Loddon Campaspe Regional Profile

An analysis of regional strengths and challenges

A Report prepared for Infrastructure Victoria

March 2019
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<th>Description</th>
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<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>ACSC</td>
<td>Ambulatory Care Sensitive Conditions</td>
</tr>
<tr>
<td>CEDA</td>
<td>Committee for Economic Development of Australia</td>
</tr>
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<td>CMA</td>
<td>Catchment Management Authority</td>
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<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation</td>
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<tr>
<td>CVM</td>
<td>Chain volume measure</td>
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<tr>
<td>DELWP</td>
<td>Department of Environment, Land, Water and Planning</td>
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<tr>
<td>DOTE</td>
<td>Dropping off the Edge (Jesuit Social Services Report)</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>FTTC</td>
<td>Fibre to the Curb</td>
</tr>
<tr>
<td>FTTN</td>
<td>Fibre to the Node</td>
</tr>
<tr>
<td>FTTTP</td>
<td>Fibre to the Premises</td>
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<tr>
<td>GRP</td>
<td>Gross Regional Product</td>
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<tr>
<td>GVA</td>
<td>Gross Value Added</td>
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<td>IEO</td>
<td>Index of Education and Occupation</td>
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<td>IER</td>
<td>Index of Economic Resources</td>
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<tr>
<td>IRSAD</td>
<td>Index of Relative Socio-Economic Advantage and Disadvantage</td>
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<tr>
<td>IRSD</td>
<td>Index of Relative Socio-Economic Disadvantage</td>
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<tr>
<td>LGA</td>
<td>Local Government Area</td>
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<tr>
<td>LQ</td>
<td>Location Quotient</td>
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<tr>
<td>NBN</td>
<td>National Broadband Network</td>
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<td>NIEIR</td>
<td>National Institute of Economic and Industry Research</td>
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<tr>
<td>SA1</td>
<td>Statistical Area 1</td>
</tr>
<tr>
<td>SEIFA</td>
<td>Social and Economic Indices For Areas</td>
</tr>
<tr>
<td>VCMC</td>
<td>Victorian Catchment Management Council</td>
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### Glossary

<table>
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<tr>
<th>Glossary</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABS SEIFA</td>
<td>Index of socio-economic conditions by geographic area and based upon data available through the national Census. This data is limited to questions which cover income, housing and education, and has comprehensive geographic coverage.</td>
</tr>
<tr>
<td>Access to community services</td>
<td>Residents who could access community services or resources, such as libraries, maternal and child health centres and neighbourhood centres, when needed.</td>
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<tr>
<td>Term</td>
<td>Description</td>
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<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Aged dependency ratio</td>
<td>The aged dependency ratio is the ratio of aged dependents (people older than 64) to the working-age population (those aged 15-64). Data shown is the proportion of dependents per 100 working-age population.</td>
</tr>
<tr>
<td>Child protection substantiations</td>
<td>The outcome of an investigation and assessment where it is assessed that the child or young person has suffered significant harm and/or there is unacceptable risk of significant harm and there is no parent able and willing to protect the child.</td>
</tr>
<tr>
<td>Declared Water Supply Catchment</td>
<td>Designated catchment areas recognised under the <em>Victorian Catchment and Land Protection Act 1994</em> for the purposes of water supply.</td>
</tr>
<tr>
<td>Environmental Water Holdings</td>
<td>Water that is held and managed for the purpose of achieving environmental outcomes.</td>
</tr>
<tr>
<td>Gross Value Added</td>
<td>A measure of the value of goods and services produced in an area, industry or sector of an economy.</td>
</tr>
<tr>
<td>Gross Regional Product</td>
<td>The market value of all final goods and services produced by all firms in a region.</td>
</tr>
<tr>
<td>Homelessness</td>
<td>When a person does not have suitable accommodation alternatives, they are considered homeless if their current living arrangement:</td>
</tr>
<tr>
<td></td>
<td>• is in a dwelling that is inadequate;</td>
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<tr>
<td></td>
<td>• has no tenure, or if their initial tenure is short and not extendable; or</td>
</tr>
<tr>
<td></td>
<td>• does not allow them to have control of, and access to space for social relations.</td>
</tr>
<tr>
<td>Hospital separations</td>
<td>The process by which an episode of care for an admitted patient ceases. A separation may be formal or statistical. A statistical separation is the administrative process by which a hospital records the cessation of an episode of care for a patient within the one hospital stay.</td>
</tr>
<tr>
<td>Jesuit Social Services DOTE report</td>
<td>The Jesuit Social Services disadvantage indicator is constructed from measures of low family income, internet access, school education, post school qualification, skilled workers, disengaged young adults, disability support, unemployment, long term unemployment, rental assistance, numeracy and reading NAPLAN scores, child maltreatment, criminal convictions, juvenile convictions, domestic violence, prison admissions, psychiatric admissions.</td>
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<tr>
<td>Labour force</td>
<td>The labour force is the sum of employed people and unemployed people.</td>
</tr>
<tr>
<td>Labour productivity</td>
<td>Labour productivity measures the amount of goods and services produced by one hour of labour.</td>
</tr>
<tr>
<td>Location Quotient</td>
<td>An LQ is a simple ratio used to determine the concentration or dominance of a particular industry in a region (i.e. Local Government area) in comparison to a larger reference or benchmark region (i.e. State or Nation). Suppose X is the amount of some asset in a region (e.g., manufacturing jobs), and Y is the total amount of assets of comparable types in the region (e.g., all jobs). X/Y is then the regional “concentration” of that asset in the region. If X' and Y' are similar data points for some larger reference region (like a state or nation), then the LQ or relative concentration of that asset in the region compared to the nation is (X/Y) / (X'/Y').</td>
</tr>
<tr>
<td>Participation rate</td>
<td>The labour force participation rate is calculated as the labour force divided by the total adult population. The adult population refers to people aged over 15.</td>
</tr>
<tr>
<td><strong>Ramsar wetland</strong></td>
<td>A ‘declared Ramsar wetland’ is an area that has been designated under Article 2 of the Ramsar Convention or declared by the Minister to be a declared Ramsar wetland under the EPBC Act. The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.</td>
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| **Salinity** | Salinity refers to the movement and concentration of salt in landscapes. Both soil and natural waters can become saline. Hence salinity can be described as either soil salinity or water salinity. The effects of salinity are broad including:  
- reduction in the productive capacity of affected land (e.g. crop yields)  
- degradation of the environment and wildlife habitats  
- loss of water quality for stock and domestic water supplies  
- production losses causing economic hardship  
- damage to roads  
- damage to water-using household equipment. |
| **SA1** | SA1s have been designated as the smallest unit for the release of Census data. |
| **Skilled jobs** | This report uses Australian Bureau Statistics data on employment and training, including terminology regarding ‘skilled’ employment. For the purpose of this report, ‘low’ skilled employment requires no post-school qualifications, ‘intermediate’ skilled employment means vocational training was obtained, and ‘high’ skilled employment means higher/tertiary education was obtained. |
| **Social Housing** | The social housing stock data includes both public housing provided directly by the Department of Health and Human Services and housing provided by the not-for-profit community housing sector. |
| **Unemployment rate** | The unemployment rate is a measure of the prevalence of unemployment and it is calculated as a percentage by dividing the number of unemployed individuals by all individuals currently in the labour force. |
| **Volunteering** | The provision of unpaid help willingly undertaken in the form of time, service or skills, to an organisation or group, excluding work done overseas. |
| **Youth Disengagement** | Those aged 15 to 19 not engaged at all in work or study. |
1. Introduction

1.1. About this project

When Infrastructure Victoria prepared their first 30-year infrastructure strategy in 2016, they committed to undertake further research to develop a stronger evidence base about the need for and impact of infrastructure investment in different parts of regional and rural Victoria. This project informs that evidence base and will assist Infrastructure Victoria to understand regional Victoria’s challenges and opportunities in depth across economic, social and environmental domains. An Economic, Social and Environment Profile has been prepared for each of the nine non-metropolitan regions identified by the Victorian Government’s Regional Partnerships.

As part of the 30-year strategy Infrastructure Victoria developed a set of ten objectives. These objectives set out what the strategy is aiming to achieve and recognise that good infrastructure is not an end in itself, but an enabler of better social, economic and environmental outcomes.

Therefore, before considering possible infrastructure solutions for regions, Infrastructure Victoria needs to better understand the economic, social and environmental strengths and challenges that infrastructure solutions might seek to address. This project explores economic, social and environmental strengths and challenges in order to support Infrastructure Victoria’s understanding and thinking on infrastructure needs, opportunities and solutions. It does not, and it is not intended to, provide insights or recommendations with respect to specific infrastructure needs, opportunities and solutions.

1.2. Approach to this regional assessment

This regional assessment provides an overview of the current economic, social and environmental profile of the Loddon Campaspe region and the potential future risks and challenges it will face. The assessment is based on currently available data with some additional analysis. Where datasets are highly correlated, such as is the case with health indicators, higher level indicators have been used. The approach to this regional assessment was to ensure that all evidence presented here is factual, unbiased and to allow for direct comparisons across all regions and the State as a whole.

This profile also includes an assessment of the key drivers of change facing Victoria and their relevance for the region. To do this, this report identifies a range of attributes, competitive strengths and challenges which have shaped the Loddon Campaspe economy and community. Attributes can be characterised as physical or built infrastructure, natural resources, or environmental amenities. Attributes may be leveraged as regional strengths or may be under threat and present a challenge to the region. This is particularly relevant when the attribute is important in the context of Victoria and provides benefits to the regional economy. These attributes have been noted more frequently throughout this report on this basis.

The assessment of the Loddon Campaspe region has identified four sub-areas with broadly distinct characteristics. The four areas have been defined by Local Government Areas (LGAs):

- Bendigo regional hub (City of Greater Bendigo LGA)
- Southern peri-urban fringe (Macedon Ranges and Mount Alexander LGAs)
- Northern rural areas (Loddon and Campaspe LGAs)
1.2.1. Report usage and limitations

Aither worked with Infrastructure Victoria through an extensive pilot reporting process to identify appropriate data sets that best align with the needs of Infrastructure Victoria for the purpose of this report.

The majority of data is available at the LGA level, and data has been generally focussed at this level to maintain consistency. This means that for some LGAs, such as Greater Bendigo, with large population centres, the outcomes for the largest population area (i.e. the city) drive the outcomes for the whole LGA. This can hide some of the nuances for the wider region, however where appropriate these have been captured anecdotally.

Economic data at the LGA level has been provided by NIEIR through their national model of the Australian economy. For small rural LGAs with an economy highly dependent on agriculture the data is not as reliable on a year to year basis given that employment and output and prices fluctuate more than in other industries. Therefore, strong conclusions should not be drawn on the basis of this data alone.

This report uses Australian and New Zealand Standard Industrial Classification (ANZIC) data at the 1 digit level. Investigation of ANZIC data at a more detailed level was outside the scope of this report.

This final report has been written to ensure clarity on the key messages and to a standard sufficient for internal dissemination and consequently some graphics have been left in their original state.

1.3. Overview of the Loddon Campaspe region

The Loddon Campaspe region is 19,100 square kilometres in extent (covering 8 per cent of Victoria) and is characterised by several distinct areas. The southern part of the region extends to the Macedon Ranges incorporating towns such as Macedon, Kyneton and Gisborne. The northern part forms part of the New South Wales-Victorian border along the Murray River, with Echuca being the main regional centre in the far north-east of the region. The western reaches of the region border the Mallee and Wimmera and are primarily rural. The region includes the regional hub of Bendigo in the centre of the region, as well as a number of moderately sized towns such as Echuca, Castlemaine, Gisborne and Maryborough spread throughout the surrounding Local Government Areas (LGAs).

The Loddon Campaspe region comprises six LGAs. As shown in Figure 1 these are:

- Loddon Shire
- City of Greater Bendigo
- Central Goldfields Shire
- Macedon Ranges Shire
- Mount Alexander Shire
- Campaspe Shire.

Loddon Campaspe is one of five regions that border metropolitan Melbourne, which has a strong influence on the region’s southern population and economy. Some areas in the south, such as Gisborne, are within Melbourne’s peri-urban fringe which continues to provide population and
associated development pressures, including on some of the region’s landscape, agricultural, waterway and other environmental assets.

The Loddon Campaspe region includes the traditional lands of the Dja Dja Wurrung peoples and small sections of the lands of the Taungurong and Yorta Yorta people. The Dja Dja Wurrung Clans Aboriginal Corporation, Wurundjeri Tribe Land and Compensation Cultural Heritage Council and the Taungurung Clans Corporation have legislated responsibilities relating to the management of Aboriginal cultural heritage places in the Loddon Campaspe region (State Government of Victoria 2014a).

The regional city of Bendigo and much of the surrounding region experienced its first period of post European growth following the discovery of gold in 1851 which saw a rapid expansion of its population. This was soon followed by the establishment of the Bendigo Bank and the completion of a rail link to Melbourne in 1862. Following the downturn in gold mining activity at the commencement of the twentieth-century, Bendigo entered a period of population decline and a transition to manufacturing. This period saw the establishment of the defence industry in Bendigo that prevails to the present day. In more recent years Bendigo has experienced population growth, in part due to the Regional Fast Rail Project which has reduced travel times to Melbourne (SGS Economics and Planning 2016).

In the north of the region, the Port of Echuca was once one of the Murray River’s busiest, facilitating up and downstream river trade. Its early growth was assisted by the construction of a rail link in 1864 which made it the closest Murray River port to Melbourne. The port however declined following the expansion of railways throughout the late nineteenth and early twentieth century, becoming defunct by the 1920s (Echuca Moama n.d.). Since the decline of the port, Echuca and much of the surrounding region have relied on irrigated agriculture. The establishment of irrigation networks within the region lead to the expansion of the dairying and food processing industry and foundation of the Murray Goulburn processing plant at Rochester (creating prospects in agricultural related manufacturing and processing) (SGS Economics and Planning 2016). The Murray Goulburn’s dairy processing plant in Rochester closed in early 2018 following decline in the dairy sector.
Figure 1  Local Government Areas in the Loddon Campaspe region


Figure 2  Loddon Campaspe Region
1.3.1. Regional centres and towns

The total population of the Loddon Campaspe region is 232,903 (ABS 2016a), representing 3.8 per cent of Victoria’s population. This is dominated by the regional city of Bendigo (91,567) which comprises 39 per cent of the region’s population.

Other regional centres include:

- Echuca (12,882)
- Castlemaine (9,811)
- Gisborne (9,551)
- Maryborough (7,430)
- Kyneton (4,806) (Plan Melbourne).

Other regional towns include:

- Kyabram (5,714)
- Woodend (3,782)
- Macedon (2,727)
- Rochester (2,692)
- Heathcote (1,677)
- Lancefield (1,443)
- Tongala (1,292)
- Inglewood (731)
- Boort (725)
- Dunolly (659).

The majority of population growth has occurred in the major commuter town of Gisborne, and, to a lesser extent, Bendigo. Smaller regional towns, particularly in the peri-urban fringe of Melbourne, have also experienced high rates of population and economic growth. Additional centres such as Castlemaine situated relatively close to both Melbourne and Bendigo have also experienced population growth.

The Loddon Campaspe region contains several sub-regions in close proximity to other regions by road, including Melbourne:

- Gisborne is approximately 50 kilometres from the Melbourne CBD
- Castlemaine is approximately 130 kilometres from the Melbourne CBD and 35 kilometres from Bendigo
- Maryborough is approximately 65 kilometres from Ballarat.

