and DTF list of accredited ILM Facilitators.

7.5. Developing a Benefit Management Plan

Once an ILM is developed, the next step is to develop a Benefit Management Plan (BMP) using the benefits initially identified in the ILM process. The scale of the investment determines the recommended way the BMP should be developed. Only investments under $2 million should consider developing an ILM or BMP outside the workshop environment. Again, a review by someone trained in the Investment Management Approach should be sought.

This Framework should be consulted during the workshops as well as during the review process that follows, to select or improve how benefits are expressed and to determine appropriate indicators and measures. Much of the work will revolve around contextualising indicators or determining whether a proxy indicator is appropriate, rather than creating completely new indicators.

Option 1: Develop the plan through a facilitated workshop

If you have completed facilitated workshops to complete an ILM and BMP, you can validate the BMP using this Framework, either during the second workshop (when a BMP is developed) or during the review process once the workshop is completed.

There are four key steps to reviewing the BMP:

1. Take each benefit initially identified in the ILM and match that benefit with the relevant Framework item. There are three possible results: the logic map benefit reflects one of the Framework outcomes; it reflects one of the Framework benefits; or neither of these.

    - **Outcomes –** If the ILM benefit matches a Framework outcome, then the benefit which is most relevant within that outcome must be identified. Have a look at the problem statements that link to the benefit in the ILM. The problem statements may refer to an issue that closely matches a benefit in the Framework. For example, if am ILM has a benefit identified as improved road safety (which matches an outcome), then refer to the problem statement to determine the relevant

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[4] http://bit.ly/15ZOLhN

benefit for the investment. If the problem was 'public behaviour around rail crossing was causing a potential safety hazard', the relevant benefit will be around <u>safety risk</u>.

- **Benefits –** If the ILM benefit matches a Framework benefit, this step is complete.

- **Neither –** If the ILM benefit matches neither, either the ILM reflects work not related to VicRoads or the Framework needs to be reviewed as the scope of works undertaken by VicRoads may have changed. In the latter case, investment managers need to contact the Investment Outcomes team so the Framework can be updated with the new benefits (if applicable).

2. Review the indicators developed within the workshop. As you review each indicator, make sure that each actual, contextual or proxy indicator meets the principles described earlier for attribution, relevance and measurability. If you believe each indicator developed within the workshop meets these principles, the next question is whether the indicators align with the Framework.

3. Each indicator could be an *actual indicator* (an exact match for the indicator in the relevant coloured wedge) such as <u>travel times</u>, or a *contextualised indicator* (a match but adjusted to suit the specific issues relating to the investment) such as <u>travel times along the Hume Freeway</u>, or a *proxy indicator* (an alternative way of describing the achievement of the indicator) such as <u>satisfaction with travel times along the Hume Freeway</u>.

4. If the indicator is neither direct, contextual or a proxy for an indicator provided in the Framework, either the indicator is not appropriate or the Framework needs to be reviewed and updated. Please do not continue with an indicator in this circumstance. Replace the indicator with a more appropriate indicator or discuss a future review of the Framework with the Investment Outcomes team.

5. Check that measures and data sources listed in the draft BMP are consistent with the Framework.

Option 2: Develop the BMP outside the workshop environment

If you have already developed an ILM and are developing the BMP outside the workshop environment, you will need to [download the templates and guidelines](#) from the Department of Treasury and Finance[5].

There are seven key steps to developing the BMP:

1. Take each benefit initially identified in the ILM and match that benefit with the relevant Framework item. There are three possible results: the logic map benefit reflects one of the Framework outcomes, it reflects one of the Framework benefits, or neither. Follow the instructions under Step 1 of Option 1 to validate this benefit.

2. Once you have selected the relevant Framework benefits, you will need to identify appropriate indicators and measures from the Framework. You can find relevant indicators from each coloured wedge relating to that benefit. After each coloured wedge, there is an example table showing how to do this.

Table 4 is taken from the section relating to Productivity and economic growth outcome.

Table 4: Example of how to apply the Framework

Steps	Example
Take one initial benefit from your Investment Logic Map (ILM)	More competitive industries
Match this benefit with the Framework	Business and industry attractiveness
Select an indicator from the Framework and add to the ILM	Travel time
Contextualise the indicator and add to the Benefit Management Plan (BMP)	**Reduction in** travel times **from Ballarat West Growth area to Ballarat West Employment zone**
Select a relevant measure from the Framework	Travel time in minutes from a specific origin to destination
Contextualise a measure to add to the BMP	Travel time in minutes between **Ballarat West Growth area to Ballarat West Employment zone**

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[5] http://bit.ly/15ZOLhN

3. Select appropriate indicators for each benefit. Once you have one or two indicators for each benefit, you can start building the BMP.

