

TRANSPORT ENERGY WATER TELECOMMUNICATIONS

infrastructure report card 2010
South Australia



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infrastructure report card 2010

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South Australia Infrastructure Report Card 2010

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South Australian Infrastructure Report Card Committee

- Doug Gillott FIEAust CPEng (Committee Chair)
- Jeff Walsh FIEAust CPEng
- Kim Read OAM FIEAust CPEng (Ret)
- Mark Gobbie FIEAust CPEng EngExec
- Dr David Cruickshanks-Boyd FIEAust EngExec

Report Card contributors

- David Alm FIEAust CPEng
- Rene Arens FIEAust CPEng
- Ian Coat MIEAust CPEng
- Dr Phil Crawley FIEAust CPEng
- Borvin Kracman FIEAust CPEng
- Duncan McLeod MIPENZ MIEAust CPEng
- Phil Motteram MIEAust CPEng
- Phil Verco RPEQ FIEAust CPEng

South Australian Division project staff

- Caroline Argent, Executive Director
- Sarah Carey, Deputy Director

National Project Director

- Project Director: Leanne Hardwicke, Director, National and International Policy, Engineers Australia

Consultant

- Principal Author: Athol Yates MIEAust, Australian Security Research Centre
- Project Team: Professor Priyan Mendis FIEAust CPEng, Henry Pike, Barbara Coe, Jacinta Nelligan, Trudy Southgate and Minh Duc Nguyen



**ENGINEERS
AUSTRALIA**

Engineers Australia
South Australia Division
Level 11, 108 King William Street
Adelaide SA 5000
Tel: 08 8202 7100
Fax: 08 8211 7702
www.engineersaustralia.org.au/sa



Australian Security Research Centre
International Affairs House
Level 1
32 Thesiger Court
Deakin ACT 2605
Tel: 02 6161 5143
Fax: 02 6161 5144
www.securityresearch.org.au

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COMMUNIQUÉ

South Australia's economic, social and environmental viability depends on the adequacy of its infrastructure.

In 2005, Engineers Australia took the initiative to raise community awareness about the importance of infrastructure by producing the 2005 South Australian Infrastructure Report Card. The Report Card gave a strategic overview of the important infrastructure sectors and independently assessed the fitness for purpose of South Australia's economic infrastructure. The Report Card found that much of the infrastructure was not in good condition.

We have again examined the state of our infrastructure to see what progress has been made and what needs to occur so that South Australia can live up to its vision to be prosperous, environmentally rich and culturally stimulating, while offering its citizens every opportunity to live well and succeed.

South Australia's infrastructure is stressed. Improvements and additions are necessary to meet our current or anticipated future needs. There are particular challenges to the provision of infrastructure in South Australia, such as the size of our regional areas with low population densities, and meeting the needs of a growing mineral resources sector. Geographic barriers around Adelaide restrict growth in some directions and low rainfall requires a diversity of water sources.

The 2010 Report Card recognises the considerable improvement in the level of strategic planning this decade, as well as improvement in integrated decision making between government entities. However, significant new investment in infrastructure is needed to meet existing and projected demand. As well, sufficient attention has not been given to including sustainability in the policies and strategies that shape cities, towns and regions in South Australia.

Some major road construction projects have been initiated recently, including the Northern and Port River expressways and the duplication of the Sturt Highway between Gawler and Daveyston. However, road congestion remains an issue, as does the quality of local government roads and bridges. There is also a significant backlog of road maintenance that must be addressed.

The start of the renewal of Adelaide's public transport network is most welcome, as is the replacement of tram and train rolling stock. This will need long term funding to maintain a reasonable standard.

Existing port infrastructure is in a reasonable condition because of recent projects such as the deepening of the shipping channel and the redevelopment of the passenger terminal in Port Adelaide's Outer Harbour. However, there is an urgent need to provide additional port infrastructure in regional South Australia to support the development of our mineral resources sector. The construction of Terminal One at Adelaide Airport is a major

improvement since 2005. Maintaining the financial viability of regional airports will be an issue for the future.

Water infrastructure is in satisfactory shape with the exception of stormwater. We have seen the introduction of an integrated approach to water management, the commencement of construction of the desalination plant and a significant increase in the use of recycled water, which will all improve water supply for the State. The efficiency of irrigation infrastructure has been increased, together with improvements in rural water supply pipelines and construction of salt interception schemes. There have been some projects undertaken to improve stormwater infrastructure, but a number of areas in suburban Adelaide remain flood prone.