Many of the towns within the Loddon Campaspe region are also within 100 kilometres of a regional centre:

- Echuca is approximately 90 kilometres from Bendigo
- Inglewood is approximately 45 kilometres from Bendigo.
1.3.2. **Major regional infrastructure**

The Loddon Campaspe region is well connected to Melbourne via a number of economic centres, and has an airport just outside of Bendigo which provides a range of commercial and light aircraft operations. The region is also directly connected to ports in Melbourne, Geelong and Portland (Figure 3). Transport infrastructure is centred around the Calder Freeway and the North-western rail line that connects Melbourne to Bendigo and with Echuca and Swan Hill.

The road network through the Loddon Campaspe region includes:

- Calder Freeway/Highway – Melbourne-Gisborne-Kyneton-Bendigo-Inglewood-Mildura
- Midland Highway – Geelong-Ballarat-Bendigo-Shepparton-Wangaratta-Mansfield
- Loddon Valley Highway – Bendigo-Kerang
- Northern Highway – Echuca-Heathcote-Wallan
- McIvor Highway – Bendigo-Heathcote
- Pyrenees Highway – Elphinstone-Maryborough-Avoca-Ararat
- Wimmera Highway – Bendigo-St Arnaud-Horsham

The rail network includes direct passenger and freight rail routes from Maryborough (via Ballarat), Swan Hill, Echuca and Bendigo to Melbourne. It also includes freight rail movements from the Mildura, Kulwin and Robinvale lines that travel via Dunolly, Maryborough and Ballarat to Melbourne, Geelong and Portland.

![Figure 3](image_url)  
**Figure 3** Loddon Campaspe transport links and access to key services in surrounding regions

*Source: State Government of Victoria 2014a.*
The region does not have a major airport however it does have several smaller regional airports. Being a landlocked region, the Loddon Campaspe region does not have a major port; access to ocean-based freight is through the Port of Melbourne via the Calder Freeway and Bendigo rail line.

The Loddon Campaspe region has a range of social infrastructure, particularly in the area surrounding the regional centre of Bendigo. Higher services are provided in Bendigo, Echuca and increasingly the portions of the region located within Melbourne’s peri-urban fringe. Loddon Campaspe also has well established education infrastructure with a Latrobe University campus, Bendigo Senior Secondary College which offers the largest range of VCE subjects in the state and several TAFE institutes. The Bendigo Art Gallery hosts an extensive collection of 19th century European and Australian art from the 1800’s onwards. The gallery has also hosted international exhibitions, such as the Grace Kelly exhibit in 2012, and is an important tourist attraction. Other major infrastructure includes Bendigo Hospital, and the Bendigo Court.

The Loddon Campaspe region also provides services to, and gains services from, New South Wales, and draws considerable freight movements between the two. In particular, the Victorian town of Echuca is situated immediately next to the New South Wales town of Moama, separated by the state border and the Murray River and connected by bridge. Echuca and Moama are closely connected and operate as twin towns. They share important tourism assets and economic activity centred on the Murray and Campaspe Rivers, and each have secondary schools accessed by residents of both towns. Echuca has key health and education services that can be accessed from Moama, including a campus of Bendigo TAFE and the Echuca Regional Health service. There is considerable interstate commuting for work. Echuca is linked to New South Wales by the train line to Deniliquin, and by bus services to Sydney via Wagga Wagga or Albury. By road, Echuca connects to New South Wales via the Cobb Highway. This is the main route connecting the Bendigo regional centre with New South Wales via the Midland and Northern Highways to Echuca.

Water storage and supply infrastructure within the Loddon Campaspe region includes Cairn Curran Reservoir, Tullaroop Reservoir, Lake Eppalock and Waranga Basin. Irrigated agriculture in the Campaspe sub-region is underpinned by the Goulburn Murray Irrigation District (GMID) which supplies irrigation water throughout the sub-region as well as a connection to the domestic supply of Bendigo. This supports the local dairying industry and is shared with the neighbouring Goulburn region.

Urban water supply across the Loddon Campaspe region is the responsibility of a number of regional water corporations, including Coliban Water (Bendigo, Castlemaine, Heathcote and Echuca), Western Water (Woodend, Macedon, Gisborne and parts of Mount Macedon LGA) and Central Highlands Water (Maryborough and surrounds). The key challenges for water security tend to be population growth (particularly in larger centres) and climate change. The impacts of climate change, in particular, are generally forecast to contribute to increasing uncertainty and reduced availability of water resources.

**Digital infrastructure**

Digital infrastructure is a broad category of technologies which together comprise the digital connectivity landscape in a given location. The most significant digital infrastructures for businesses and households include:

- **Fixed broadband access**: for example, National Broadband Network (NBN) fixed-line broadband services including Fibre to the Premises (FTTP), Fibre to the Node (FTTN), Fibre to the Curb (FTTC), Fixed Wireless and Satellite services.

- **Mobile access**: digital mobile networks capable of supporting voice telephony and data applications such as through 4G networks, with emerging Internet of Things capability.
The quality of this infrastructure across Loddon Campaspe is highly variable, as are the demand characteristics of different user groups within each location, making it difficult to provide a simple snapshot of the current infrastructure landscape across the whole region. However, general points can be made about the availability of these infrastructures in different place and sector contexts, as summarised in the table below.¹

The general findings below do not consider the adequacy of the infrastructure in meeting the economic and social needs of businesses, households and other users in a given location, rather it provides an outline of what tends to be available. Although mobile coverage availability may be noted below, regional users may still face issues with the quality and reliability of services including accessing data.

¹ These high-level findings are informed by continuing work from the Loddon Campaspe Regional Partnership to assess the current state of digital infrastructure supply and demand in their region, in the form of a Digital Plan. Digital Plans are not yet complete and are subject to further consultation and input which is underway. While the table above focuses on the major infrastructures of fixed broadband and mobile access, these are not the only types of infrastructure relevant to digital connectivity. For instance, Low Powered Wide Area Networks (that can support Internet of Things applications like remote sensors) and WiFi networks are increasingly relevant infrastructures for industry applications, tourism and addressing disadvantage. Also, backhaul fibre networks provide national and global digital connectivity and the quality of these networks in a location affects investment, availability, affordability and quality of all digital services.
<table>
<thead>
<tr>
<th><strong>Cities and large towns, such as Bendigo and Echuca</strong></th>
<th><strong>Fixed broadband access</strong></th>
<th><strong>Mobile access</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Generally comparable to metropolitan Melbourne with some access to FTTP and widespread provision of FTTN within town centres, but fixed wireless and satellite serving the town fringe and beyond.</td>
<td>Generally comparable to metropolitan Melbourne with multiple carriers operating 4G networks, but quality and reliability of access can fade beyond town centre.</td>
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<thead>
<tr>
<th><strong>Small towns and localities, such as Rushworth and Newstead</strong></th>
<th><strong>Fixed broadband access</strong></th>
<th><strong>Mobile access</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Generally provisioned with fixed wireless services in the town centre with the fringe and surrounding areas receiving satellite. Some small towns receive higher-speed FTTN or FTTC services.</td>
<td>Less capacity and reliability than in larger towns. Better quality within the town centre than when moving into surrounding areas and between towns.</td>
<td></td>
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<thead>
<tr>
<th><strong>Primary production areas, such as dairy and beef grazing north of Kyabram</strong></th>
<th><strong>Fixed broadband access</strong></th>
<th><strong>Mobile access</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower capacity fixed broadband technologies like fixed wireless and satellite available due to remoteness of these farms / businesses. Fixed wireless more available closer to population centres.</td>
<td>Variable service quality across primary production areas. Better when closer to population centres and unimpeded by local topography.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tourist locations, such as Hanging Rock</strong></th>
<th><strong>Fixed broadband access</strong></th>
<th><strong>Mobile access</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Most relevant to tourist operators and businesses. Higher capacity technologies like FTTN available to operators in town centres, but lower capacity services like fixed wireless and satellite in more remote tourist locations.</td>
<td>Often weak coverage in remote locations such as trail walks and national parks and network limitations in accommodating large influxes of visitors such as periodic events.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Transport corridors, such as major highways and rail lines</strong></th>
<th><strong>Fixed broadband access</strong></th>
<th><strong>Mobile access</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Stronger and more reliable coverage on large highways and rail lines out to Bendigo, with service quality and reliability compromised on smaller roads and in more remote areas.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Infrastructure Victoria 2019.
2. Summary of findings

2.1. Loddon Campaspe region high-level findings

Attributes

- The regional economy is supported by transport infrastructure that includes Calder Freeway/Highway and the Midland Highway, and both freight and passenger rail infrastructure to Melbourne and NSW.

- Natural resources including solar and wind energy and mineral sands provide opportunities. Soils support agriculture. The Murray River system provides water for irrigated agriculture in the region’s north.

- Environmental assets near Melbourne (natural springs and Macedon Ranges) and in the far north along the Murray River.

Key Insights

- Bendigo regional hub has a significant and diverse economy and provides services as well as employment opportunities to the region. Other regional hubs include Echuca.

- Manufacturing (15%), agriculture (11%), health care (11%), construction (10%) and financial services (7%) account for 54% of GRP, with agriculture and food product manufacturing being of regional importance (with LQs above 3).

- Projected employment growth in health care and social assistance and education and training. Modest growth in a number of other service sectors.

- Relative advantage in parts of Bendigo and in the farmlands, outside of the rural towns, except in the southwest goldfields region.

- Moderate to high population growth, growing working age population and low unemployment rates compared to the Victorian average along the peri-urban fringe and in Bendigo.

- Higher levels of self-reported wellbeing than the Victorian average.

Regional Strengths

- Agriculture (11% of GVA)and manufacturing (15% of GVA) industries likely to be impacted by climate change and deindustrialisation and structural adjustment. Employment in both sectors is forecast to decline substantially.

- High relative disadvantage in parts of Bendigo and the southwest goldfields region including Central Goldfields and Loddon, which are the 1st and 6th most disadvantaged LGAs in Victoria.

- Potential degradation of environmental amenity assets (including in known tourism and amenity areas such as Mount Alexander LGA). Potential reduction in water availability for agriculture due to climate change (49% GVA in Loddon LGA).

- Population expected to continue to decline and age in rural areas.

- The impacts of climate change represent a risk to social wellbeing and cohesion, public health from higher temperatures, uncertainty about water resource availability and a potential increase in the frequency and severity of natural hazards such as bushfires, droughts and floods.

- Agglomeration of services to regional hubs.
### 2.2. Loddon Campaspe economic, social and environmental profile summary

#### Economic Profile

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Rating</th>
<th>Likely impact of drivers of change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry structure</td>
<td>N/A</td>
<td>N/A</td>
<td>The Loddon Campaspe region is characterised by a relatively large concentration of agriculture and food product manufacturing industries, both of which are key exports for the region. While employment is expected to grow for the food product manufacturing industry, employment in the agriculture industry is expected to decline. Employment is growing in other service industries however the concentration of employment is at a lower level than in Victoria as a whole.</td>
</tr>
<tr>
<td>Economic output</td>
<td>Below average</td>
<td>Adverse</td>
<td>The Loddon Campaspe GRP per capita is below the Victorian average and varies by LGA. The low relative value of economic output compared to Victoria can be attributed to lower labour productivity, lower participation rates and an ageing population. However, the value of economic output in this region is also impacted by the large number of commuters living in the southern peri-urban fringe working in Melbourne, resulting in their economic output being attributed to other regions. This can be seen in the low level of GRP per capita in Macedon Ranges LGA which has relatively high income and large commuter rates.</td>
</tr>
<tr>
<td>Labour productivity</td>
<td>Below average</td>
<td>-</td>
<td>Labour productivity in the Loddon Campaspe region is below the level of Victoria as a whole and appears to have fallen relative to Victoria over time.</td>
</tr>
<tr>
<td>Capital investment</td>
<td>Below average</td>
<td>Favourable</td>
<td>Capital investment in the Loddon Campaspe region is below the Victorian average with the largest rates of investment in residential new construction in Macedon Ranges, Mount Alexander, and Greater Bendigo LGAs likely reflecting the growing population in these LGAs. The lowest rates are seen in Central Goldfields and Loddon LGAs, reflecting the projected population decline in these LGAs.</td>
</tr>
<tr>
<td>Participation rate</td>
<td>Below average</td>
<td>Adverse</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>The average participation rate for the Loddon Campaspe region is below the average for Victoria which can be due to a range of contributing factors including the number of retirees. The participation rate is particularly low in Central Goldfields LGA and also low in Loddon and Mount Alexander LGAs. As well as the participation rate of those of working age, the regional economy is affected by the size of the working population compared to the dependant population. The working age population is particularly low for Central Goldfields and Loddon LGAs whereas the working age population of Greater Bendigo is closer to the Victorian average.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household income and unemployment</th>
<th>Average</th>
<th>Adverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household income is lower than the state average across all LGAs except for Macedon Ranges, which is likely due to the proximity of this LGA to Melbourne. This proximity allows for a large proportion of working residents commuting and accessing higher skill, higher paid jobs in Melbourne. Whilst income in Greater Bendigo LGA is below the Victorian average, it is higher than the more rural LGAs in the region potentially due to the greater availability of jobs within the regional centre compared to the rural areas. The lowest household incomes are in the LGAs of Central Goldfields and Loddon. Unemployment across all LGAs except Central Goldfields is lower than the Victorian average.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment and skills</th>
<th>Below average</th>
<th>Adverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment growth has been strongest in the health care, accommodation and food services and construction sectors, with declines in employment in manufacturing and agriculture. These trends are projected to continue, particularly with respect to the growth in high skill industries. This presents both a challenge and an opportunity for the region. While growth in high skill jobs offers opportunities for continued wage growth, increasing demand for high skill labour will potentially lead to future skill shortages and increasing income differences between those with higher qualifications and those without. The majority of resident’s work within Greater Bendigo, and it also draws in workers from the surrounding LGAs. Nearly half of employed Loddon Campaspe residents work within the Greater Bendigo LGA.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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2 ABS calculate participation rate based on population aged over 15, not working age population (15-64) as used elsewhere in this report.
## Social Profile

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Rating</th>
<th>Likely impact of drivers of change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative disadvantage</td>
<td>Above average</td>
<td>Adverse</td>
<td>There is major variation in relative disadvantage across the region. The region contains the most socially disadvantaged LGA in Victoria (Central Goldfields), as well as two of the least disadvantaged LGAs in Victoria (Macedon Ranges and Mount Alexander). Disadvantage is focused in areas where manufacturing has declined and there is little to no agriculture. Many of the rural towns have higher relative disadvantage which is potentially driven by people from surrounding rural areas migrating to access support services.</td>
</tr>
<tr>
<td>Youth engagement with work or study</td>
<td>Average</td>
<td>Adverse</td>
<td>There is substantial variation across the region. Youth engagement is close to the Victorian average, with more youth engaged in full-time work than further study in regional areas. Central Goldfields has poorer youth engagement and large proportions of the population not in learning or further education.</td>
</tr>
<tr>
<td>Population health</td>
<td>Below average</td>
<td>Adverse</td>
<td>The health indicators reveal a gap between the good health outcomes in the peri-urban fringe and a range of poorer outcomes in the rest of the Loddon Campaspe region. Life expectancy is lower than the state average in all LGAs except Macedon Ranges, with substantially lower life expectancy for males in the Loddon LGA. All LGAs except the peri-urban fringe demonstrate far higher levels of self-reported obesity than the Victorian average. The peri-urban fringe has much higher numbers of GPs and better rates of ACSC hospital separations than the rest of the Loddon Campaspe region and Victoria. High ACSC separations in other LGAs may be related to poor access to earlier intervention and health services. This correlates with low self-reported access to community services and resources, and low numbers of GPs per capita in Loddon and Central Goldfields in particular. Home and Community Care (HACC) service utilisation is higher than state averages in all LGAs.</td>
</tr>
<tr>
<td>Early childhood outcomes</td>
<td>Average</td>
<td>-</td>
<td>Early childhood outcomes appear to be affected by sample size in many LGAs, however, the outcomes are generally similar to the Victorian average. Central Goldfields is the exception to this, with poor earlier childhood outcomes.</td>
</tr>
</tbody>
</table>

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AITHER | Report
Loddon Campaspe Regional Profile
Housing stress is relatively low in the region compared to the Victorian average – particularly in rural and rural residential areas. Bendigo and Macedon Ranges and Central Goldfields have levels of housing stress closer to the Victorian average.