4. Each indicator could be an *actual indicator* (an exact match for the indicator in the relevant coloured wedge) such as travel times, be a *contextualised indicator* (a match but adjusted to suit the specific issues relating to the investment) such as travel times along the Hume Freeway, or a *proxy indicator* (an alternative way of describing the achievement of the indicator) such as satisfaction with travel times along the Hume Freeway.

5. If the indicator is neither direct, contextual or a proxy for an indicator provided in the Framework, the indicator is not appropriate or the Framework needs to be reviewed and updated. Please do not continue with an indicator in this circumstance. Replace with a more appropriate indicator or discuss a review of the Framework with the Investment Outcomes team.

6. You are now ready to start building the BMP. In the Benefit Map, add the benefits from the ILM that you validated in Step 1 above. Then add and link the indicators and measures you have selected. You will also need to add the target values and the date by which you think this target will be achieved. Figure 11 shows the format of a simple Benefit Map.
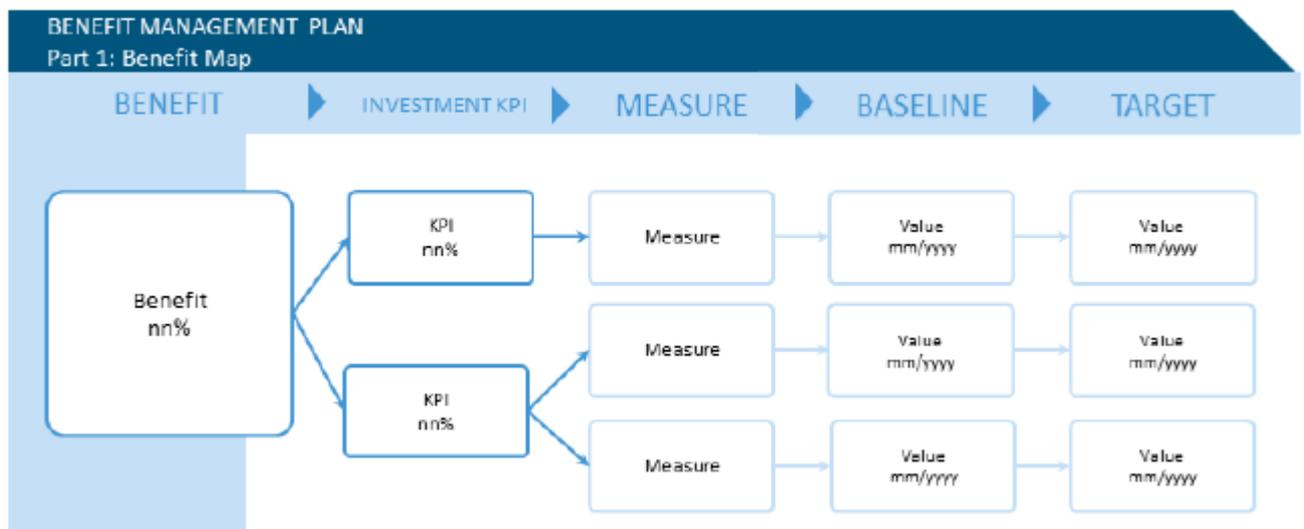

Figure 11: Benefit Map

7. The final step is to complete all the information required in the 'reporting and responsibilities' section of the Benefit Management Plan, including baseline and target values, the data source, any interim targets, the forum that will receive status reports, the dates between which reporting will be undertaken and the person or position responsible for providing the data to the investor / owner.

Figure 12: Benefit Plan template - reporting and responsibilities

8. Contact your data sources

A consistent approach to data collection is critical to ensure that the key performance indicators and measures can be compared between investments.

VicRoads Information Access collects routine and project-specific data (volume, travel time, speed and crash statistics) from within the Melbourne metropolitan area and across rural Victoria.

It also maintains summary injury and crash data across Victoria. Project and program managers are encouraged to utilise existing data sources and contribute to them as much as possible.

The tables in this Framework provide key contact points, which should be consulted before any data collection. If the key contacts do not have the relevant data sets, they should be able to provide specification for data collections that can be used by the contractors so that data is recorded in the same format and is fed into the VicRoads corporate database.