Electricity and gas infrastructure are rated well and there is sufficient generation capacity to meet current demand. There have been a number of significant developments, particularly with regard to the construction of wind farms and two gas transmission pipelines. Renewing aging electricity transmission infrastructure will need to be high on the agenda in the future in order to meet growing consumer demand, the requirements of the renewable energy sector, and the changing energy demands likely under a carbon constrained power generation regime.

Telecommunications infrastructure is only adequate. The success of the Broadband Development Fund is recognised, but many black spots remain for broadband and mobile phone coverage.

Ratings are given below for the current and past South Australian and National Report Cards.

Infrastructure Type	SA 2010	SA 2005	National 2005	National 2001
Roads Overall	C-	Not rated	C	Not rated
National roads	C	C	C+	C
State roads	C	C-	C	C-
Local roads	D	D	C-	D
Rail	C	C ARTC B- Metropolitan D Regional	C-	D-
Ports	B-	Not rated	C+	B
Airports	B-	Not rated	B	B
Potable water	B	B- Metropolitan C Non-metropolitan	B-	C
Wastewater	B-	C+ Metropolitan C- Non-metropolitan	C+	C-
Stormwater	D	D	C-	D
Irrigation	C+	Not rated	C-	D-
Electricity	B-	B-	C+	B-
Gas	B+	B+ Overall B+ Transmission A- Distribution B+ LP Gas	C+	C
Telecommunications	C	Not rated	Not rated	B

Recommendations

Engineers Australia recommends the following to improve the standard of South Australia's infrastructure:

1. Further integrate State-wide planning, especially transport strategies, to improve the movement of people and freight.
 2. Encourage shifts in transport modes from road to rail for freight, and from private to public transport for people.
 3. Increase funding for all infrastructure, including maintenance and renewal, to ensure the State's long term productivity.
 4. Prioritise the development of port infrastructure in regional South Australia to support the emerging mineral resources sector.
 5. Continue to increase the diversity of water supply options, including greater take up of recycled water.
 6. Deliver improvements to stormwater infrastructure in flood prone areas and apply careful planning to new urban infill schemes.
 7. Increase efforts to achieve the State's sustainability objectives with regard to energy use, especially with respect to base load electricity generation.
 8. Provide a financial and regulatory environment that facilitates the creation of renewable energy generation and transmission infrastructure to meet the State Government's ambitious renewable energy targets.
 9. Give further consideration to road infrastructure funding alternatives to enable earlier provision of key road links.
-

RATINGS SUMMARY

The following summarises the South Australian Infrastructure Report Card ratings.

Infrastructure Type	Grade	Comment
Roads Overall National roads State roads Local roads	C- C C D	These ratings recognise that significant improvements are needed in road infrastructure, notably a need to address the significant maintenance backlog in regional and metropolitan areas, and growing congestion and slow speeds on major Adelaide arterial roads. Deterioration in the road network is likely unless increased funding for capital works and maintenance occurs, coupled with a reduction in the distance travelled per capita.
Rail	C	This rating recognises that the metropolitan rail network has experienced a continual decline in service quality over the last 5 years, however significant planned investments should arrest this trend. The intrastate rail network has improved marginally in some areas, but the remainder of this network continues to wither. The interstate network has improved due to selective upgrades by the ARTC, but bottlenecks remain, particularly in the Adelaide Hills and metropolitan areas.
Ports	B-	This rating recognises that the ports are generally fit for their current purpose. However, major expansion of existing ports or the development of new ports will be needed to accommodate any significant increase in mineral exports.
Airports	B-	This rating recognises that there have been continual upgrades at Adelaide Airport and regional airports. However, some smaller airports have limited financial means to provide the improved airport infrastructure required to accommodate heavier aircraft and new security measures.
Potable water	B	This rating recognises that country water supply has improved due to the Country Water Quality Improvement Program, as will metropolitan supply reliability with the completion of the Adelaide Desalination Plant. However, there is a need to continue to increase the diversity of supply in both rural and metropolitan areas, so as to reduce reliance on River Murray water and groundwater, and to reduce demand.
Wastewater	B-	This rating recognises that there have been improvements in the funding and asset quality of sewerage networks in both metropolitan and rural areas, a reduction in environmental impacts from sewage, and a continual growth in the reuse of wastewater.
Stormwater	D	This rating recognises that while stormwater reuse continues to rise in SA, there are a number of areas in Adelaide that remain flood prone and require improved drainage and stormwater infrastructure. In addition, there is a concern that existing stormwater infrastructure will be more frequently overwhelmed due to increased runoff arising from urban infill that creates larger impervious areas.
Irrigation	C+	This rating recognises that while there has been improvement in irrigation infrastructure, such as replacing open channels with pipes, constructing salt interception schemes and increasing the use of recycled water, there is concern about the long-term viability of much irrigation infrastructure due to poor management of the total Murray-Darling water resource.
Electricity	B-	This rating recognises that SA has sufficient generation capacity to meet demand until 2012/13. However, peak demand growth needs to be moderated to prevent high cost, low utilisation infrastructure being required. While the present significant expansion in transmission and distribution network infrastructure is important to rectify key limitations, ongoing growth in wind power and the development of distributed generation will require significant additional investment.
Gas	B+	This rating recognises that the two transmission pipelines in the State provide security of supply, and the distribution network is in adequate condition.