Crime fluctuates across the region with higher rates in Central Goldfields, Greater Bendigo, and Campaspe – this may be due to higher relative disadvantage, particularly in the larger regional towns in these LGAs. Contrastingly, Loddon (which has fewer regional towns), Mount Alexander and Macedon Ranges have low crime levels.

Across the wellbeing metrics there are relatively similar results across each LGA within the region, with results similar to or slightly above the Victorian average. This is aligned with typically higher rates of self-reported wellbeing by regional populations.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Rating</th>
<th>Likely Impact of drivers of change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>Poor condition</td>
<td>Adverse</td>
<td>The terrestrial environmental assets are diverse, including River Red Gum forests, Box-Ironbark, Black Box forest communities, grasslands, grassy woodlands and various lakes, rivers and wetlands. Gunbower National Park and State Forest is a Ramsar listed wetland. The region has an elevated risk of erosion from bare soils in dryland production areas. Salinity and acid sulfate soils are also threats to the region.</td>
</tr>
<tr>
<td>Natural resources</td>
<td>N/A</td>
<td>N/A</td>
<td>The Loddon Campaspe region has a rich gold mining heritage; the region was the epicentre of the Victorian goldrush of the 1800s. Gold mining is still an important industry, with the Fosterville Mine near Bendigo being Victoria’s largest gold producer. Mining for other minerals and stone products are also important, as is commercial forestry. There is considerable solar energy generation potential in the Loddon Campaspe region, including some existing large-scale generators in the Loddon Shire and other rural areas.</td>
</tr>
<tr>
<td>Category</td>
<td>Condition</td>
<td>Adverse</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td><strong>Biodiversity</strong></td>
<td>Poor</td>
<td>Adverse</td>
<td></td>
</tr>
<tr>
<td><strong>Waterway health</strong></td>
<td>Poor</td>
<td>Adverse</td>
<td></td>
</tr>
<tr>
<td><strong>Natural hazards</strong></td>
<td>Average</td>
<td>Adverse</td>
<td></td>
</tr>
<tr>
<td><strong>Contaminated sites and pollution</strong></td>
<td>Average</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Tree cover is varied across the Loddon Campaspe region. The lowest levels of tree cover (15 per cent) are observed in the North Central CMA area which spans the bulk of the Loddon Campaspe region. Goulburn Broken CMA and Port Phillip and Western Port CMA report moderate levels of tree cover (approximately 30 per cent) but account for very small portions of the region.

The Loddon Campaspe region is part of the Murray-Darling Basin. Many of the catchments in the region are used to supply water for urban and rural purposes and are declared water supply catchments. While there is generally good water security across many water supply systems, demand is expected to outstrip supply in some systems and supply augmentation and/or demand-side measures will be required. Natural waterways across the region have been heavily impacted by past land use, resulting in poor condition.

The region, similar to other rural areas, is characterised by the threat of both bushfire and flood including vulnerable areas that intersect with towns and cities and areas that are experiencing rural residential and tourism expansion.

The extensive mining history of the Loddon Campaspe region, along with its non-mining industrial history, might mean that there are large areas of contaminated land throughout the region. As of March 2018, there are currently 31 sites in the Loddon Campaspe region listed on the EPA’s Priority Sites Register.
2.3. **Loddon Campaspe sub-regional summary**

The Loddon Campaspe has been divided into four sub-regions which have been defined to better summarise the differences demonstrated in economic, social and environmental profiles. Figure 4 shows the four key areas:

- Northern rural areas (light green)
- Bendigo regional hub (light yellow)
- Southern peri-urban fringe (light pink)
- Southwest goldfields (light blue).

![Figure 4: Loddon Campaspe region showing the four key areas of regional assessment](image)
**Bendigo regional hub**

Bendigo generally performs well across economic, social and environmental indicators with respect to other parts of the Loddon Campaspe region, and is a strong economic hub. It is located in the heart of the Loddon Campaspe region and is the area’s major population centre. Bendigo is very much a regional hub experiencing steady population growth supported by well-established financial, education and health care services. It has the largest diversity of industries in the Loddon Campaspe region, with the largest industries being financial and insurance services, driven by the presence of Bendigo Bank, and health and social assistance driven by the recent opening of the new hospital and agglomeration of health care services in Bendigo. This region also has potentially strong tourism industry prospects associated with cultural and heritage attractions.

The workforce participation rate in Bendigo is close to the Victorian average, as is the unemployment rate. The working age population in Greater Bendigo is projected to grow to 2031, potentially at the expense of the surrounding rural areas. Household income is lower than the average for Victoria but higher than in the other LGAs in Loddon Campaspe, with the exception of Macedon Ranges on the peri-urban fringe. The majority of residents work within Greater Bendigo, and it also draws in workers from the surrounding LGAs. Nearly half of employed Loddon Campaspe residents work within the Greater Bendigo LGA.

In terms of social indicators, Bendigo exhibits the trends expected of a regional hub. There appears to be greater access to community services and resources, good youth engagement, early childhood outcomes, and generally good population-health related outcomes.

Relative disadvantage across the Greater Bendigo LGA is fairly evenly distributed across relative advantage and disadvantage – overall, Greater Bendigo LGA ranks 26th (for relative disadvantage) out of all 79 LGAs (which is on par with similar regional hubs such as Ballarat, Shepparton and Horsham).

Housing stress and homelessness are similar to the Victorian average, and crime is marginally higher than the Victorian average. Sense of wellbeing, sense of personal safety and rates of volunteering are all similar (if not marginally higher) than the Victorian average.

Bendigo is surrounded by the Greater Bendigo National Park and other state parks and forests. In addition to various environmental assets, the area’s Victorian Goldrush heritage sites and the Heathcote wine region to the east present strong tourism opportunities.

Commercial agriculture is the dominant land use in the north of this LGA. The Bendigo area and land along the Calder Highway towards Melbourne is experiencing steady growth. Development pressure on existing land uses, especially the conversion of agricultural land to rural residential living is well established along this corridor. Provision of services including reliable and secure water supply is likely to be a challenge in the medium term as demand is predicted to outstrip supply by 2040.

Looking ahead, increasing service sector growth, population growth and automation of routine labour will continue to drive agglomeration with potential positive impacts on the economic outlook for Bendigo as a result.

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3 Regional Victoria has a number of population centres which, for the purposes of this project, have been termed ‘regional hubs’. Regional hubs provide services for those within the hub as well as surrounding areas, which characterises them as being ‘catchment-serving’. Geelong, Ballarat, Bendigo and Albury-Wodonga are identified as larger and diversified regional hubs.
Northern rural areas

Within this sub-region (covered by Loddon and Campaspe LGAs), there is some distinction between the dryland agricultural areas to the south and the relatively more prosperous irrigation areas to the north. There are similarities across social and economic indicators when compared to other rural areas and alignment with the trends and outcomes observed further upstream and downstream along the Murray River (and tributaries) (e.g. through Swan Hill to Mildura in the west, and east through Goulburn region) where access to water is generating greater economic activity relative to adjacent dryland rural areas.

The data shows that the rural areas of Loddon and Campaspe have lower gross regional product (GRP) per capita than the Victorian average, but higher than the other LGAs within the region. Agriculture is the largest industry by GVA in this sub-region, with important food manufacturing industries closely associated with local agriculture in the Campaspe LGA. However, this is changing, particularly with the downturn in the dairy sector and the closure of the Murray Goulburn processing plant in Rochester in January 2018 which is likely to continue to create challenges into the future as further adjustment occurs.

Higher temperatures and changing water supply as a result of climate variability and change are, and will continue to be, a key driver; potentially depressing economic growth in the region. Population decline and an ageing population will also suppress economic growth. Concentration of jobs and services, primarily in the urban centre of Bendigo, will mean greater need for access for those who reside in surrounding rural areas.

Campaspe and Loddon have some difference across the social indicators, potentially driven by the low population in Loddon LGA, and the prevalence of more regional towns in Campaspe which have different socio-economic characteristics compared to the more rural population of Loddon. This being said, the overarching trends across the northern rural sub-region are consistent with other rural areas in Victoria.

In terms of population health, there are relatively worse outcomes (including with respect to life expectancy) with poorer access to health services a potential driver (particularly in Loddon). Youth engagement is similar to the Victorian average, with a larger proportion of the population aged 15-19 years old employed full time (and fewer with a year 12 certificate or higher). This may present a variety of challenges in terms of employment and current skillsets. Decline in manufacturing, coupled with automation and other structural change may lead to less low- and intermediate-skilled jobs.

Across wellbeing, crime and housing stress indicators, this sub-region shows trends similar to other rural areas through performing generally better than the Victorian average, despite generally poorer health and socio-economic outcomes reported for other indicators (i.e. poor self-reported health outcomes and poor access to health services).

The sub-region is home to some important environmental assets such as the Ramsar-listed Gunbower Forest National and State Park, which is situated on the Murray River to the south of Cohuna. Boort Lakes, in the west of the region, is an important environmental asset but also a site with significant Aboriginal cultural importance.

An ageing and declining population, and climate change coupled with changes in the agricultural sector and associated food manufacturing will be the main forces of influence for this region. This will present challenges for future economic growth. Access to social and health services is also likely to be an important issue, particularly given relatively poor health outcomes, poorer access to services and an ageing population.
Southern peri-urban fringe areas

The southern peri-urban fringe performs well across social, economic and environmental indicators relative to the rest of the Loddon Campaspe region.

Comparatively high household income and high participation rates (particularly in Macedon Ranges LGA) is consistent with characteristics of a commuter population. Compared to the rest of the Loddon Campaspe region, Macedon Ranges’ economy has a larger proportion of construction activity, likely due to development pressures in the area. This sub-region also possesses greater tourism industry opportunities associated with environmental assets which could provide competing interests to the development pressures associated with a growing commuter population.

Mount Alexander is slightly further from the Melbourne CBD and is not a commuter LGA in the same manner as Macedon, however, it appears to be heavily driven by its position between both Melbourne and Bendigo. There is commuting from Castlemaine to Bendigo for work and some commuting to Melbourne. The southern peri-urban fringe of the region is increasingly attracting weekenders, tree changers and retirees from Melbourne.

Improved transport accessibility to Melbourne is likely to support population growth in Macedon Ranges LGA while market trends which drive service agglomeration in Melbourne and Bendigo will likely experience a continuation of the trend which sees a large proportion of residents’ work being outside their LGA of residence.

The sub-region performs relatively well across all social indicators with relatively less disadvantage (ranking as some of the least disadvantaged LGAs across Victoria). Population health, early childhood outcomes and youth engagement all perform well in this sub-region.

Housing stress is relatively low, with the trade-off being that many residents are likely to be commuting for work (for higher paying jobs) or may be further from key services and resources (e.g. commuters from Castlemaine to Bendigo or Melbourne, or commuters from Gisborne to Melbourne).

Rates of homelessness are low, as is the crime rate, perhaps reflecting the relative advantage in this sub-region. Sense of wellbeing, sense of personal safety and rates of volunteering are all similar (if not marginally higher) than the Victorian average.

The sub-region is close to environmental assets such as state parks and forests, both locally as well as in neighbouring regions. There are good opportunities for tourism associated with the sub-region’s environmental assets.

Settlements with projected growth in the region are likely to encounter common peri-urban challenges to land use planning and provision of essential services. This is likely to be of particular importance given the relatively high value environmental assets in this sub-region. Despite this, the peri-urban fringe is likely to continue to experience more positive economic and social indicators, compared to more rural regions, as higher levels of critical infrastructure and proximity to major urban centres of Melbourne, and Bendigo continue to drive population growth.

Southwest goldfields

This sub-region straddles the southwest tip of Loddon LGA and the Central Goldfields LGA. The area shares similar characteristics to neighbouring areas of the Wimmera Southern Mallee and performs relatively poorly compared to both the rest of the Loddon Campaspe region and Victoria as a whole.

This sub-region is characterised by poor social and economic indicators and has relatively few environmental assets of note. Since the gold rush, manufacturing emerged as the major industry and
is still the largest industry by GVA in this sub-region, with less agriculture than the northern rural areas.

There is a low working age population in this sub-region, which is expected to decline further to 2031. Household income is lower than the Victorian average and lower than the rest of the Loddon Campaspe region.

Central Goldfields and southwest Loddon are areas with severe relative disadvantage. The sub-region performs poorly with respect to youth engagement with a large proportion of the population (relative to the Victorian average) aged 15-19 years not engaged in work or full-time study, and 4 per cent not in the labour force, or further education and training (NILFET). Health outcomes including life expectancy and self-reported health metrics are well below the state average, and child protection substantiations and the crime rate are almost double the state average (although early childhood indicators may be impacted by a relatively small sample sizes). Based on SEIFA data, Central Goldfields is the most disadvantaged LGA in Victoria. Contrastingly, self-reported wellbeing metrics are generally above the state average.

The sub-region has relatively poorer farming assets, and few notable environmental assets and only accounts for a relatively small extent of the total Loddon Campaspe region. Outside of the towns, most land is cleared rural residential stemming from gold rush era subdivisions. There is the Paddy Ranges State Park outside Maryborough, various smaller reserves, and the Tullaroop reservoir in the south.

This sub-region may be less affected by climate change due to the lower share of agriculture. Population decline and an ageing population will likely be key drivers of change in this region. Concentration of jobs and services, primarily in the urban centres of Bendigo and Melbourne, will mean greater need for access to these key destinations for those who reside in this sub-region. This sub-region in particular may be further disadvantaged as a result of service agglomeration in Melbourne, Bendigo and Ballarat.
3. **Drivers of change**

The Loddon Campaspe region, along with many other areas in Victoria and Australia, has experienced substantial changes to its economy, society and environment. Australia continues to shift away from a resource-based to a service-based economy. For example, the share of output from agriculture fell from over a third in the 19th century to just three per cent in the 2000s (Department of Industry 2014).

Partly as a result of the shift away from a distributed, resource-based economy, increasing urbanisation has resulted in a greater concentration of people living in Melbourne and regional cities. In the 10 years from 2006 to 2016 the population in Greater Melbourne grew by 26 per cent while the population in the rest of Victoria only grew by 12 per cent (ABS 2016b). Alongside this there is an ageing population with the number of people aged 65 years and over in Victoria projected to almost triple from 2011 to 2051 (DELWP 2016b). A further challenge to be faced is climate change. In Victoria, this means a warmer and drier future, with an increasing likelihood of more extreme events such as heatwaves, bushfires and storm surges (CSIRO 2016).

These changes all present challenges and opportunities for improving the health, wellbeing and prosperity of Victorians in the future.

### 3.1. Deindustrialisation and structural change

Similar to many other Western countries the Australian economy has been shifting over time from a manufacturing to a service-orientated economy and this shift is expected to continue (Department of Industry 2014). This can be seen in Figure 5 which shows the decreasing share of non-service industries in output and employment in the Loddon Campaspe region. This is happening at a faster rate for employment than output as increasing productivity and capital intensity reduce labour requirements in non-service industries. A report by the Committee for Economic Development of Australia (CEDA) found that almost five million Australian jobs – around 40 per cent of the workforce – face the high probability of automation in the next 10 to 15 years (CEDA 2015). Historically, much of the automation of labour has been in the goods-producing industries which has contributed to the changing industrial structure. However, in the future automation is likely to affect jobs in the service industries, such as health care, which have previously been largely unaffected by automation. With service industries as the main growth area in employment in the Loddon Campaspe (Figure 6), there are likely to be future challenges due to these changes.
Note: Only non-service industries have been included.