Appendix 1 - Indicator definitions

The presence of an indicator on this list does not mean that VicRoads has a responsibility for its management. In some cases, VicRoads activities may also be one of a number of factors that would have contributed to a change in an indicator.

Acceptance of planned extensions to the transport network – the degree to which community members support or tolerate network developments. This will only be used where an investment improves acceptance of extensions to the transport network which are already planned. For example, where an investment is made to build a shared path alongside a road duplication which is already planned. In this example the investment (the bike path) is intended to increase acceptance of an existing planned extension (the duplication).

Acceptance of the impacts of existing transport on amenity – the degree to which community understand and/or are prepared to tolerate the impacts of the existing transport on amenity. For example, investment in architecturally-designed noise barriers enable the community to better tolerate the loss of amenity by the same noise barrier.

Access (to services and employment) – the ease with which services and employment can be reached from a location. This might be used where transport network improvements make it easier to reach job and or retail, medical, recreational, social or other community facilities.

Access to public transport – the ease with which public transport services can be reached from a location. This might be used where transport network improvements make it easier to reach existing public transport services or where new services are provided.

Access to stakeholder asset – the ability for asset owner (other than VicRoads) to physically reach their assets (such as roadside lighting). For example, roadside maintenance activities allow utility providers to access pits.

Activity centre employment catchments – the spatial area from which most potential employees are likely to travel to an Activity Centre[6] for work. This indicator is only used as a proxy for access to employment.

Air quality – the degree to which the air in a particular place is clean, clear and free of pollution (i.e. gases, dust, fumes or odour in amounts which could be harmful to the health or comfort of humans). This might be used where an investment reduces emission of pollutants by vehicle.

Asset utilisation – the degree to which the of existing assets are utilised . If an asset (such as a Variable Message Sign) is not working, the resource is being wasted. This would only be used where an asset would otherwise not deliver (or deliver less of) the benefit/s it is intended to deliver.

Business activation – the stimulation of new or improved business activity. This might be used when an investment encourages an increase in business activity in a locality.

Casualty crash rating – an indicator of the level of road safety risks present (also referred to as crash risk). There are a number of methodologies available for rating safety risk (such as ANRAM or AusRAP). This might be used where there is a known and measurable safety risk but there is no crash history available.

Connectivity between different transport modes – the ease of making connections between transport services (e.g. making a change from a bus to a train upon reaching the train station). This might be used when investment improve the quality of a connection facility (e.g. moving the bus stop closer to the train station) or improve the reliability of services (e.g. making sure the bus always arrives on time so the train isn't missed).

Cycling activity – the quantity of bicycling which is occurring, measured as the number of trips, total km travelled, number of people cycling, percentage mode share, etc.

Damage to vehicles/properties – damage which occurs to non-VicRoads property (including vehicles) as a result of the road network (excluding usual vehicle maintenance which is covered under vehicle operating costs). This might be vehicles damaged by potholes or damage to neighbouring properties caused by falling tree branches.

Delays – the additional travel time experienced by road users with reference to a base travel time (e.g. in comparison with free flow travel time). Delays could be along an entire route or at a specific location (such as an intersection).

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[6] Activity Centres are defined suburban centres in the Victorian planning scheme that feature a concentration of services, employment, housing, transport and social interaction spaces.

Delays in accessing services and employment – the additional travel time experienced by road users in getting to the location of services, employment or other activities with reference to a base travel time (e.g. in comparison with free flow travel time).

Durability of assets – the ability of an asset to remain functional over time. This might be by withstanding wear and damage (i.e. remain functional after prolonged exposure to traffic, weather and other external factors) or by remaining up to date (i.e. assets or systems not becoming redundant). This might be used where routine maintenance would allow pavements / structures to have a long usable life in economic terms.

Efficiency of goods movement – the ability to move goods from one location to with least time, cost and/or resources, usually measured as the money and/or time required to move a given value, weight or volume of freight a given distance (e.g. 1km) or along a specified route (e.g. from a port to a freight hub).

Energy consumption from network assets – the amount of energy (usually electricity) used by a road network asset. This might be used where an electrical asset is upgraded to reduce its energy use (such as the replacement of incandescent bulbs with LEDs).

Equity of access – the provision of fair and equitable access to all community groups including those who may need an extra support or may not be able to afford (financially or otherwise) to use a given mode. This might be used where a project provides access for community members with disabilities or those of low socio-economic standing.