Ratings Summary

Infrastructure Type	Grade	Comment
Telecommunications	C	This rating recognises that while telecommunication services are generally available to a high percentage of the population, there are still many blackspots in broadband and mobile coverage, and areas of network vulnerability due to a lack of competitive backhaul.

OVERVIEW

Rating process

Background

The objective of the Report Card is to rate the quality of economic infrastructure. Engineers Australia has been rating infrastructure since 1999. In 1999, 2001 and 2005, national report cards were published. In 2003, 2004, and 2005, report cards on States and Territories were published. This Report Card revises and expands on the 2005 edition of the South Australian Infrastructure Report Card.

The purposes of the Report Cards are to:

- ▶ Raise awareness by politicians, media, business and the public that infrastructure underpins the community's quality of life and that inadequate infrastructure impedes economic and social growth, and reduces environmental and societal sustainability
- ▶ Generate debate on the adequacy of the infrastructure (including condition, distribution, funding and timing) required to meet society's needs
- ▶ Increase appreciation of the value of developing an integrated and strategic approach to the provision of infrastructure
- ▶ Raise awareness of the new challenges facing Australia's infrastructure due to climate change, changes in demographics, increases in demand, resilience and sustainability
- ▶ Improve the policy, regulation, planning, provision, operation and maintenance of infrastructure.

This Report Card provides a strategic overview of South Australia (SA) infrastructure that other organisations can use when they undertake detailed analysis of particular infrastructures. It also provides a benchmark that the community can use to identify need and evaluate alternative infrastructure priorities over time.

Rating description

Ratings have been based on an assessment of asset condition, asset availability and reliability, asset management, sustainability (including economic, environmental and social issues) and resilience. The assessment includes evaluating infrastructure policy, regulation, planning, provision, operation and maintenance. (See *Appendix A: Rating methodology* for details.) The assessment was carried out through research and consultation. Interviews were held with relevant stakeholders and documents were analysed. The assessment has relied on publicly available information and has, in line with its aims, focused on strategic issues, supplemented by quantitative performance measures where these were readily available. A number of industry associations were consulted and Engineers Australia provided assistance through its experts. Ratings used are comparable with those of past Report Cards. The rating scale is detailed below.

Rating scale

Letter grade	Designation	Definition*
A	Very good	Infrastructure is fit for its current and anticipated future purposes
B	Good	Minor changes required to enable infrastructure to be fit for its current and anticipated future purposes
C	Adequate	Major changes required to enable infrastructure to be fit for its current and anticipated future purposes
D	Poor	Critical changes required to enable infrastructure to be fit for its current and anticipated future purposes
F	Inadequate	Inadequate for current and anticipated future purposes

* Fitness for purpose is evaluated in terms of the needs of the community, economy and environment using criteria of sustainability, effectiveness, efficiency and equity.