**Figure 5** Size of non-service sector industries in the Loddon Campaspe region, 1994 - 2016

**Figure 6** Projected employment growth in industries in the Loddon Campaspe, change from 2016 to 2031
A shift towards a service-based economy has implications for the skills and qualifications of the workforce. Many jobs requiring intermediate skill levels exist in manufacturing and production industries. The shift towards service-based industries coupled with automation of the primary industries, such as agriculture and manufacturing, may lead to less low-skilled jobs.

These changes will produce both challenges and opportunities. Further automation can increase productivity and increase wages for those with complementary skills able to leverage those productivity gains. However, it will also mean jobs losses and increased skill requirements, with growth particularly in high skilled industries.

### 3.2. Demographic changes and urbanisation

In the Loddon Campaspe there has been population growth in the majority of regional centres and towns since 1981, with the exceptions of Maryborough in Central Goldfields LGA (Figure 7) and Boort in Loddon LGA which both shrank in size. All other towns in the Loddon Campaspe have experienced growing populations, with the greatest percentage growth occurring in the peri-urban towns of Gisborne (311 per cent) and Lancefield (128 per cent). The regional city of Bendigo has also experienced substantial growth with a population increase of 35,902 (64 per cent) between 1981 and 2016.

Lower birth rates and longer life expectancy have led to an ageing of the population, which is expected to continue. The working age population is already declining in some LGAs within the Loddon Campaspe region, including Loddon, Campaspe and Central Goldfield LGAs (Figure 8). Those LGAs which are seeing growth in working age population are seeing an even greater increase in the population aged over 60. This trend is expected to continue in the future. An ageing population leads to an increasingly dependent population, with fewer working age adults to support those who have retired from the workforce.

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4 This report uses unpublished data from DELWP’s *Towns in Time* data source (DELWP 2016a) that may differ from population data from the Australian Bureau of Statistics (ABS), which uses different boundary definitions. The *Towns in Time* data also counts population by location on Census date, while ABS uses usual residences, as this definition can be used consistently further into the past. This dataset is therefore able to be used consistently over time.
Figure 7  Growth in population from 1981 – 2016 and total town size for regional cities, regional centres and regional towns in Loddon Campaspe

Figure 8  Change in population by 20-year age groups between 2006 and 2016

A key driver of population change in these areas is migration, both within the Loddon Campaspe region and within Victoria. There has been high positive net migration to Macedon ranges and
suburban Bendigo (Figure 9). Net out-migration has occurred in Loddon LGA, as well as in the eastern areas of Campaspe and central Bendigo.

Source: ABS 2016a.

Figure 9  Net migration of Victorian residents within the Loddon Campaspe region, 2011-2016
Aside from movement within the Loddon Campaspe region, the largest numbers of migrations have come from the Northern and Western Metro regions with the majority relocating to Macedon Ranges (Figure 10). This suggests that whilst there is movement away from rural areas, there is also suburbanisation occurring with residents moving away from larger cities including Melbourne and Bendigo.

Source: ABS 2016a.

**Figure 10  Region of origin in Victoria and destination LGA for in-migration to Loddon Campaspe, 2011-2016**
The LGAs of the Loddon Campaspe region can be broadly divided into two groups according to different demographic trajectories. As shown in Figure 11, population growth is projected for Greater Bendigo LGA where the regional centre of Bendigo is located, and in the Macedon ranges in the peri-urban fringe. There is also a smaller rate of projected growth for the towns of Castlemaine and Echuca. The remaining LGAs are all projected to experience continued population declines with the fastest declines occurring in the northern parts of the region. The higher population growth in urban centres – often at the expense of rural areas – is consistent with broader trends across Victoria and Australia.

![Figure 11](image-url)

**Figure 11** Projected population change in the Loddon Campaspe region (%), sub-LGA level, 2016-2031

Source: DELWP 2016b.
For Greater Bendigo LGA, the aged dependency ratio is expected to increase to 2031 but only to 34 per cent compared to an average of 30 per cent for Victoria as a whole. Similarly, Macedon ranges is expected to increase to 41 per cent. For the other LGAs, the age dependency ratio in these LGAs is projected to increase to much higher levels, reaching between 56 and 70 per cent, with Loddon LGA projected to reach 82 per cent aged dependency by 2031 (Figure 12).

Figure 12  Aged dependency, current and projected, Loddon Campaspe region and Victorian average (2011-2031)

### 3.3. Climate change

Climate change is a major future risk to agricultural industries across Australia. Victoria has already experienced decreased rainfall and increased temperatures over the past few decades. For much of Victoria the impacts of climate change are expected to mean higher average temperatures, decreased cool season rainfall and increased fire risk (Figure 13).

Figure 13  Projected annual average temperature changes (LHS) and percentage changes in average rainfall (RHS) for the Loddon Mallee region under different emission scenarios

Source: CSIRO 2016.
The potential impacts of climate change are uncertain and dependent in part on future efforts to curb greenhouse gas emissions. The Loddon Mallee region of Victoria (encapsulating much of the Loddon Campaspe region) has already become warmer and drier, reflecting a trend expected to continue in the future and includes:

- increasing temperatures year-round
- fewer frosts
- more frequent and more intense rainfall events
- more hot days and warm spells
- less rainfall in autumn, winter and spring
- harsher fire weather and longer fire seasons.

Over the past fifteen years water scarcity has impacted irrigation supply and has caused a large number of irrigators to sell their water to downstream horticultural businesses, to the environment or to town water supply. The most obvious impact of a changing climate was the decommissioning of the Campaspe West Irrigation district near Rochester. The district was commenced some 40 years earlier after the creation of Lake Eppalock. The Millennium drought demonstrated the probable future of low water supply reliability and an increasing reliance on the water supply from a growing population in Bendigo. Farmers experienced four out of five years with no water allocation. In 2010 farmers owning 90 per cent of the water allocation voted to exit and accept an adjustment package (NVIRP 2010).

Research suggests that farmers in dryland farming areas have adapted to the longer-term changes in climate by focusing on technologies and management practices that improve productivity during dry years. Farmers have made a variety of management practice changes—including adoption of conservation tillage—to better exploit summer soil moisture, as an adaptation to reduced winter rainfall. There is also evidence of shifts in the location of cropping activity over time. Both the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) and ABS data shows that the amount of cropping activity in higher-rainfall zones—such as south-western Victoria—has increased in recent decades. At the same time, there is evidence that cropping activity has decreased in some inland areas that have been heavily affected by the deteriorating climate (ABARES 2017). While the full impact of these changes on the agricultural industries across the region is difficult to predict, particularly in the short-term, an increase in the risks to agricultural productivity from the expected impacts of climate change is likely. Shorter growing seasons, more extreme rainfall events, increasing bushfire risks and water scarcity are all potential risks that could substantially reduce the economic output of these regions.

More broadly, the impacts of climate change represent a risk to social wellbeing and cohesion, with health implications from higher temperatures, uncertainty about water resource availability, decreased urban and rural amenity (e.g. gardens, sporting fields, recreational facilities etc.) and a potential increase in the frequency and severity of natural hazards such as bushfires and floods.
4. Economic profile

4.1. Summary

**Bendigo regional hub**

In Greater Bendigo LGA, the GRP per capita is below the Victorian average, and below that in the northern rural areas in Loddon Campaspe. Greater Bendigo LGA has the largest diversity of industries in the Loddon Campaspe region, with the largest industries being the financial and insurance services, driven by the presence of Bendigo Bank, and health and social assistance driven by the recent opening of the new hospital and its growing agglomeration of health care organisations. This region also has potentially strong tourism industry associated with cultural and heritage attractions. The workforce participation rate in Bendigo is close to the Victorian average. The working age population in Greater Bendigo is projected to grow to 2031, potentially at the expense of the surrounding rural areas. Household income is lower than the average for Victoria but higher than in the other LGAs in Loddon Campaspe, with the exception of Macedon Ranges on the peri-urban fringe. The majority of employed resident’s work within Greater Bendigo, and it also draws in workers from the surrounding LGAs. Nearly half of employed Loddon Campaspe residents work within the Greater Bendigo LGA.

Greater Bendigo will be affected by the same climatic factors that affect the rural areas (lower value of agricultural output will affect expenditure in the regional hub). The structure of the economy in Greater Bendigo means it is also exposed to other drivers such as technological drivers (e.g. prospects for decentralised education). Increasing service sector growth, population growth and automation of routine labour will continue to drive agglomeration with potential positive impacts on the economic outlook as a result.

**Northern rural areas**

The data shows that the rural areas of Loddon and Campaspe have lower gross regional product (GRP) per capita than the Victorian average, but higher than the other LGAs within the region. Agriculture is the largest industry by GVA in these regions, with important food manufacturing industries closely associated with local agriculture in the Campaspe LGA. These areas have lower workforce participation rates than both the Victorian average and the wider region. There is a low working age population in these LGAs, which is expected to decline further to 2031. Household income is lower than the Victorian average and lower than in Bendigo and the peri-urban fringe. This region also has potentially strong tourism industry associated with the Murray River.

Higher temperatures and changing water supply as a result of climate variability and change will be a key driver, potentially depressing economic growth in the region. Population decline and an ageing population will also suppress economic growth. Concentration of jobs and services, primarily in the urban centre of Bendigo, will mean greater need for access to these key destinations for those who reside in the rural areas.

Within this sub-region, there is some distinction between the dryland agricultural areas to the south and the relatively more prosperous irrigation areas along river corridors to the north. The story for this northern region is generally more positive and aligns with the trends and outcomes observed further downstream along the Murray (e.g. through Swan Hill to Mildura) where higher value horticulture and access to water is generating greater economic activity relative to adjacent areas. Loddon is also sparsely populated with the main regional towns of Boort (725 people) and Inglewood (731 people) within commuting distance from Bendigo.
Southern peri-urban fringe areas

Macedon Ranges LGA within the peri-urban fringe area of Melbourne has a very low GRP per capita due to the large commuter population not directly contributing to the local economy through their labour. The average work commute of residents of Macedon Ranges in almost 50 kilometres, making them one of the more distant commuter LGAs of Melbourne. Underlining this trend is Macedon Ranges LGA’s comparatively high household income and high participation rates. Compared to the rest of the Loddon Campaspe region, Macedon Ranges also has a larger proportion of construction, likely due to development pressures in the area. This sub-region also possesses important tourism industry opportunities associated with environmental assets which could provide competing interests to the development pressures associated with a growing commuter population.

Mount Alexander is slightly further from the Melbourne CBD and is not a commuter LGA in the same manner as Macedon, however, it appears to be heavily driven by its position between both Melbourne and Bendigo. There is commuting from Castlemaine to Bendigo for work and some commuting to Melbourne. This LGA is increasingly attracting weekenders, tree changers and retirees from Melbourne.

Improved transport accessibility to Melbourne is likely to support population growth in Macedon Ranges LGA while market trends which drive service agglomeration in Melbourne and Bendigo will continue the trend of a large proportion of residents’ work being outside the LGA.

Southwest goldfields

The southwest goldfields includes both the southwest tip of Loddon LGA and the LGA of Central Goldfields.

This sub-region is characterised by lower gross regional product (GRP) than other areas in the region (except for the Macedon Ranges LGA where the commuter population drives lower GRP but higher income). The area shares similar characteristics to neighbouring areas of the Wimmera Southern Mallee and has been in a relative state of decline following development during the gold rush.

After the gold rush, manufacturing emerged as the major industry and is still the largest industry by GVA in this sub-region, with less agriculture than the northern rural areas driven by poor land and gold rush era subdivisions (that are too small for farming).

There is a low working age population in this sub-region, which is expected to decline further to 2031. Household income is lower than the Victorian average and lower than in Bendigo, the peri-urban fringe and northern rural areas.

This region may be less affected by climate change due to the lower share of agriculture. Population decline and an ageing population will likely be key drivers in this region. Concentration of jobs and services, primarily in the urban centres of Bendigo and Melbourne, will mean greater need for access to these key destinations for those who reside in the rural areas. This sub-region in particular may be further disadvantaged by agglomeration of service centres in Melbourne, Bendigo and Ballarat.

4.2. Regional economic data

Economic data to inform the regional economic profile has been collected and presented at two spatial scales:

1. At the regional scale, GRP per capita, GVA by industry, changes in the structure (number and size) of firms, labour productivity and participation rates are used to assess the economic performance of the region as a whole.
2. At the household scale, household income, household wealth, unemployment and the location of where income is earned relative to place of residence are used to assess the economic wellbeing of the residents of a region.

The economic profile is heavily influenced by the difference between place of work and usual residence. There will be people:

- living and working in the region and therefore contributing to the local economy through both their income and output
- living in the region and working elsewhere and therefore contributing through their income but not their output
- working in the region and living elsewhere and therefore contributing to output but with income accounted for in another region.

4.2.1. Economic performance of regional industry

The Loddon Campaspe regional economy is highly concentrated within both agriculture and related food product manufacturing. Location quotient is a measure of the concentration of industries in a particular region compared to the State. Industries with a location quotient above 1 have a higher proportion of employment in that region compared to the Victoria overall.

Figure 14 shows the location quotient and growth in employment over 25 years for industries in the Loddon Campaspe region. The size of the bubbles indicates the percentage contribution to total employment in the region. The location quotient can potentially show which industries are strengths of a region. However, this does not necessarily hold where a high location quotient is combined with a small share of regional employment. The location quotient should be used as a potential indicator of which industries are important in a region, rather than as a definitive analysis of regional strengths.
Figure 14  Employment concentration of industries in the Loddon Campaspe region, 2017

Source: NIEIR 2018.
Note: Bubble size indicates industry employment rates.
Industries with a location quotient greater than 1.5 and with growing employment are potentially relatively important growth industries for a region. This suggests that food product manufacturing is an important growth industry in the Loddon Campaspe region, particularly fruit and dairy product manufacturing and processing (noting this data will not capture recent downturns in the dairy sector). Employment is growing in other service industries however the concentration of employment is not substantially higher than in Victoria as a whole. Industries with a location quotient greater than 1.5 but with declining employment are likely to be historically important industries that are now in decline. This can be seen with agriculture in this region. The importance of both the food product manufacturing industry and agricultural industry can also be seen in relation to exports in Figure 15 which shows they are two of the key export industries in the Loddon Campaspe region.

Source: NIeIR 2018.

**Figure 15** Proportion of sales exported from the Loddon Campaspe region, 2017
The industrial structure of the Loddon Campaspe region has been changing over the past 10 years, with movement within sectors occurring in addition to a more general shift to service sectors. Figure 16, which shows the change in both average firm size and the number of firms by sector, shows that the number of firms in both agriculture and manufacturing in this region has remained relatively constant between 2006 and 2017. However, whilst agriculture has seen an increase in average GVA, manufacturing has seen a decline. Construction and accommodation and food services are experiencing this to a greater extent. Firms in the construction, accommodation and food service sectors have tended to proliferate, with growth in the number of firms but a decline in average size. There has been an expansion of both mining and health care with an increase in both number and size of firms. In the health care sector, this is likely to be closely linked to the opening of the new hospital in Bendigo.


Note: Consolidators refers to growth in fewer, larger firms. Expanders are experiencing increases in both firm output and number. Proliferators are experiencing an increase in number of smaller firms and decliners are experiencing falls in both the number and output of firms.