Exposure to high noise levels – exposure of community members to above acceptable noise generated from the road network. This might be used when an investment reduces the noise levels experienced by section of the community (such as through the installation of noise walls). The number or dwellings experiencing noise levels within 5dB bands, from 50dB to 70dB are measures (i.e. the number <55dB, 55-60dB, 60-65dB, 65-70dB and above 70dB).

Fire risk – the probability of fire being started or spread within the road / road side land managed by VicRoads. This might be used where roadside maintenance (such as grass slashing) reduces the fuel load on the road shoulder.

Freight rate of throughput – the amount of freight that passes a given point in a given time period. This could be all freight or freight of a specific type quantified by weight or value. The number of freight vehicles is often used as a proxy for the amount of freight.

Frequency of casualty crashes – how often casualties crashes occur.

Frequency of people taking risks – the risk-taking behaviour by road users (e.g. pedestrians crossing against signals). This might be used where risk taking behaviour is observable but there is no crash history.

Future costs avoided – known or certain cost savings which will occur in the future. This should only be used where an investment reduces the future total amount spent such as where routine maintenance would reduce the need for rehabilitation. This would also include where meeting standards / legislative requirements could avoid penalties and/or legal costs.

Incident / hazard response times – the time it takes to acknowledge and action an incident or hazard. This may be measured as the time from when an incident record is created, until the time the incident has been resolved.

Jobs created within a specified area – the number of jobs created within a given area. Often the square kilometre of a retail or commercial floor space can be used as a proxy measure for this. However, this indicator would only be used where an investment can be shown to have contributed directly to the creation of new jobs.

Level of service –The level of service is expressed as an index (a letter grade A through F) of the operational performance of traffic on a given traffic lane, carriageway or road. This could be when accommodating various traffic volumes under different combinations of operating conditions. It is usually defined in terms of the convenience of travel and safety performance. SmartRoads operating gaps can be used as proxy measures.

Local trips made by walking and cycling – the number (or proportion) of trips to local destinations made by walking or cycling. This might be used where an investment encourages the use of walking or cycling for local trips. An increase might occur due to new trips or mode shift.

Mode share – the percentage of travel made by different modes of transport. Mode share is usually reported as a percentage of trips. A proportion of travel distance or travel time could also be used.

Mode shift from car – the amount of travel which changes from being undertaken by car to being undertaken by another mode of transport. This might be used where an investment discourages the use of personal vehicles or encourages the use of alternative modes of transport. Note that it is generally appropriate to consider 'car passenger' as a different mode to 'car driver'.

Occupational Health and Safety (OHS) risk – safety risks to individuals engaged in activities (working) on or around the road. This might be used where an improvement in asset management procedures or technology reduce the amount of time workers are on the road.

Optimisation of network capacity – making the best possible use of existing network capacity. This might be used where road space is better used (to move people and freight) as a result of changing its allocation (e.g. providing a contra-flow facility), better managing vehicle flow (e.g. freeway management systems) or redirecting traffic to underutilised parts of the network (e.g. improving driver information). Note that load factor can be used to measure the degree of utilisation of an approach to a signalised intersection or to measure the degree of utilisation of a freight vehicle's capacity, but a network impact needs to be established to be able to use that for the whole network capacity.

Optimisation of the tram and bus fleet – the ability to make optimum use of the tram and bus fleet to move the same number of people and more reliably. This is usually achieved by ensuring the services are spaced running along the same route, instead of running in the same location at the same time due to road congestion (bunching), thus preventing the need to use extra vehicles to fill cover gaps in service.

Patronage of rest areas – the number of vehicles (or people) visiting rest areas over a given time period. It might be important to consider only specific users (e.g. truck drivers) for some investments. This might be used where a rest area is built or improved.

Pedestrian movement – the amount travel being undertaken by walking.

People feel safer – how safe community members consider a place or situation to be. This should only be used where community members perceive that a risk to safety exists but no measurable safety risk (such as a crash history) is present. For example, the presence of graffiti (act of defacement and vandalism) may cause for people to believe that there is presence of crime, leading to public safety and concerns.

Person rate of throughput – the number of people that pass a point in a given time period using any/all modes.

Public transport patronage – the number of passengers carried by public transportation modes.

Public transport punctuality – the percentage of services which are considered to be 'on-time'.