State-wide issues

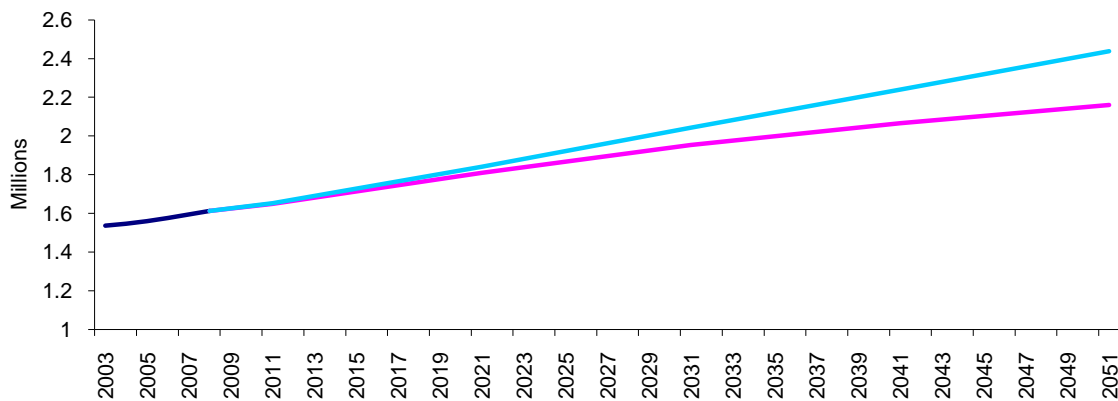
Major factors influencing SA’s infrastructure demand and supply

Both population and economic growth are key drivers of infrastructure demand.

Population

The figure below shows SA’s population projections along a high and low future growth path. It shows that SA’s population will expand from nearly 1.6 million in 2007 to 2.1 million (31% increase) in 2051 under low growth assumptions, or 2.4 million (50% increase) under high growth assumptions. A growing population will accelerate the demand for all water, electricity, transport and telecommunication services.

SA’s recent and projected population using high and low growth assumptions^{1a}



Gross State Product

The table below shows SA’s projected Gross State Product. Economic growth directly increases demand by businesses for infrastructure services, and indirectly increases demand by consumers due to their raised standard of living.

SA’s Gross State Product²

Gross State Product	2008/09	2009/10 Forecast	2010/11 Projection	2011/12 Projection	2012/13 Projection
Yearly change	1.4%	-0.5%	2.25%	3.25%	3.25%

^a The 2007 *South Australia’s Strategic Plan* uses this data series for its predictions and projections. Government of South Australia, 2007, *South Australia’s Strategic Plan*, p. 16.

Climate change

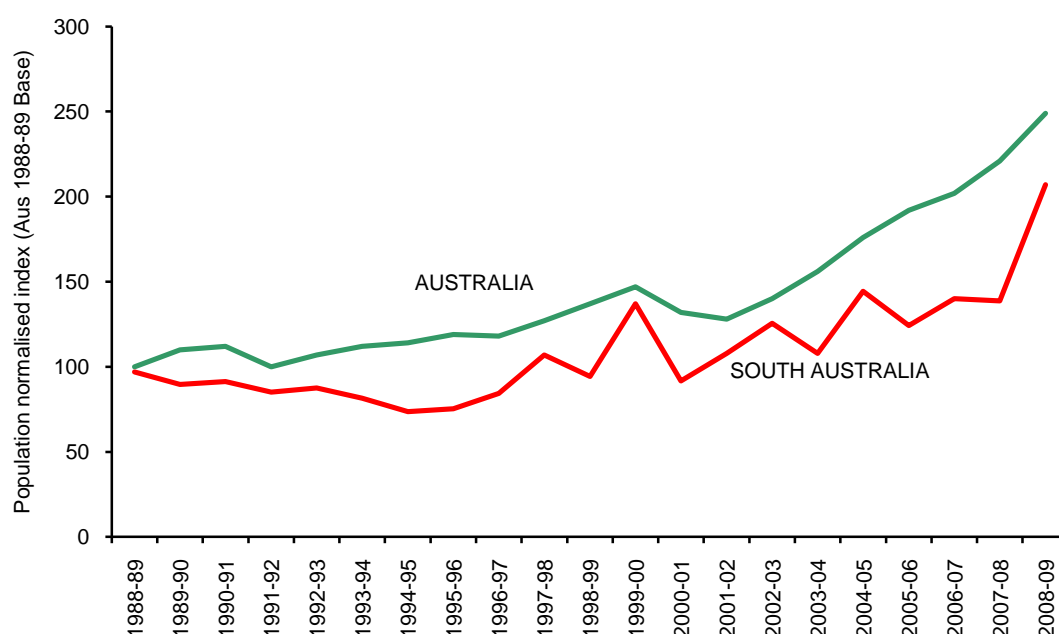
Climate change impacts on infrastructure in SA may include:

- ▶ Increased flooding due to more frequent extreme rainfall events exceeding stormwater and drainage infrastructure capacity
- ▶ Increased ingress of saline water into stormwater and sewerage infrastructure due to rising sea levels and rising coastal water tables
- ▶ Increased rail buckling and signal failure, and road fatigue due to more frequent hot weather
- ▶ Surges in electricity demand leading to brownouts caused by more frequent heat waves.

Infrastructure investment

The supply of infrastructure is heavily influenced by the amount of investment. The figure below illustrates the investment in transport, electricity and gas, water and sewerage and telecommunications facilities over a 25-year period and shows that SA's investment levels have tracked roughly parallel to the national levels, albeit at a lower level compared with the national average.

Index of economic infrastructure expenditure in SA and nationally³



Real prices, base year index is 1988/89, base is 100 for national expenditure.

Cross sector challenges

While each chapter identifies sector-specific challenges to the future provision of individual infrastructures, below are challenges that cross multiple infrastructure sectors.

Strategic planning, coordination and integration

Infrastructure drives the productivity, liveability and sustainability of cities, towns and regions. Optimising all three is a considerable challenge that requires planning, coordination and integration. Strategic planning requires a long-term perspective which, for cities, can exceed 100 years. Coordination requires bringing together all stakeholders, including the owners, operators and builders of the infrastructure, the infrastructure users, and the community, in the planning process and negotiating mutually acceptable outcomes. Integration requires linking infrastructure plans with broader land-use objectives, as well as ensuring that the plans for different infrastructures complement one another.

SA's level of strategic planning has improved considerably this decade, as illustrated in the release of a number of plans such as the *Water for Good* plan. The SA Government has also worked to improve integrated strategic decision-making by reforming legislation, policy and the priorities of infrastructure organisations. SA is also benefiting from increased national level strategic planning, such as the creation of a National Transmission Planner, and the work of Infrastructure Australia in identifying nationally significant infrastructure requirements.

Challenges to improving planning, coordination and integration of infrastructure include:

- ▶ Ensuring that plans balance productivity, liveability and sustainability goals, and explicitly identify any tradeoffs that have to be made
- ▶ Recognising that strategic plans are based on predictions that often turn out to be inaccurate, e.g. population growth or traffic demand, and consequently all plans have to be continually adapted so that their long-term vision can still be achieved
- ▶ Controlling overly-optimistic expectations of what the strategic plan can achieve (e.g. containing growth within boundaries, achieving high levels of infill, increasing economic activity in areas of social disadvantage), the ease of its implementation, and the ability to maintain a consistent vision over decades
- ▶ Ensuring that plans not only address growth areas, but also address the very large outer suburban areas and regional towns that today have inadequate infrastructure
- ▶ Making unpopular decisions such as changing economic activity or relocating populations in areas that are unsustainable
- ▶ Implementing a long-term land-release program to meet the housing needs of a growing population and address housing affordability.

Funding

New infrastructure provision can be extremely expensive, particularly in built-up areas.

SA has recognised that there needs to be significant investment in infrastructure over the next few decades to meet existing and projected demand. Identified investment includes \$2 billion for metropolitan rail transport, \$3 billion for water and \$2 billion for electricity network infrastructure.

Challenges to infrastructure funding include:

- ▶ Ensuring that high levels of investment are maintained over many years
- ▶ Balancing investment on capital works, maintenance, renewals and upgrades against investment on reducing/managing demand
- ▶ Selecting the best-value source of infrastructure funding
- ▶ Ensuring that new infrastructure projects receive funding for both the capital works and maintenance.

Sustainability and climate change

Infrastructure must contribute to sustainable economic, social and environmental activities. While individual projects in SA over the last decade have sustainability as one of their criteria, sustainability has not been prominent in policies and strategies that shape cities, towns and regions.