**Figure 16  Total percentage change in number of firms and average firm GVA, Loddon Campaspe, 2006 to 2017**

GRP measures the value of economic production of a region. In order to compare regions, GRP per capita is used. This is an imperfect metric at this level as high labour mobility exists between regions, meaning that those working in a region do not necessarily live there, which affects both the measure of GRP and the population measure. The Loddon Campaspe GRP per capita is below the Victorian average (Figure 17) however GRP per capita varies by LGA. All LGAs are below the Victorian average with the Loddon and Campaspe LGAs having the highest GRP per capita within the Loddon Campaspe region, likely driven by high productivity agriculture and food processing. Macedon Ranges and Mount Alexander LGAs are well below the Victoria average, which as discussed above, is due to the large proportion of residents working outside the Loddon Campaspe region. The large fall in GRP per capita in both Loddon and Campaspe is due to large declines in manufacturing output.
in these regions. Central Goldfields is well below the regional average which may be due to extremely high levels of social relative disadvantage in this LGA, as well as the much smaller agricultural industry. The regional city of Bendigo is below the Victorian average but higher than the Central Goldfields, Macedon Ranges and Mount Alexander LGAs.

![Figure 17 GRP per capita, 2006 and 2017, Loddon Campaspe and Victoria](image)

Source: NIEIR 2018.

Note: There appears to exceptionally high GRP per capita in 2006 for Loddon – it is unclear why this would be the case.

**GVA by industry**

GRP in a region is the sum of industrial GVA. Figure 18 shows the biggest industries by GVA in the Loddon Campaspe region:

- manufacturing (15%)
- agriculture (11%)
- health care (11%)
- construction (10%)
- financial and insurance (7%).

These five industries comprise over 64 per cent of regional GVA. Between 2006 and 2017, there was a decline in the share of GVA from manufacturing in the Loddon Campaspe region and an increase in the share of health care. This is broadly consistent with trends occurring across Victoria, with a decline in the manufacturing sectors and an increase in service-based industries, particularly health-related services associated with ageing populations.
The biggest industries vary across the LGAs with agriculture being more important in Loddon and Campaspe LGAs than in the region as a whole. Manufacturing is a large proportion of local industry in both Central Goldfields and Campaspe LGAs, however the closure of Murray Goulburn’s dairy processing plant in Rochester in early 2018 will impact the contribution of manufacturing to GVA.

Construction is greatest where population is growing, this includes in Macedon Ranges and Mount Alexander LGAs driven by growth in the peri-urban fringe. Greater Bendigo LGA has the largest diversity of industries in the Loddon Campaspe region, with the largest industry being financial and insurance services, driven by the presence of Bendigo Bank. This is closely followed by health services and construction.

Source: NIEIR 2018.

Figure 18  GVA share of key industries in the Loddon Campaspe region, 2017\(^5\)

Regional employment

The regional hub of Bendigo acts as a centre of employment for the region with 46 per cent of employed Loddon Campaspe residents working within the Greater Bendigo LGA. Outside of Greater Bendigo, the largest proportion of workers come from Loddon and Mount Alexander. However, the regional hub of Bendigo has less influence on employment for residents of Campaspe, Central

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\(^5\) Other industries in each region are comparatively small and therefore not included. The full range of industries includes: Agriculture, Forestry and Fishing; Mining; Manufacturing; Electricity, Gas, Water and Waste Services; Construction; Wholesale Trade; Retail Trade; Accommodation and Food Services; Transport, Postal and Warehousing; Information Media and Telecommunications; Financial and Insurance Services; Rental, Hiring and Real Estate Services; Professional, Scientific and Technical Services; Administrative and Support Services; Public Administration and Safety; Education and Training; Health Care and Social Assistance; Arts and Recreation Services; Other Services.
Goldfields and Macedon Ranges LGAs where residents have a greater tendency to work in Shepparton, Ballarat and Melbourne respectively.

Source: ABS 2016c.

**Figure 19  Employment location of Loddon Campaspe residents by LGA, 2016**
Capital Investment

Capital investment in the Loddon Campaspe region is below the Victorian average (Figure 20) with the highest rates of investment in residential new construction in Macedon Ranges, Mount Alexander, and Greater Bendigo LGAs likely reflecting the growing population in these LGAs. The lowest rates are seen in Central Goldfields and Loddon LGAs, reflecting the projected population decline in these LGAs.

![Capital Investment Diagram](image)

Source: NIEIR 2018.

Figure 20   Capital investment in the Loddon Campaspe region, 2017

Tourism

The major tourism assets in the Loddon Campaspe region include the Murray River, the natural environmental assets in the Macedon Ranges and Bendigo’s cultural, heritage attractions and events program.

Analysis by Tourism Research Australia (2016) includes three key tourism regions within the Loddon Campaspe: Macedon, Bendigo Loddon and Central Murray. Tourism expenditure in these regions is highest in Bendigo Loddon and is at the higher end of expenditure in Victoria (Figure 21). Tourism in Bendigo experiences spikes for major events such as the Bendigo Blues and Roots Music Festival, Bendigo Swap Meet, Groovin’ the Moo, and the Easter Show which generate substantial revenue.

Whilst total tourism expenditure is highest in Bendigo Loddon, the visitor-population ratio is highest in the Central Murray region, with 13 visitors for every resident in 2014-15 (Figure 22).

The number of dwellings not occupied on Census night may indicate the proportion of units which are second homes or holiday rental properties. The 2016 Census reported that for the Loddon Campaspe region the average occupancy rates were similar to the Victorian average (Figure 23).
Figure 21  Tourism expenditure by tourism region (excluding Central Melbourne), 2014-15

Figure 22  Tourism visitor-population ratio by tourism region, 2014-15
Labour productivity

Labour productivity in the Loddon Campaspe region is below the level of Victoria as a whole and appears to have fallen relative to Victoria over time (Figure 24). As relatively high productivity industries such as manufacturing continue to decline in importance in the Loddon Campaspe region, this trend is likely to continue.
**Participation rate**

The average participation rate for the Loddon Campaspe region is below the average for Victoria as shown in Figure 25. The participation rate is particularly low in Central Goldfields LGA and also low in Loddon and Mount Alexander LGAs. This may be due to a combination of economic and social factors in these LGAs such as access to jobs, family structure and the number of retirees. These factors may be worth further investigation to understand the key drivers of the difference between LGAs. This is offset to some extent by the higher participation rates in Macedon Ranges and Greater Bendigo.

![Labour force participation rate, Loddon Campaspe and Victoria, 2001 to 2016](image)

Source: ABS 2016c.

Note: ABS calculate participation rate based on population aged over 15, not working age population (15-64) as used elsewhere in this report.

**Figure 25  Labour force participation rate, Loddon Campaspe and Victoria, 2001 to 2016**

The total proportion of the population employed or seeking work is affected by the demographics of the region. Figure 26 shows that the working age population (population aged 15-64) is a smaller proportion of the total population in Central Goldfields and Loddon LGAs in particular. Conversely the working age population of Greater Bendigo is closer to the Victorian average. Loddon and Central Goldfields LGAs are also projected to experience the biggest declines in working age population with declines also projected for Campaspe and Mount Alexander LGAs as shown in Figure 27. By contrast Macedon Ranges LGA is expected to undergo relatively strong working age population growth and Greater Bendigo LGA is expected to experience comparable growth to Victoria as a whole.
Figure 26  Population by age group in the Loddon Campaspe region, 2016

Figure 27  Projected change in working age population, indexed to 2011
**Difference between Victorian average and Loddon Campaspe**

The factors discussed above account for the difference in GRP per capita between Victoria as a whole and the Loddon Campaspe region. Figure 28 shows that both the difference in productivity and the difference in hours worked contribute evenly to the difference in GRP per capita between Loddon Campaspe and Victoria.

![Graph showing the difference in GRP per capita between Victoria and Loddon Campaspe](image)

Source: NIEIR 2018.

Note: This analysis is based on the accounting principle that GRP is the sum of GVA which is a function of the supply of labour and labour productivity. Labour is shown by hours worked, which is influenced by size of the labour force and the participation rate, as well as the type of work i.e. full time or part time.

**Figure 28** Components of the difference in GRP per capita between Victoria and the Loddon Campaspe region

### 4.2.2. Economic wellbeing of residents

**Household Income**

As shown by Figure 29, household income is lower than the state average across all LGAs except for Macedon Ranges, which is likely due to the proximity to this LGA to Melbourne, with a substantial proportion of working residents commuting and accessing higher skill, higher paid jobs. For example, residents of Macedon Ranges LGA who work in the inner Metro area of Melbourne have a median wage bracket of $1,500-$1,749 per week. In comparison those who work in the Loddon Campaspe region have a median income of $800-$999 per week (ABS 2016c). Whilst income in Greater Bendigo LGA is below the Victorian average, it is higher than the more rural LGAs in the region potentially due to the greater availability of jobs within the regional centre compared to the rural areas. The lowest household incomes are in the LGAs of Central Goldfields and Loddon.
**Unemployment**

The unemployment rate varies across the region from 4.5 per cent in Macedon Ranges to 6.4 per cent in Greater Bendigo, just below the Victorian rate of 6.6 per cent. The unemployment rate in Central Goldfields is exceptionally high at 8.8 per cent. This is correlated with other measures of social and economic relative disadvantage within the Central Goldfields LGA. The unemployment rates in Campaspe and Loddon are low relative to the Victorian average. This is in contrast to the lower average income levels seen in the Campaspe and Loddon LGAs, and the low participation rates. This may suggest that in these LGAs, there is work available for those participating in the labour market. It may also be that there is a high level of structural unemployment which is therefore being counted in the low participation rate rather than measures of short term unemployment (Figure 30). The relatively higher rates of unemployment in Greater Bendigo may reflect the characteristics of a regional hub, seen more broadly across Australia. Other research has shown that unemployment has increased faster in many regional centres compared to the rural areas that surround regional centres and that at the same time, the populations of these regional centres have also tended to grow faster (Daley, Wood and Chivers 2017).
As discussed above a part of the economic wealth of residents in the region comes from jobs outside of the Loddon Campaspe region. This can be seen in Figure 31 where the majority of residents in the peri-urban fringe LGA of Macedon Ranges work outside of the Loddon Campaspe region. For the Loddon Campaspe as a whole, 17 per cent of the resident population work outside of the region.
For those residents working outside the Loddon Campaspe region, the key regions for work are the Melbourne Metro regions (Figure 32). The majority of those traveling to other regions do so by car, with 14 per cent travelling by public transport of which 87 per cent are working in Melbourne’s inner metro region.

For those travelling into the Loddon Campaspe region for work, the majority (83 per cent) travel by car, mainly from the neighbouring regions of Goulburn, Central Highlands and Northern Metro (Figure 33).

Source: ABS 2016c.

**Figure 32** Place of work of Loddon Campaspe residents outside the Loddon Campaspe region and method of transport, 2016

Source: ABS 2016c.

**Figure 33** Origin of non-resident workforce and mode of transport, 2016
As shown by Figure 32 and Figure 33 there are high rates of labour mobility, particularly between the Loddon Campaspe region and Melbourne. There is also a correlation between LGAs with higher income (Figure 29) and number of people working outside of the LGA (Figure 31). This is likely to continue to be the case as high skill, high-wage jobs are increasingly centralised in urban areas.

Access to other regions is therefore a potentially key driver of future economic success for a region, whether through public transport, car or through virtual access. Access to public transport is defined as the percentage of the population that lives within 400 metres of a bus and/or tram stop and/or within 800 metres of a train station (noting there are not trams networks in this region).

As shown in Table 2 access to public transport across the region is substantially lower than the state as a whole, with Greater Bendigo seeing the highest levels of access. Central Goldfields also has relatively high access to public transport, which may reflect that the population is concentrated within the town of Maryborough rather than more widely spread across the LGA (57 per cent of the population live in Maryborough). By contrast, the proportion of households with a vehicle is higher across the region – and in each LGA – than across Victoria. This is particularly true of those LGAs with lower access to public transport.

The number of household dwellings with access to the internet is lower across the region than the Victorian average with the exception Macedon Ranges LGA, which is in closest proximity to Melbourne.

| Percentage population with access to car, public transport, and internet |
|--------------------------|---------------------------|------------------------|-------------------|
|                         | Percentage households with car * | Dwellings with internet access** | Access to Public Transport† *** |
| Campaspe                | 96%                        | 71%                     | 23%                |
| Central Goldfields      | 94%                        | 65%                     | 45%                |
| Greater Bendigo         | 95%                        | 76%                     | 58%                |
| Loddon                  | 97%                        | 62%                     | 8%                 |
| Macedon Ranges          | 98%                        | 82%                     | 14%                |
| Mount Alexander         | 96%                        | 75%                     | 25%                |
| Victoria                | 93%                        | 80%                     | 74%                |

Source: *ABS 2016e, **ABS 2016f, ***DHHS 2015.

Note: †The percentage of the population that lives within 400m of a bus and/or tram stop and/or within 800m of a train station (Infrastructure Australia 2013).

4.2.3. Employment and skills

Consistent with state-wide trends, total employment declined in the agricultural and overall manufacturing industries in the Loddon Campaspe region between 2006 and 2016 (Figure 34). This is consistent with projected employment growth to 2031 shown in Section 3.1 which shows manufacturing and agricultural employment declining. The majority of employment growth since 2006 has been in the health care sector. There is growth in high skill employment in the health care and growth in low skill jobs in the accommodation and food services sector and growth for middle skill jobs.

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6 This variable records whether any member of the household accesses the internet from the dwelling. This variable is applicable to all occupied private dwellings enumerated in the 2016 Census.
in the construction sector. Projections by Deloitte Access Economics for the Department of Education and Training (Figure 35), show projected growth in the percentage of the population with higher qualifications and a decline in the percentage with no qualifications.

Source: ABS 2016c.

**Figure 34** Employee skill level by key industries, 2006 and 2016

**Figure 35** Projected change in workforce qualifications in Loddon Campaspe and Victoria, 2010 to 2031
5. Social profile

5.1. Summary

**Bendigo regional hub**

Bendigo regional hub exhibits the trends expected of a regional hub. There appears to be greater access to community services and resources, good youth engagement, early childhood outcomes, and generally good population health related outcomes.

The relative disadvantage across the Greater Bendigo LGA is mixed with a fairly even distribution of relative advantage and disadvantage – overall, Greater Bendigo LGA ranks 26th (for relative disadvantage) out of all 79 LGAs (and on par with similar regional hubs such as Ballarat, Shepparton and Horsham).

Housing stress and homelessness are similar to the Victorian average, and crime is marginally higher than the Victorian average. Sense of wellbeing, sense of personal safety and rates of volunteering are all similar (if not marginally higher) than the Victorian average.

**Northern rural areas**

Campaspe and Loddon have some difference across the social indicators, potentially driven by the low population in Loddon LGA, and the prevalence of more regional towns in Campaspe which have different socio-economic characteristics to the more rural population of Loddon. However, the overarching trends across the northern rural sub-region are consistent with other rural areas in Victoria.

There is substantial relative disadvantage in the southwest tip of Loddon which is discussed in a separate sub-region below. Across the north of Loddon LGA, and Campaspe LGA, there is moderate relative disadvantage.

In terms of population health, there are relatively poorer outcomes (including with respect to life expectancy) with poorer access to health services a potential driver (particularly in Loddon). Youth engagement is similar to the Victorian average, with a larger proportion of the population aged 15-19 years old employed full time (and fewer with a year 12 certificate or higher). This may present a variety of challenges in terms of employment and current skillsets. Decline in manufacturing, coupled with automation and other structural change may lead to less low- and intermediate-skilled jobs.