Range of modes – the modes (or means) of transport available to members of the community. This might be used where one or more modes which were previously not available to a section of the community are made available. This indicator should only be used where a better indicator of accessibility (such as 'Access to activities and services') cannot feasibly be used.

Resilience to changes in demand – the ability for road network to keep functioning when changes in transport demand occur (short or long term). This might be used where road capacity or the standard of road has been built to allow for uncertain future changes (in use). For example upgrading a bridge to be strong enough for Higher Productivity Freight Vehicles despite them not being allowed to use that route yet or building a new road with extra lanes due to the possibility of future land use change. A reduction in vulnerability can be considered an improvement in resilience.

Resilience to extreme events – the ability for road network to continue functioning during/after extreme events (e.g. extreme weather, extreme demand or sudden loss of capacity). For example, where an asset is upgraded to enable it to withstand severe storms / flooding (such as by installing uninterruptible power supply at signals) or where sealed shoulders are constructed such that they can carry traffic during an emergency. A reduction in vulnerability can be considered an improvement in resilience.

Resilience to network changes – the ability for road network to continue functioning when changes to the transport network occur without adversely affecting the road network. For example, by putting trams in their own right of way, any changes in tram frequency will not impact traffic flow as greatly, compared with being in the same stream of traffic with other vehicle types. A reduction in vulnerability can be considered an improvement in resilience.

Ride quality and comfort – the level of discomfort experienced by the vehicle occupants as a result of vibration and noise. This indicator might be used where road pavements are improved.

Risk to Biodiversity – the risk of reducing the variety of plant and animal life in a particular habitat. This might be used where roadside maintenance or similar activities protect biodiversity.

Risk of harm (non-crash) – the risk of injuries or illness resulting from use of VicRoads assets not directly caused by crashes. For example, a chemical spill due to truck rollover may have risk of harming local residents, or over-height vehicles hitting the bridges may cause damage to pedestrians or public transport passengers if it hits nearby train lines .

Risk to heritage loss – the chance or possibility of losing something of heritage value/significance. This might be used where an investment is made with the purpose of preserving or protecting something of heritage value (e.g. a heritage bridge).

Satisfaction with local amenity – how satisfied community members are with local amenity (features of a place which make for a comfortable and pleasant life). This might be used where an investment makes improvements to local amenity which cannot easily be measured directly.

Satisfaction with service provided – satisfaction with any service provided by VicRoads. This may be the satisfaction experienced with the level of service of a road (or road network) or a direct customer service, usually measured through direct customer feedback.

Severity of casualty crashes – how serious the crashes are whereby the highest injury sustained by one person is either a 'fatality' or 'serious injury'. Serious injuries means person has been taken and admitted to hospital but has not died within 30 days of the crash. Fatalities means person who has been killed in a crash or has died within 30 days of the crash.

Severity of crash rating – an indicator of the level of road safety risks present but only considers crashes resulting in serious injuries or fatalities. This might be used where the number of crashes is not expected to improve but the severity of the crashes is expected to improve.

Time Saved (non-travel) – the amount of time (besides travel time) which is saved by community members, businesses or VicRoads staff as a result of improvements to systems, processes or resource allocation. This might be used where making a registration or licensing service available online makes it faster for customers and/or reduces the amount of staff time needed to provide services.

Travel time – the time required to travel between two points. This might be along a length of road or between a specific origin and a specific destination.

Travel time reliability – the consistency / dependability of travel times. It represents the uncertainty experienced by road users incurred by the variability in travel time/s. This might be used where network capacity is increased so that travel times become more consistent (despite fluctuations in demand).

Trucks using appropriate freight routes – large freight vehicles using roads which are designated for their use. This might be used where improving a freight route takes freight vehicles off local routes.

Vehicle carbon emissions – the amount of carbon emissions expelled from the exhaust pipe of vehicles.

Vehicle operating cost – the cost of operating a vehicle and includes fuel, lubricating oils, tyres, vehicle depreciation, repairs and maintenance measured using mechanistic algorithm. Austroads publishes standard values for vehicle operating costs which are used in standard economic appraisal calculations.

Vehicle rate of throughput – the number of vehicles that pass a point in a given time period.

Volume to capacity ratio – the ratio between the volume of traffic using a road and the capacity of that road. This can be used as a proxy for travel time and reliability or as an indicator of roads capacity utilisation. This might be used where data collection for travel time or reliability are not feasible.