Challenges in improving infrastructure's contribution to sustainability include:

- ▶ Ensuring that decisions on infrastructure reflect economic, social and environmental criteria
- ▶ Ensuring that decisions on infrastructure reflect the fact that its physical life is typically between 20 and 50 years, but can be over 100 years with refurbishment
- ▶ Designing the infrastructure to operate under changed rainfall, temperature, wind speeds etc, due to climate change
- ▶ Minimising greenhouse gas emissions over the infrastructure's lifecycle

- ▶ Designing infrastructure so that it can be upgraded at some time in the future
- ▶ Designing infrastructure that maximises the use of recycled elements and minimises total resources use.

Infrastructure performance

Infrastructure performance is judged differently by infrastructure owners, operators, users and other stakeholders. Some stakeholders give priority to financial returns, while others focus on service quality.^b

Challenges to improving the performance of infrastructure include:

- ▶ Increasing the supply of infrastructure through the building of new infrastructure or increasing the utilisation of existing infrastructure
- ▶ Reducing/managing infrastructure demand by methods such as introducing pricing regimes that reflect the fixed cost of provision and time of use
- ▶ Developing infrastructure performance measures that reflect the priorities of all stakeholders
- ▶ Building detailed information on infrastructure demand and supply, and infrastructure conditions, to allow for better allocation of resources.

Maintaining governments' informed buyer status

Having and utilising technical expertise is a pre-condition to being an informed buyer of engineering, information technology and other technical goods and services. It is crucial that buyers are well informed so that they are able to select and justify the option that offers best value for money, select and justify an innovative solution, as well as to reduce contractor risks by providing relevant technical details in tender documents, and prevent contractors from taking advantage of the buyer's lack of knowledge. The SA Government and local governments need to maintain their informed buyer status, which can be challenging due to budgetary constraints and finding appropriately experienced staff.

Infrastructure security and continuity

Security risks to infrastructure became apparent following the 11 September 2001 terrorist attacks in the US, the Madrid attacks in 2004, and the London attacks in 2005. Continuity risks to infrastructure became apparent during the 2009 heatwaves in SA. The community expects that infrastructure security and continuity risks will be appropriately managed. The security and continuity of SA's infrastructure has generally improved this decade, however, there are noticeable inadequacies that are related to the infrastructure's accessibility, age, condition, level of redundancy and tight supply-demand balance.

Challenges to improving the security and continuity of infrastructure include:

- ▶ Managing unrealistic stakeholder expectations for absolute security and 100% supply continuity
- ▶ Ensuring investment in infrastructure security and continuity is focused on the highest risks rather than political or topical risks
- ▶ Maintaining appropriate levels of security and continuity given yearly variation in the frequency of malicious attacks and extreme weather events.

Intelligent infrastructure networks

Infrastructure of the future will increasingly be intelligent. Intelligent infrastructure has attached or built-in components (e.g. sensors and cameras) that are able to collect and transmit information about its physical state. This information can be used to identify when water pipes require maintenance, when traffic conditions should be changed to improve flows, and which route

^b The Report Card uses a balanced stakeholder assessment.

motorists should use to minimise travel time. Currently, very little of SA's infrastructure could be called intelligent.

Challenges to building intelligent infrastructure include:

- ▶ Justifying the cost of investing in intelligent infrastructure
- ▶ Designing network-wide intelligent infrastructure systems
- ▶ Manipulating the infrastructure data and providing it to stakeholders in a useful form
- ▶ Providing a process so that third parties can access infrastructure data and exploit it.

Conclusion

SA's infrastructure is mostly rated as only adequate meaning major changes are required to enable infrastructure to be fit for its current and anticipated future purposes. There has been little improvement in most sectors over the past five years. The ratings for the State reflect that its infrastructure is stressed. In metropolitan areas, this is evident from traffic congestion and public transport inadequacies. In regional areas, it is evident in road quality and inadequate broadband availability.

The State experiences particular constraints not faced by most other States, such as its low population density requiring extensive infrastructure with a low utilisation rate, geographic barriers around Adelaide limiting its growth to the north-south axis, and low rainfall requiring diversity in its water sources. Critically important is maintaining existing infrastructure rather than waiting for it to fail and then replacing it. Significant investment in new infrastructure is also required. Sustaining this necessary high level of investment will be challenging due to the numerous demands for government and private sector investment. However, it is critical that this is done to ensure that the State has liveable, productive and sustainable cities, towns and regions.