Across wellbeing, crime and housing stress indicators, this sub-region shows trends similar to other rural areas (i.e. generally better than the Victorian average, despite generally poorer health and socio-economic outcomes report for other indicators).

**Southern peri-urban fringe**

Macedon Ranges and Mount Alexander perform relatively well across all social indicators with relatively less disadvantage (ranking as some of the least disadvantaged LGAs across Victoria). Population health, early childhood outcomes and youth engagement all perform well in this sub-region – noting that there is some uncertainty regarding early childhood outcomes given relatively small sample sizes (particularly for Mount Alexander).
Housing stress is relatively low, with the trade-off being that many residents are likely to be commuting for work (for higher paying jobs) or may be further from key services and resources (e.g. commuters from Castlemaine to Bendigo or Melbourne, or commuters from Gisborne to Melbourne).

Rates of homelessness are low, as is the crime rate perhaps reflecting the relative advantage in this sub-region. Sense of wellbeing, sense of personal safety and rates of volunteering are all similar (if not marginally higher) than the Victorian average.

**Southwest goldfields**

Central Goldfields and southwest Loddon are areas with severe relative disadvantage. Based on SEIFA data, the southwest Loddon area indicates similar characteristics to Central Goldfields and has therefore been included in this sub-region – however, the discussion below is based on Central Goldfields data which has been extrapolated to cover this portion of the Loddon LGA as well.

The sub-region performs poorly with respect to youth engagement with a large proportion of the population (relative to the Victorian average) age 15-19 years not engaged in work or full-time study, and 4 per cent not in the labour force, or further education and training (NILFET). Health outcomes including life expectancy and self-reported metrics are well below the state average, and child protection substantiations and the crime rate are almost double the state average (although early childhood indicators may be impacted by a relatively small sample sizes). Contrastingly, self-reported wellbeing metrics are generally above the state average.

### 5.2. Regional social data

#### 5.2.1. Disadvantage

At an LGA level the ABS SEIFA indices reveal a divide between the peri-urban eastern fringe and northern areas of the region. The SEIFA Index of Relative Social Disadvantage (IRSD) ranks the Central Goldfields LGA as the most disadvantaged out of 79 Victorian LGAs. Loddon LGA also demonstrates relatively high disadvantage, ranked 6th in the state, with disadvantage focussed in the southwest (Figure 36). Within both Loddon and Campaspe there is a mix of relatively advantaged and disadvantaged areas.

Mount Alexander and Macedon Ranges are the amongst the least disadvantaged LGAs in Victoria: they rank 65th and 67th (respectively) across the 79 Victorian LGA. The Bendigo LGA contains an extremely varied mix of advantage and disadvantage, which is revealed by finer grain data at SA1 level. The greatest areas of relative advantage are generally found in the peri-urban fringe adjacent to Melbourne.

Figure 38 shows the same SEIFA data charted by decile for each LGA. This highlights the rate (by decile) of advantage and disadvantage across the population within each LGA.

The southern peri-urban fringe of the Macedon Ranges and Mount Alexander LGAs have a very low 3 per cent of the population living within SA1s in the lowest national deciles. In stark contrast, the Central Goldfields LGA has over 75 per cent of the population living in SA1s within the lowest two deciles, indicating significant disadvantage. This is consistent with the Jesuit “Dropping off the Edge” map of social disadvantage which shows a concentrated area of relative disadvantage adjacent to Maryborough (see Figure 39). The Loddon and Campaspe LGAs have approximately 45 per cent and

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7 Rankings are based on the percentage of the population in the lowest two SEIFA deciles and are ranked against the 79 LGAs across rural and metropolitan Victoria.
35 per cent (respectively) of the population living within SA1s in the two lowest deciles. Approximately 30 per cent of the population in the Bendigo regional hub are in the lowest two deciles, and Bendigo has less extreme variation than the other LGAs, more closely matching the overall state distribution of disadvantage.

The spatial pattern of relative social disadvantage can be partially explained by the influence of the main economic and social drivers. In the north of the Loddon Campaspe region disadvantage is concentrated in the rural towns and less so in the rural areas surrounding those towns. These towns grew up to serve the agricultural industries either by directly supplying services to the farm sector or through supporting services such as the railway system. Increased economic efficiency in the agriculture sector since the 1960s has resulted in a reduced demand for labour. Services for agriculture have grown more technical, demand higher skills and have consolidated in major regional towns. Those remaining in these small towns have experienced declining availability of employment opportunity.

By contrast, in the west both Maryborough and its rural hinterland exhibit high levels of disadvantage. Maryborough was first a gold town and later a centre of manufacturing, particularly for the textile industries. The decline of both these industries appears to have left a population economically adrift. The surrounding rural areas are not high-quality farmland. Significant areas of rural land were subdivided during the gold years for towns that have ceased to exist or never existed. Some of these blocks are likely to have become occupied for rural residential living by those seeking affordable housing.

**ABS SEIFA**

There are a number of indices available which aim to measure relative socio-economic disadvantage. The most widely-used measures come from the ABS Social and Economic Indices For Areas (SEIFA) which are based upon data available in the census. This data is limited to questions which cover income, housing and education, and has comprehensive geographic coverage at Statistical Area 1 (SA1)\(^8\), which is the smallest scale at which ABS data (other than population counts) is presented. The ABS SEIFA comprises four indexes:

- Index of Relative Socio-Economic Disadvantage (IRSD)
- Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD)
- Index of Education and Occupation (IEO)
- Index of Economic Resources (IER).

The SEIFA Index of Relative Social Advantage and Disadvantage (IRSAD) has been chosen for this regional assessment as it assesses both relative disadvantage and advantage. The IRSAD data is presented at SA1 level in Figure 36 for the Loddon Campaspe region and for Bendigo in Figure 37. Figure 38 displays a population distribution for each LGA allocating the population according to the IRSAD score of the SA1 in which they reside.

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\(^8\) SA1 is the smallest area of output from the Australian Census of Population and Housing. Victoria is covered by 13,339 SA1s. This compares with 79 LGAs and 667 postcodes.
Source: ABS 2016g.

Figure 36  ABS SEIFA – Index of Relative Disadvantage by SA1
Figure 37  Index of Relative Disadvantage by SA1, Bendigo

Figure 38  ABS SEIFA – Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) by LGA
Dropping off the Edge Index

The Dropping off the Edge index (DOTE), developed by Jesuit Social Services and the Catholic Social Services Australia, identifies areas of relative disadvantage across Australia and has a broader suite of underlying data than that used by the ABS SEIFA with a greater focus upon outcomes of relative disadvantage\(^9\). (Jesuit Social Services 2015). It is presented at a postcode level in order to show the most disadvantaged areas and neighbourhoods within LGAs. DOTE measures indicators including unemployment, criminal convictions, unemployment and young adults not fully engaged in work or study. However, the greater range of indicators combined with the larger spatial areas can mask the finer detailed analysis presented through the SEIFA SA1 level analysis. Similarly, the smaller the LGA, the DOTE dataset can potentially misrepresent relative disadvantage where there are only a small number of indicators collected for a postcode. Nevertheless, it can provide a useful way to support or contrast the SEIFA analysis. The two indices can be viewed as complementary.

\(^9\) The Jesuit Social Services disadvantage indicator is constructed from measures of low family income, internet access, school education, post school qualification, skilled workers, disengaged young adults, disability support, unemployment, long term unemployment, rental assistance, numeracy and reading NAPLAN scores, child maltreatment, criminal convictions, juvenile convictions, domestic violence, prison admissions, psychiatric admissions.
5.2.2. Youth engagement with work or study

Youth disengagement contributes to higher indicators of relative disadvantage. State-wide, a cohort of young people are not fully engaging with study or employment and this trend is quite prevalent in the Loddon Campaspe region, with the exception of the Macedon Ranges LGA (Figure 40).

In all LGAs with the exception of Macedon Ranges, there is a smaller proportion of people aged 20-24 with Year 12 or higher qualifications compared to the Victorian average. The proportion of the population aged 15-19 not engaged at all in work or study is also larger than the state average in all LGAs except the Macedon Ranges. In the Central Goldfields this number is nearly double the state average. However, the proportion of 15-19 years old employed full time is larger than the Victorian average in all LGAs and is particularly high in the Loddon and Campaspe LGAs.

This may present a variety of challenges in terms of employment and current skillsets. Decline in manufacturing, coupled with automation and other structural change may lead to less low and intermediate skilled jobs.

Source: ABS 2016c.

**Figure 40  Youth engagement by LGA, 2016**

On Track is a Victorian Government initiative which surveys school leavers who have left school in the last six months to find out if they are on track to a bright future. On Track ensures school leavers are contacted within six months of leaving school to see if they are on a path to further education, training or employment. It also enables young people to seek further advice and assistance via a referral service if required to get back on track.

Table 3 below shows that all LGAs have a lower than average number of students participating in or continuing with further education or training, particularly in Mount Alexander. One of the most important indicators in Table 3 is the percentage of those not in the labour force, education or training (NILFET) which speaks to the rate of youth disengagement. The percentage of those NILFET is marginally higher in Loddon and Campaspe LGAs, and much higher in the Central Goldfields (at 4 per cent) than the state average (1 per cent).
Table 3  Destinations of 2016 Year 12 or equivalent completers Loddon Campaspe (%)

<table>
<thead>
<tr>
<th></th>
<th>Campaspe</th>
<th>Central Goldfields</th>
<th>Greater Bendigo</th>
<th>Loddon</th>
<th>Macedon Ranges</th>
<th>Mount Alexander</th>
<th>Victoria</th>
</tr>
</thead>
<tbody>
<tr>
<td>In further education or training</td>
<td>58.1</td>
<td>60.5</td>
<td>60.2</td>
<td>66.7</td>
<td>67.9</td>
<td>41.2</td>
<td>74.8</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>32.0</td>
<td>40.8</td>
<td>39.5</td>
<td>50.0</td>
<td>41.8</td>
<td>23.5</td>
<td>53.8</td>
</tr>
<tr>
<td>Certificates/ Diplomas</td>
<td>11.0</td>
<td>9.2</td>
<td>10.5</td>
<td>8.3</td>
<td>15.7</td>
<td>11.8</td>
<td>12.9</td>
</tr>
<tr>
<td>Apprentice/ Trainee</td>
<td>15.1</td>
<td>10.5</td>
<td>10.3</td>
<td>8.3</td>
<td>10.4</td>
<td>5.9</td>
<td>8.1</td>
</tr>
<tr>
<td>Not continuing in further education or training</td>
<td>41.9</td>
<td>39.5</td>
<td>39.8</td>
<td>33.3</td>
<td>31.7</td>
<td>58.8</td>
<td>25.1</td>
</tr>
<tr>
<td>Employed</td>
<td>33.7</td>
<td>28.9</td>
<td>31.9</td>
<td>25.0</td>
<td>26.5</td>
<td>45.1</td>
<td>19.5</td>
</tr>
<tr>
<td>Looking for work</td>
<td>7.0</td>
<td>6.6</td>
<td>6.7</td>
<td>8.3</td>
<td>4.0</td>
<td>13.7</td>
<td>4.6</td>
</tr>
<tr>
<td>Not in the labour force, education or training</td>
<td>1.2</td>
<td>3.9</td>
<td>1.3</td>
<td>0.0</td>
<td>0.4</td>
<td>0.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: Department of Education 2018.

5.2.3. Population health

The health indicators reveal a gap between peri-urban areas and the rest of the region, with exceptionally high outcomes in Mount Alexander and the Macedon Ranges. This result should be interpreted with caution. While research has demonstrated a relationship between relative disadvantage and negative health outcomes (Marmot and Wilkinson 2005) there are other contributing factors such as structural ageing. This is particularly important to note given the large proportion of the population aged 65 years or older in the Loddon and Central Goldfield LGAs, both of which had poor health outcomes.

Another aspect of population health is access to health and other community services. Inability to easily access health services can lead to poorer outcomes due to failure to seek appropriate care. Table 4 shows the percentage of LGA residents who could access community services or resources, such as libraries, maternal and child health centres and neighbourhood centres, when needed. It also shows the number of GPs per 1000 population. Finally, it includes Ambulatory Care Sensitive Conditions (ACSC) separations per 1000 population. ACSCs are those for which hospitalisation is thought to be avoidable with the application of public health interventions and early disease management, usually delivered in ambulatory settings such as primary care. High rates of separations are an indicator of poor health outcomes as hospital admissions for ACSCs may provide indirect
evidence of problems with patient access to primary healthcare, inadequate skills and resources, or disconnection with specialist services.

Table 4 shows that there is variation across the region in all three categories with some LGAs below the average for the State and some above. Macedon Ranges and Mount Alexander rate very high in all three categories compared to both the Victorian average and the other regions. LGA’s outside the peri-urban fringe have high ACSC separation numbers, and Loddon and Central Goldfields have very low GP numbers. This may suggest that these areas are in need of greater access to health care services.

Loddon in particular has just 0.5 GPs per 1000 population (less the half the state average), low self-reported access to community services and resources, and high rates of ACSC separations. This all points to poor access to health services in the Loddon LGA.

### Table 4 Community services and health care services

<table>
<thead>
<tr>
<th>LGA</th>
<th>People who could definitely access community services and resources*</th>
<th>GPs/1000 head*</th>
<th>ACSC (PPH) separations for all conditions per 1,000 population**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campaspe</td>
<td>87.4%</td>
<td>1.2</td>
<td>36.60</td>
</tr>
<tr>
<td>Central Goldfields</td>
<td>89.1%</td>
<td>0.9</td>
<td>41.00</td>
</tr>
<tr>
<td>Greater Bendigo</td>
<td>86.8%</td>
<td>1.3</td>
<td>30.00</td>
</tr>
<tr>
<td>Loddon</td>
<td>79.0%</td>
<td>0.5</td>
<td>40.10</td>
</tr>
<tr>
<td>Macedon Ranges</td>
<td>86.1%</td>
<td>1.3</td>
<td>19.70</td>
</tr>
<tr>
<td>Mount Alexander</td>
<td>89.7%</td>
<td>1.5</td>
<td>25.50</td>
</tr>
<tr>
<td>Victoria</td>
<td>85.2%</td>
<td>1.2</td>
<td>27.71</td>
</tr>
</tbody>
</table>

Source: *DHHS 2015, **Department of Human Services and State Government of Victoria n.d.
Life expectancy at birth is a good summary indicator of health status. Life expectancy in the Macedon Ranges is close to the average Victorian life expectancy (Figure 41). However, life expectancy falls considerably in Campaspe, Loddon and Central Goldfields compared to the Victorian average. Life expectancy in Greater Bendigo is similar to, but a bit below the Victorian average.

The greatest divergence from the Victorian average for male life expectancy is in the Loddon LGA at almost 10 years less. For females, the greatest divergence from the Victorian average is in Central Goldfields. This is probably due to the poorer economic and social outcomes in these LGAs (Loddon and Central Goldfields) compared to Macedon Ranges and Mount Alexander, and lower connection to health-related services in rural areas.

Source: DHHS 2015.

**Figure 41** Life expectancy at birth for males and females by LGA
Figure 42 shows three preventable health conditions reported in the DHHS health survey. All LGAs except Macedon Ranges and Mount Alexander in the peri-urban fringe score higher than the Victorian average on self-reported obesity. The difference is substantially higher in Campaspe where rates of self-reported obesity are almost double the state average.