Water quality – degree to which the waterways are clean, clear and free of pollution. For example, maintaining roadside drainage systems will ensure reduced road debris or traffic spills in the waterways.

Whole of life cost – total cost of owning an asset or a product over its entire life, including capital cost as well as cost of maintaining and operating the asset.

Appendix 2– Linking asset management output indicators to

Proponents are encouraged to use outcome indicators, where possible. It is however, acknowledged that output indicators have been traditionally used in asset management literature. The table below helps demonstrate a causal link of the changes in the outputs (measured through output indicators) can lead to outcome changes (measure through outcome indicators). For example, road closures chosen as an output to mitigate road safety issues will affect (i.e. reduce) access to services and employment. Proponents can use this matrix to identify the likely change in outcomes that can be anticipated from the indicated output changes.

Table 5: Asset Management Output Indicator

Outcome indicators	Pavement Condition[1]	Road Closures	Structure Condition[2] / Load Limits	Number of high risk land slip sites	Roadside Condition[3]	Barrier Condition
Acceptance of the impacts of existing transport on amenity					Yes	
Access to services and employment[7]	Yes	Yes				
Access to stakeholder asset[7]		Yes			Yes	
Activity centre employment catchments	Yes	Yes				
Business activation	Yes	Yes	Yes			
Casualty crash rating						Yes
Certainty of access	Yes	Yes	Yes	Yes		
Damage to vehicle / properties[7]	Yes					
Delays in accessing services and employment	Yes					
Delays[7]	Yes					
Durability	Yes		Yes	Yes		
Efficiency of goods movement	Yes	Yes	Yes			
Equity of access	Yes	Yes				
Fire risk[7]					Yes	
Optimisation of asset capacity	Yes	Yes	Yes			
Optimisation of the tram and bus fleet[7]	Yes	Yes	Yes			
People feel safer	Yes				Yes	Yes
Resilience to extreme events	Yes	Yes	Yes	Yes		
Ride quality and comfort[7]	Yes					
Risk of harm (Non-crash)			Yes	Yes	Yes	
Risk to biodiversity					Yes	
Satisfaction with local amenity					Yes	
Satisfaction with service provided	Yes	Yes	Yes		Yes	Yes
Severity of crash rating						Yes
Travel time reliability[7]		Yes				
Travel time[7]	Yes	Yes	Yes			

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[7] These outcome indicators contribute to multiple benefits in the Benefit Management Frameworks (BMF)

Outcome indicators	Pavement Condition[1]	Road Closures	Structure Condition[2] / Load Limits	Number of high risk land slip sites	Roadside Condition[3]	Barrier Condition
Trucks using appropriate freight routes		Yes	Yes			
Vehicle operating cost[7]	Yes		Yes			

[1]Pavement condition

Pavement condition refers to the state of the road pavement. A range of factors contribute to the overall condition of a pavement including:

- *Cracking (measured in* % of pavement area/length effected)

- Texture which is made up of:

  - *Loss of Aggregate (Stripping)*
  - *Loss of Surface Texture (*Flushing)
  - *Loss of Binder*
- *Binder Condition (Oxidation)*

- *Maintenance Patching (measured in* % of pavement area/length effected)

- *Deformation (measured in* % of pavement area/length effected) and made up of:

  - Rutting (measure as rut depth)
  - Roughness (measured by IRI (new method), NRM (method method), HATI (for trucks) or Riding Quality Indicator (RQI) (rated from good to very poor)
  - Shoving
  - Depressions
- Potholes

- Edge defects

For more information, see VicRoads Technical Bulletin 50 Guide to Surface Inspection Rating (QD#2529471).

The Australian Government uses two indicators—the *Preventative Maintenance Indicator* (PMI) and the *Riding Quality Indicator* (RQI)—to monitor road conditions under the National Partnership Agreements.

[2]Structure condition

Structure condition refers to the state of structures (e.g. bridges, noise walls, gantries). The condition of a structure is dependent on the condition on each of its structural elements, each of which is rated on a scale of 1 to 4 based on the presence of damage such as cracking, rusting, loss of protection, spalling, loss of section or other defects.

A bridge or culvert in poor condition may require load limit. The probability of a load limit being required in future is also used as a measure of structure condition.

[3]Roadsides condition

Roadsides condition refers to the state of the roadsides (the land along the side of a road which is not part of the road pavement). A range of factors contribute to the overall condition of a roadside including:

- Vegetation clearance (to road and/or signs)

- Sight distance

- Roadside weeds