Reported rates of type 2 diabetes are quite consistent with state averages in all LGAs, except in the Macedon Ranges and Mount Alexander where they are considerably lower. Oddly, higher rates of self-reported obesity in Loddon, Campaspe and Greater Bendigo do not appear to translate into higher instances of type 2 diabetes. This could be an awareness and diagnosis challenge given the strong correlation between obesity and type 2 diabetes. Poor dental health fluctuates considerably with respect to the Victorian average, and is much higher than the average in Loddon, Central Goldfields and Mount Alexander – it is not clear why this is the case, however lack of awareness and poor access to health services may be contributing to poor self-diagnosis and/or poor health outcomes.

Source: DHHS 2015.

**Figure 42  Self-reported type 2 diabetes, obesity and dental health by LGA**

The health indicators reveal a gap between the good health outcomes in the peri-urban fringe and a range of poorer outcomes in the rest of the Loddon Campaspe region. Life expectancy is lower than the state average in all LGAs except Macedon Ranges, with substantially lower life expectancy for males in the Loddon LGA. All LGAs except the peri-urban fringe demonstrate far higher levels of self-reported obesity than the Victorian average.

The peri-urban fringe has much higher numbers of general practitioners and better rates of ACSC hospital separations than the rest of the Loddon Campaspe region and Victoria. High ACSC separations in other LGAs may be related to access to earlier intervention and health services, this correlates with low self-reported access to community services and resources, and low numbers general practitioners per capita in Loddon and Central Goldfields.

Home and Community Care (HACC) service utilisation is higher than state averages in all LGAs particularly in Loddon and Mount Alexander shires. (Figure 43). Service utilisation for both mental
health and drug and alcohol services is higher that the Victorian average in all LGAs except the Macedon Ranges which is below the Victorian average (Figure 44). Campaspe and Loddon have similar rates of service utilisation. The Central Goldfields, Greater Bendigo and Mount Alexander LGAs have substantially high rates of registered mental health clients. Central Goldfields also demonstrates a larger proportion of persons that receive drug and alcohol treatment services. High rates of service utilisation may also reflect service quality and accessibility, and non-resident use.

Source: DHHS 2015.

Figure 43  Service utilisation for hospital in-patient services and HACC services

Source: DHHS 2015.

Figure 44  Service utilisation for mental health and drug and alcohol services by LGA
5.2.4. Early childhood outcomes

Indicators have been selected to represent three aspects of early childhood development:

• infant health
• early childhood development
• children at risk of abuse and neglect.

Figure 45 shows the proportion of children born under-weight. Loddon and the peri-urban fringe show substantially smaller levels than the Victorian average; Mount Alexander has less than a third of the state average. Greater Bendigo has results similar to the Victorian average, as does Campaspe and Central Goldfields.

Figure 46 displays the proportion of children who are fully immunised. Loddon and the peri-urban fringe demonstrate only slightly smaller levels of full immunisation than the Victorian average.

Figure 47 displays the rate of emotional problems and vulnerability in two or more domains. Outcomes are slightly lower than the state average in the peri-urban fringe (Macedon Ranges and Mount Alexander). Outside this sub-region, Greater Bendigo performs slightly lower than the Victorian average, while there are major fluctuations across both metrics (with respect to the state average) for Loddon, Campaspe and Central Goldfields.

Figure 48 displays rates of child protection substantiations per 1,000 children. Rates are nearly double the state average in Central Goldfields, and Greater Bendigo is marginally above the average. Loddon and Macedon Ranges demonstrate very low rates of substantiations. Campaspe is similar to the Victorian average, while Mount Alexander is slightly below the state average. This correlates well with relative advantage in Macedon Ranges and Mount Alexander, and severe relative disadvantage in Central Goldfields.

Source: DHHS 2015.

Figure 45  Per cent of babies born with low birth weight by LGA
Figure 46 Children fully immunised between 24 and 27 months by LGA

Figure 47 Children with emotional or behavioural problems at school and children developmentally vulnerable in two or more domains by LGA
5.2.5. Housing stress

Housing stress can be measured in multiple ways however low income households with more than 30 per cent of household income allocated to housing costs is often used as a benchmark. Housing costs include households that are paying mortgages or rent.

Different indicators of housing stress will produce differing results, so the data presented using this indicator as a benchmark should be taken as an indicator of the relative prevalence of housing stress within the region. The Social Health Atlas (2018) data produced by the Public Health Information Development Unit (PHIDU) calculates housing stress using ABS census data and has been used in this analysis.

Housing stress as a proportion of the total population is much smaller than the state average in the LGAs of Loddon and Macedon Ranges. Low housing stress in Loddon may be explained by the phenomena of migration to small isolated rural towns. When housing is inexpensive because of limited economic opportunity, it becomes within the reach of those on modest incomes. The cost of cheaper housing is paid for in limited income earning opportunities and limited access to services. This is particularly likely to favour older migrants. At the southern end of the region, housing stress is also lower than the state average in Macedon Ranges. In this case, low stress is a reflection of higher incomes and relatively lower housing prices compared to Melbourne. There is a trade-off for higher income earners between lower housing stress and an increased commuting time to more distant workplaces. In between these extremes, the level of housing stress in remaining LGAs is close to the state average. (See Figure 49 and Figure 50 on the following page).

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10 Defined as households in the bottom 40% of the income distribution.

Source: DHHS 2015.
Figure 49  Low income households with housing costs 30% or more of income by LGA, 2016

Source: PHIDU 2018.

Figure 50  Low income households experiencing household stress as a percentage of all households

Homelessness is lower than the Victorian average in all LGAs except Loddon (Table 5). Macedon Ranges has a very low rate of homelessness.
The percentage of social housing compared to the Victorian average varies across the Loddon Campaspe region. The Campaspe, Central Goldfields and Bendigo LGAs have very high rates of social housing as a percentage of total dwellings, while Loddon and the peri-urban fringe are very low.

The higher rate of homelessness in Loddon correlates with low social housing and may be driven by the fact there is not a large population or large regional centre in the LGA that provides social housing. The small population may also explain a higher rate of homelessness in Loddon LGA due to small sample size not providing a reasonable representation.

Larger proportions of social housing and homelessness in Greater Bendigo, Central Goldfields and Campaspe correlate with relative disadvantage as well as the presence of regional hubs (e.g. Bendigo, Maryborough and Echuca) which are likely to provide services which homeless persons may seek out. Higher rates of social housing in regional areas are also partially driven by historic decentralisation policies from the 1940s to 1970s which required 45% of social housing development in Victoria to be in country areas (Ministry of Housing and Construction, 1988).

### Table 5  Social Housing and Homelessness in Loddon Campaspe

<table>
<thead>
<tr>
<th>LGA</th>
<th>Social housing (% total dwellings)</th>
<th>Homeless people (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campaspe</td>
<td>5.2%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Central Goldfields</td>
<td>4.4%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Greater Bendigo</td>
<td>5.7%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Loddon</td>
<td>2.0%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Macedon Ranges</td>
<td>1.9%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Mount Alexander</td>
<td>2.9%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Victoria</td>
<td>3.9%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Source: DHHS 2015.

#### 5.2.6. Crime

Crime rates vary across the LGAs (Figure 51). The Loddon Campaspe region has higher reported offence rates than the Victorian average in Campaspe, Central Goldfields and Bendigo LGAs, particularly Central Goldfields. While lower rates are observed in Loddon, Macedon Ranges and Mount Alexander which have substantially lower rates of reported offences.

The higher rates of crime in Campaspe, Central Goldfields and Greater Bendigo may be correlated with several other key social indicators and further research may be warranted. For example, Campaspe, Central Goldfields and Bendigo all demonstrate high rates of relative social disadvantage. These areas also reported high utilisation of services for mental health and drug and alcohol treatment. Loddon is an outlier in the sense that it also has relatively high disadvantage (based on SEIFA data), but low levels of crime – this is likely driven by the small and rural population, with rural areas being typically less crime prone.
5.2.7. Wellbeing index

Wellbeing is a subjective measure of an individual’s quality of life (VicHealth 2016). Three key self-reported indicators of wellbeing have been used in this regional assessment:

- sense of wellbeing
- personal safety
- proportion of population who volunteer.

A slightly larger proportion of respondents in all LGAs of the Loddon Campaspe region report a higher level of wellbeing than those from Victoria overall. This may appear inconsistent with the information from objective social indicators which show relatively higher levels of disadvantage in parts of these rural areas. This result is however, consistent with other studies of subject wellbeing in rural and regional areas. Part of the explanation may be found in the measures of sense of community involvement and personal safety that contribute to the index. Rural residents score higher on these indicators than their urban counterparts. The most sensitive indicator of the sense of personal security is the number of people who feel safe to walk alone at night in the local area. Most of the region scores notably higher than the whole Victorian population. The exception is in Mount Alexander, which demonstrates a slightly lessened sense of security in males, but not females.

There are potentially other objective differences between the LGAs and sub-regions that may also contribute to the higher rural wellbeing score. The Loddon Campaspe region has a slightly older population than the Victorian standard, and sense of subjective wellbeing has been shown to increase with age.
Self-reported sense of wellbeing

Sense of wellbeing is recorded through surveys and is self-reported which makes measurement a challenge. Wellbeing is influenced by objective factors such as financial security, family and community support, employment, work life balance and physical safety. However, self–reporting can be influenced by intrinsic factors such as personal outlook, personality, sense of social status and expectations.

In Victoria, the VicHealth Indicators Survey uses a series of questions across a number of domains of wellbeing (VicHealth 2015) in order to determine a wellbeing index. The mean score of this survey for all the LGAs of the Loddon Campaspe is slightly higher than that measured for Victoria overall (Figure 52). There is not a large variation between the LGAs.

Source: VicHealth 2016.

Figure 52  Self-reported Personal Wellbeing Index by LGA

Figure 53 shows indicators from a 2011 collection. The Loddon Campaspe region reports slightly higher wellbeing in all ages compared to the state average. However, consistent with the rest of Victoria, the sense of wellbeing is slightly higher in the young (18-34 years of age) and older (55 years of age and older) adult age groups (Figure 53). Campaspe and Greater Bendigo report particularly high rates of wellbeing in the older group (55 years of age and older), while young people (aged 18-34) in the peri-urban fringe report substantially higher rates of wellbeing than the other LGAs and the Victorian average.
Sense of personal safety

Personal safety is a key indicator of wellbeing, with the number of people who feel safe to walk alone at night in the local area the most sensitive component of this indicator. Consistent across Victoria, the proportion of males who feel safe to walk alone in a local area at night is larger than the proportion of women for the same area (Figure 54). In Loddon Campaspe, LGAs generally demonstrate a larger proportion of respondents indicating a sense of personal safety than those across Victoria, both male and female.
Volunteering

Rates of volunteering are higher in all LGAs across the Loddon Campaspe than the Victorian average (Figure 55). Loddon and Mount Alexander demonstrate particularly high rates while Central Goldfields and Bendigo are lower, but still above the state average. This is consistent with generally observed higher rates of volunteering in regional areas.

Source: ABS 2016c.

Figure 55  Percentage of population who volunteer, 2016
6. Environmental profile

6.1. Summary

Bendigo regional hub

Bendigo is located in the heart of the Loddon Campaspe region and is the area’s major population centre. Bendigo is a regional hub owing to its steady population growth, access to good transport links via the Calder Highway and rail as well as the location of well-established financial, education and healthcare services.

Bendigo is surrounded by the Greater Bendigo National Park and other state parks and forests. In addition to various environmental assets, the area’s Victorian Goldrush heritage sites and the Heathcote wine region to the east present strong tourism opportunities.

Commercial agriculture is the dominant land use in the north of this LGA. The Bendigo area and land along the Calder Highway towards Melbourne is experiencing steady growth. Development pressure on existing land uses, especially the conversion of agricultural land to rural residential living is well established along this corridor. Provision of services including reliable and secure water supply is likely to be a challenge, too. Demand is predicted to outstrip supply by 2040.

Northern rural areas

In the northern rural areas of the Loddon Campaspe (in the LGAs of Loddon and Campaspe) dryland and irrigated agriculture are dominant land uses. Access to water for irrigation creates a division within this region. Irrigated agriculture in the GMID supports livestock, grains, milk, fruit and vegetables in the north of Loddon and Campaspe LGAs, while dryland agriculture produces broadacre cropping and mixed farming to the south.

Consolidation of agricultural holdings into larger businesses is a long-term trend that is not expected to cease.

The sub-region is home to some important environmental assets such as the Ramsar-listed Gunbower Forest National and State Park, which is situated on the Murray River to the south of Cohuna. Boort Lakes, in the west of the region, is an important environmental asset but also a site with significant Aboriginal cultural importance.

In other areas of the region irrigated dairy and horticultural production are well established. The dairy sector is currently undergoing a radical restructuring because of low international milk prices, sale of water from the industry to government and horticulture, and the demise of the once dominant Murray-Goulburn Co-operative. The closure of the Murray Goulburn Dairy processing plant located in Rochester is a symptom of these changes. Dryland cropping is also found throughout the region. This area also contains ‘manufacturing’ – which is likely to be dairy factories.

Southern peri-urban fringe

The southern parts of the Loddon Campaspe region include peri-urban areas such as the Macedon Ranges which interface with outer metropolitan Melbourne. The southern peri-urban fringe is characterised by increasing urban development pressure due to population growth, commuting opportunities and demand for amenity living in areas such as Mount Macedon.
The sub-region is close to environmental assets such as state parks and forests, both locally as well as in neighbouring regions. There are good opportunities for tourism associated with the sub-region’s environmental assets.

Settlements with projected growth in the region are likely to encounter common peri-urban challenges to land use planning and provision of essential services.

**Southwest goldfields**

The southwest area (encompassing the southwest tip of Loddon LGA and Central Goldfields LGA) has relatively poorer farming assets, and few notable environmental assets. This accounts for a relatively small extent of the total LGA, and outside of the towns most land is cleared rural residential stemming from gold rush era subdivisions. There is the Paddy Ranges State Park outside Maryborough, various smaller reserves, and the Tullaroop reservoir in the south.

### 6.2. Regional environmental data

#### 6.2.1. Land

The Loddon Campaspe region is highly modified from its pre-European settlement state and supports a range of land uses. Land use in the region is dominated by agriculture although there is also a substantial amount of parkland (Figure 56). The ‘other’ land use category is much more prominent than in other regions of Victoria, particularly for Mount Alexander. This may be driven by ‘amenity farming’ or other land uses for migrants from Melbourne (including tourism).

Residential land use is most pronounced in the Macedon Ranges in the southern peri-urban fringe as well as Greater Bendigo owing to the higher concentration of smaller commuter settlements in that area. The region is home to a range of Aboriginal and Traditional Owner and historic heritage assets, important landscapes and environmental assets.

There are various parts of the region that are under development pressure with land use potentially changing to support urban and rural residential development. For example, land between Bendigo and Mount Macedon contains large amounts of agricultural land and parklands that support important terrestrial habitat and other social values which is under rural residential development pressure.
Figure 56  Land use in the Loddon Campaspe, 2016

Source: ABS 2016h.
Terrestrial environmental assets

The Loddon Campaspe region is home to an extensive network of public land that protects important environmental, social and economic values (Figure 57). The terrestrial environmental assets are diverse, including River Red Gum forests, Box-Ironbark, Black Box forest communities, grasslands, grassy woodlands and various lakes, rivers and wetlands (VCMC 2017). Cultural heritage values are associated with both Aboriginal cultural heritage sites and historical heritage sites such as former Victorian Gold Rush sites. Important economic opportunities are associated with tourism linked with environmental assets.

Other environmental assets
1. Rushworth-Heathcote State Forest
2. Lederderg State Forest
3. Macedon Regional Park
4. Leaghur State Park

National Parks
- Gunbower National Park and State Forest.
- Castlemaine Diggings National Heritage Park
- Heathcote-Graytown National Park
- Greater Bendigo National Park
- Terrick Terrick National Park.

Source State Government of Victoria 2014b.

Figure 57 Loddon Campaspe region – key environmental assets
State Forest and State Parks

- Kooyoora State Park
- Paddys Ranges State Park
- Mount Alexander Regional Park
- Macedon Regional Park
- Rushworth-Heathcote State Forest
- Leaghur State Park.

Other

- Aboriginal cultural heritage sites including Lake Boort, Kooyoora State Park, Mount Tarrengower and Terrick Terrick National Park.
- Regional Parks including Mount Alexander Regional Park
- Wychitella Nature Conservation Reserve
- Victorian Gold Rush sites.

Aboriginal cultural heritage assets

The Loddon Campaspe region includes the traditional lands of the Dja Dja Wurrung peoples and small sections of the lands of the Taungurong and Yorta Yorta people, and comprises important cultural heritage assets.

Rivers and waterways are particularly important heritage sites for the Dja Dja Warrung people and hold economic, social, environmental and spiritual values. Sites include the Loddon, Coliban, Campaspe, Avoca and Avon Rivers, and the Boort, Eppalock and Laanecoorie Lakes. The health of these waterways is very important. The Dhelkunya Dja Land Management Board manages six parks held as Aboriginal Title and managed through Joint Management Plans: the Greater Bendigo and Kara Kara National Parks, the Paddys Ranges State Forest, Kooyoora State Park, Hepburn Regional Park, and Wehla Nature Conservation Reserve. Dja Dja Warrung artefacts continue to be found across the Loddon Campaspe region, particularly as development of infrastructure and housing expands. Artefacts include scar trees, middens, burial remains and other ritual artefacts.


Soil health

Soils in the Loddon Campaspe region vary depending on the geological and land formation history they have experienced (State Government of Victoria 2014b). The region has soils that are suitable for a range of productive uses; broadacre cropping, horticulture, viticulture, grazing and intensive animal production are all important agricultural industries.

The region has an elevated risk of erosion from bare soils in dryland production areas (VCMC 2017). The North Central CMA 2016-17 Annual Report states that the loss of topsoil through both wind and
water erosion is the greatest threat to the environmental and productive value of dryland areas in the Loddon Campaspe (North Central CMA 2017). Drought conditions have returned for the region in the last few years preceding 2017 which will increase the likelihood of soil erosion (VCMC 2017).

The North Central CMA 2016-17 Annual Report states that salinity is an important threat across both irrigated and dryland agricultural areas in the Loddon Campaspe region (North Central CMA 2017). Knowledge of the extent and severity of salinity are considered to be poor in Victoria (CES 2013). Despite this, the Victorian Government has prepared a range of planning and management activities to address this problem including groundwater monitoring and various community action plans (State Government of Victoria 2017).

Acid sulfate soils are naturally occurring soils that can pose threats to human health, agricultural production and infrastructure (State Government of Victoria 2014b). According to mapping available on the Australian Soil Resource Information System, there is a high probability that acid sulfate soils might occur in the Loddon Campaspe region, predominantly associated with wetland sites (State Government of Victoria 2014b).

6.2.2. Natural resources

Mineral resources and forestry

The Loddon Campaspe region has a rich history of gold mining, with many areas of the region being centres of gold mining activity during the Victorian goldrush of the 1800s. Although not at the same scale today, gold mining is still an important industry (State Government of Victoria 2014a). The Fosterville Mine located near Bendigo and operated by the Perseverance Corporation Pty Limited is the largest gold producer in Victoria (Kirkland Lake Gold n.d.).

The Loddon Campaspe region also possesses mineral sands and supports extractive industries like sand and stone mining (State Government of Victoria 2014a).

Commercial forestry is also an important industry, particularly within the extensive Box-Ironbark forests that occur on both public and private land. State forests support more than just timber production; apiculture (beekeeping) and eucalyptus oil production are other notable industries.

Renewable energy

There is considerable solar energy generation potential in the Loddon Campaspe region, including some existing large-scale generators in the Loddon Shire and other rural areas. Development of the solar energy sector, and other renewable energy sources more generally, is increasingly a government and community priority (State Government of Victoria 2014b).

6.2.3. Biodiversity

Tree cover is used as one proxy for biodiversity by the Victorian Catchment Management Council (VCMC) in their 5-yearly Catchment Condition and Management Report (VCMC 2017). Tree cover is varied across the Loddon Campaspe region. The lowest levels of tree cover (15 per cent) are observed in North Central CMA which spans the bulk of the Loddon Campaspe region. The low levels of tree cover observed in North Central CMA reflect past land clearing practices as well as the presence of native grasslands that have naturally low levels of tree cover. Goulburn Broken CMA and Port Phillip and Western Port CMA report moderate levels of tree cover (approximately 30 per cent) but account for very small portions of the region.
North Central and Goulburn Broken CMAs both assessed the condition of biodiversity as ‘poor’ in their 2015-16 annual condition reports (North Central CMA 2017, Goulburn Broken CMA 2017).

6.2.4. Water

Hydrology and waterway condition

The Loddon Campaspe region is part of the Murray-Darling Basin. Hydrological features include multiple waterways, lakes, floodplains and wetlands as well as important drinking water catchments and reservoirs:

- To the north-west, the Loddon system flows towards the Murray River. Part of the Gunbower Forest Ramsar site is also located here as well as the Lake Boort and the Mid Loddon Wetlands.
- To the west, the Avoca River straddles the border of the Loddon Campaspe region.
- To the south, there are large storages at Tullaroop Reservoir and Cairn Curran Reservoir, and also in the south east within the Macedon Ranges.
- In the south east, the Campaspe and Coliban rivers flow into Lake Eppalock.
- To the east, Waranga Basin is situated outside Rushworth.
- In the north east, the Campaspe system joins the Murray River near Echuca.

The Loddon Campaspe is located across three of Victoria’s ten CMAs. The most important by geographical coverage and major river systems is North Central CMA (Figure 58). Goulburn Broken and Port Phillip and Westernport CMA cover smaller portions of the Loddon Campaspe to the east and the south east respectively.
The catchment areas within the region are used to supply water for domestic, irrigation and other purposes. Domestic supply includes water for Melbourne as well as cities such as Bendigo and Castlemaine and other smaller towns. Consequently, many of the catchments in the south and south east of the region are declared water supply catchments.

More broadly, natural waterways across the region have been heavily impacted by past land use (clearing and agriculture), resulting in poor condition, particularly when compared with eastern Victorian waterways (Figure 59).
Based on the latest Index of Stream Condition, over half (51 per cent) of the stream length of rivers in the Loddon Campaspe region are either in poor or very poor condition (Figure 60) (DELWP 2010). A further 46 per cent of stream length in the region is in moderate condition. Only one stream reach assessed in the region was assessed as in ‘good’ condition (VCMC 2017). Environmental water holdings\(^\text{11}\) exist on a number of river systems (Loddon, Campaspe, and Coliban).

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\(^{11}\) Water that is held and managed for the purpose of achieving environmental outcomes.
The north western perimeter of the Loddon Campaspe region contains part of Gunbower Forest, an internationally recognised Ramsar-listed site (Figure 61). The site is a large, seasonally flooded River Red Gum (*Eucalyptus camaldulensis*) forest and woodland on the floodplain of the Murray River in Victoria between Echuca and Koondrook.

![Ramsar Listed sites in Victoria](source: Victorian Auditor-General 2016.)

**Figure 61  Ramsar Listed sites in Victoria**

The Department of Environment, Land, Water and Planning (DELWP) assessed the overall condition of Gunbower Forest as ‘good’ in its *Index of Wetland Condition 2009/10* report (DSE 2012). Of the 24 representative plots assessed during the study, over half the plots were in good condition, 30 per cent were in moderate condition and just over 10 per cent were in excellent condition (DSE 2012). Hydrology was generally in moderate condition. The vegetation in two thirds of plots was in poor or very poor condition, whereas for the remainder of plots vegetation was in moderate to excellent condition. The wetland catchment, physical form, water properties, the soil were in excellent condition (DSE 2012).

**Urban water supply and water security**

Urban water supply across the Loddon Campaspe region is the responsibility of a number of regional water corporations, including Coliban Water (Bendigo, Castlemaine, Heathcote and Echuca), Western Water (Woodend, Macedon, Gisborne and parts of Mount Alexander LGA) and Central Highlands Water (Maryborough and surrounds). In 2017, each water corporation completed an Urban Water Strategy that articulates the outlook for, and actions required to ensure water supply security over a fifty-year horizon.

Urban water security reflects the balance between demand for water and available supply, each of which is impacted by a number of factors over time. The resulting uncertainty when forecasting future urban water security is addressed through scenario planning. The scenarios – which consider the implications of population and climate change, among other factors – indicate the possible timeframe over which intervention or investment might be required under a range of plausible conditions.
Most water supply systems inherently have some level of vulnerability to infrequent and severe drought conditions that arise from time to time, for which Drought Preparedness Plans are prepared and implemented to ensure water supplies can be maintained over short periods of relative water scarcity. More substantial upgrades to system infrastructure are triggered when forecasts of demand and supply over time suggest that levels of service can no longer be maintained.

The key challenges for water security in the Loddon Campaspe region tend to be population growth (particularly in larger centres) and climate change. The impacts of climate change, in particular, are generally forecast to contribute to increasing uncertainty and reduced availability of water resources.

The outlook for key urban water supply systems in the Loddon Campaspe region includes the following:

- **Campaspe system:** the system is not expected to experience a shortfall in water supply over the 50-year planning horizon. Nevertheless, a number of initiatives are proposed to smooth supply and demand and to improve operations.

- **Coliban Northern system:** comprises two independent water supply systems (Bendigo and Heathcote) and a number of rural channel supplies. Supply and demand are presently closely balanced, with any shortfall able to be managed through operational flexibility. Population growth and climate change are expected to exacerbate the shortfall in supply over time, with a substantial upgrade to the system expected to be considered within the next 5 to 10 years. Augmentation is proposed via upgrade of the Superpipe (Goulburn-Campaspe Link Pipeline).

- **Coliban Southern system:** comprises two independent water supply systems (Castlemaine and Kyneton) as well as a substantial rural water component. The Coliban Southern System is not expected to experience a shortfall in water supply until at least 2042.

- **Goulburn system:** supply in this system is forecast to remain secure until at least 2049. A number of initiatives are proposed to improve operational efficiency and system performance.

- **Loddon system:** the Loddon system is reliant on a single water source and is therefore particularly vulnerable to supply shortfalls during drought conditions. In most years supply is sufficient to meet demand. However, the outcomes for the system are very dependent on the occurrence and severity of drought conditions that might arise, with a resulting emphasis on drought preparedness to manage periods of short-term water scarcity. Demand management and alternative water sources will be employed as the main management strategies in the event of these conditions. Under a worst-case scenario, an upgrade to the system may be required by 2029 to secure supply for the longer-term.

- **Maryborough system:** the system supplies customers in the towns of Maryborough and Carisbrook and the surrounding district. The system is the second largest managed by Central Highlands Water. Under worst-case conditions (particularly associated with impacts of climate change) action may be required as soon as 2023. Specific actions are expected to be identified within the next 5 years.

- **Rosslynne system:** the peri-urban towns of Gisborne, Macedon and Mount Macedon are supplied by Western Water’s Rosslynne system. A shortfall in supply could arise as soon as 2031 under worst-case conditions. Future water supply augmentations are expected to be met via additional entitlement from the Melbourne system.

- **Woodend system:** access to available entitlement for the Woodend system (held in Campaspe Reservoir) is currently not fully utilised due to limitations in system storage capacity. Construction of additional storage capacity is planned in the next 5 years to optimise the use of the current entitlement and enable increased supply. Further supply augmentations may be required as soon as 2032 under worst-case conditions.
• Murray system: demand is anticipated to exceed supply as early as 2024, with any supply shortfall expected to be addressed through demand management in the first instance. Depending on the extent of population growth and the impacts of climate change, a supply augmentation may be required from 2024 at the earliest.

6.2.5. Natural hazards

Like all regions in Victoria, the Loddon Campaspe has a history of bushfire, storm and flood with recent data indicating the occurrence of some form of damage from natural hazards in every year between 2009 and 2016 except 2012\(^\text{12}\) (Figure 62). In particular, the Loddon Campaspe region is predisposed to flood. The floods experienced in 2010-11 were the largest on record.

![Frequency of natural disasters in the Loddon Campaspe region](image)

Source: Disaster Assist 2017.

**Figure 62 Frequency of natural disasters in the Loddon Campaspe region**

The risks presented to land use from flood hazards must continue to be considered in strategic and statutory planning decision making. These decisions should be based on the best quality information on flood hazards to minimise the risk to life, property, infrastructure and environmental assets. Many settlements within the region that are identified for growth have flood risks that must be considered, including Bendigo, Castlemaine, Kyneton, Gisborne (State Government of Victoria 2014a). Central Goldfields and Loddon Shire also have a large amount of flood-prone land.

The Loddon Campaspe region is characterised by many high bushfire hazard areas that intersect with settlements and areas that are experiencing rural residential and tourism expansion. Some of the settlements identified for focused growth also occur in areas with bushfire hazards, including Bendigo, Castlemaine, Maldon, Macedon and Maryborough (State Government of Victoria 2014a).

\(^{12}\) This has been identified as any natural disaster which was eligible for receiving Federal funding for recovery. Eligible disasters are those where more than $100,000 worth of damage has occurred across the extent of the disaster.
6.2.6. Contaminated sites and pollution

There are many areas in the Loddon Campaspe region that contain contaminated land, particularly as a result of the region’s gold mining history. Contaminated sites may pose immediate or longer-term risks to human health and the environment, depending on the type and extent of the contamination and how the site will be used in the future. The specific locations of all contaminated sites in the region are unknown. The potential for contamination will need to be considered as sites are developed (either through urban expansion or infill such as in Bendigo and Castlemaine), particularly for sensitive uses (State Government of Victoria 2014a).

As of March 2018, there are currently 31 sites in the Loddon Campaspe region listed on the EPA’s Priority Sites Register. These sites have been issued a Clean Up Notice pursuant to section 62A, or a Pollution Abatement Notice pursuant to section 31A or 31B of the Environment Protection Act 1970 (EPA 2017). The current condition of these sites has been identified as incompatible with the current or approved use of the site and poses a risk to human health or the environment. Sites are removed from the Priority Sites Register once all conditions of a Notice have been complied with.

Examples of contamination/pollution issues experienced in the Loddon Campaspe region include:

- current and former landfill sites in Greater Bendigo City, Central Goldfields Shire, Campaspe Shire and Macedon Ranges Shire Council
- current and former industrial sites in Greater Bendigo City
- historical deposit of mine tailings in Greater Bendigo City
- contaminated soil storage and current wastewater treatment plant in Mount Alexandre Shire.

A detailed list of current Priority Sites can be found on the EPA Priority Sites Register.

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13 Recommendation 14.1 of the Inquiry in to the Environment Protection Authority (available: http://epa-inquiry.vic.gov.au/epa-inquiry-report) identifies: The Department of Environment, Land, Water and Planning develop a comprehensive statewide database of sites that pose a high risk to the community because of their past use, which should link to other relevant government data sources including information held by the EPA.
7. References


Australian Bureau of Statistics (ABS) 2016a, *Internal Migration*, TableBuilder. Findings based on use of ABS TableBuilder data.


Australian Bureau of Statistics (ABS) 2016c, *Employment, Income and Education*, TableBuilder. Findings based on use of ABS TableBuilder data.


Australian Bureau of Statistics (ABS) 2016e, *Selected Dwelling Characteristics*, TableBuilder. Findings based on use of ABS TableBuilder data.


National Institute of Economic and Industry Research (NIEIR) 2018, *Regional Economic Data*.


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