

# Smarter Infrastructure for Queensland

## Discussion Paper

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# Smarter infrastructure AT A GLANCE

## Infrastructure underpins every aspect of modern life

While the systems using our infrastructure have improved, the underlying infrastructure has developed comparatively slowly. Smart infrastructure seeks to extract greater value from new and existing assets by improving user experience, reducing expenditure and enabling better decision-making and policy outcomes from the same or similar cost, environmental and spatial footprint<sup>1</sup>.



**Population growth** is placing increasing pressure on infrastructure and services, driving the need for **innovation and agile approaches**.



The rise of **digital and mobile** will generate more data, different demands and different ways of interacting across regions and infrastructure.



In 2014 there were **two billion devices connected to the internet**; by 2020 there will be 50 billion.



**Digital disruption** will impact at least five million Australian jobs by 2035.



**Innovation, machine learning, artificial intelligence and robotics** will disrupt business, service delivery and infrastructure.



Smart infrastructure **responds intelligently to changes in its environment**, including user demands and other infrastructure, to achieve an improved performance<sup>1</sup>.



A focus on citizens and the **customer experience** will ensure solutions are relevant, achievable and sustainable.



New perspectives and governance models will assist to unlock **regional growth opportunities** and faster implementation.



There is an increasing need for **physical and digital connectedness** – within and between cities and regions.

<sup>1</sup> Inquiry into the role of Smart ICT in the design and planning of infrastructure – Chapter 2: What is Smart Infrastructure?, Parliament of Australia, 15 March 2016



## Aerial, Brisbane

Source: Tourism and Events  
Queensland



# Positioning Queensland as a leader in smarter infrastructure

The Queensland Government is hosting a Smarter Infrastructure for Queensland Summit (the Summit) on Tuesday 17 October 2017 to demonstrate practical outcomes that can be achieved by combining infrastructure, innovation and technology.

It will bring together industry experts and thought leaders, state and local government and academia to collaborate and discuss strategies to support the transition to a smart-enabled state.

**The Summit will assist the Queensland Government to plan for the knowledge economy of the future by adopting smart and sustainable infrastructure.**

By identifying challenges and case studies on innovative solutions locally and around the world, this paper aims to encourage discussion on a more connected and smarter future.

Input and collaboration following this paper will help position Queensland as a leader in smart and innovative infrastructure planning, delivery and utilisation.

The feedback, ideas and strategies generated through this paper, the Summit and its activities will be further considered by the Infrastructure Innovation Taskforce to help shape the future direction of Queensland's infrastructure networks.

**Smart infrastructure will play an increasingly significant role in addressing resource constraints and enhancing the state's connectivity, liveability, productivity and resilience.**

Queensland's anticipated future state is one where:

- 1 Connected devices will play a vital role in improving the standard and delivery of critical services, including those in remote areas.
- 2 Sensor technology will better identify infrastructure stress and climate change threats to reduce capital and maintenance expenditure.
- 3 Regulation and policy settings encourage entrepreneurialism and innovation.
- 4 Data analysis techniques will drive better decision-making and infrastructure investment for more effective asset use.
- 5 Integrated systems for data collection and processing provide a state-wide information platform.

Fortunately Queenslanders are typically early adopters of new technology, but with this said our infrastructure sector is ripe for disruption.

# The future is here. Disruptive innovation is fundamentally transforming the infrastructure landscape

In the short-term, smart technology has been identified as a measure to preserve existing assets. In the longer-term, it is expected to improve service delivery standards and decrease the need for investment in ‘hard’ infrastructure<sup>2</sup>.

**“We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten. Don’t let yourself be lulled into inaction.”**

– Bill Gates

Whilst many technologies that will power our future infrastructure are still emerging, disruption is increasing the pressure on our communities, cities, regions and nations to become smarter and more innovative with existing resources and assets. Infrastructure investment, intelligent planning and robust policies are critical to economic growth, sustaining competitiveness, and positioning our state on the global stage.

## Case study: Intellibus autonomous bus trial in Perth

Western Australia is trialling a driverless, electric shuttle bus in South Perth. The bus uses GPS to plot a course through the city and sensor technology to avoid obstacles. The vehicle is a Level 4 Autonomous Vehicle (AV) – making it one of the most advanced AVs currently being tested anywhere in the world.

**With 90% of road accidents resulting from human error, autonomous vehicles provide considerable scope for improving road safety.**

In addition to reducing or even eliminating road deaths and injuries, the ability of vehicles to communicate with each other could significantly lower the economic cost of lost productivity resulting from accidents, congestion and traffic jams.

<sup>2</sup> *Inquiry into the role of Smart ICT in the design and planning of infrastructure – Chapter 2: What is Smart Infrastructure?*, Parliament of Australia, 15 March 2016



## Case study: Roames data modelling to mitigate risk

Ergon Energy's use of Fugro Roames (Remote Observation Automated Modelling Economic Simulation) technology is delivering a paradigm shift in the way assets, their surrounding environments and disasters are managed. Roames uses an aircraft-based laser and image capture system which quickly and efficiently maps a network, creating a 3D model that allows fast and accurate inspection and assessment of electricity networks and the surrounding environment.

The solution is helping to scan 1.1 million overhead power poles across 160,000 km of a geographically dispersed electricity network.

This service has contributed to \$40 million saving annually in inspection costs and has improved safety, reliability and customer service.

# State Infrastructure Plan

The State Infrastructure Plan (SIP) provides a framework for planning and prioritising infrastructure investment and delivery in a manner that supports growth, employment and economic development in Queensland.

It aims to encourage private sector involvement to drive innovation and deliver value for money.<sup>3</sup>

By encouraging and enabling ‘better use’ of existing infrastructure, the deployment of smarter infrastructure aligns with the Queensland Government’s infrastructure prioritisation approach, as described in the SIP.

The SIP also outlines the desired outcomes from the government’s infrastructure investment including smart infrastructure.

**By 2031, most state-owned infrastructure is ‘smart’ and able to provide real-time data to operators and customers.<sup>4</sup>**

This discussion on smarter infrastructure aims to support key implementation actions from the SIP, including:

## Implementation action 1

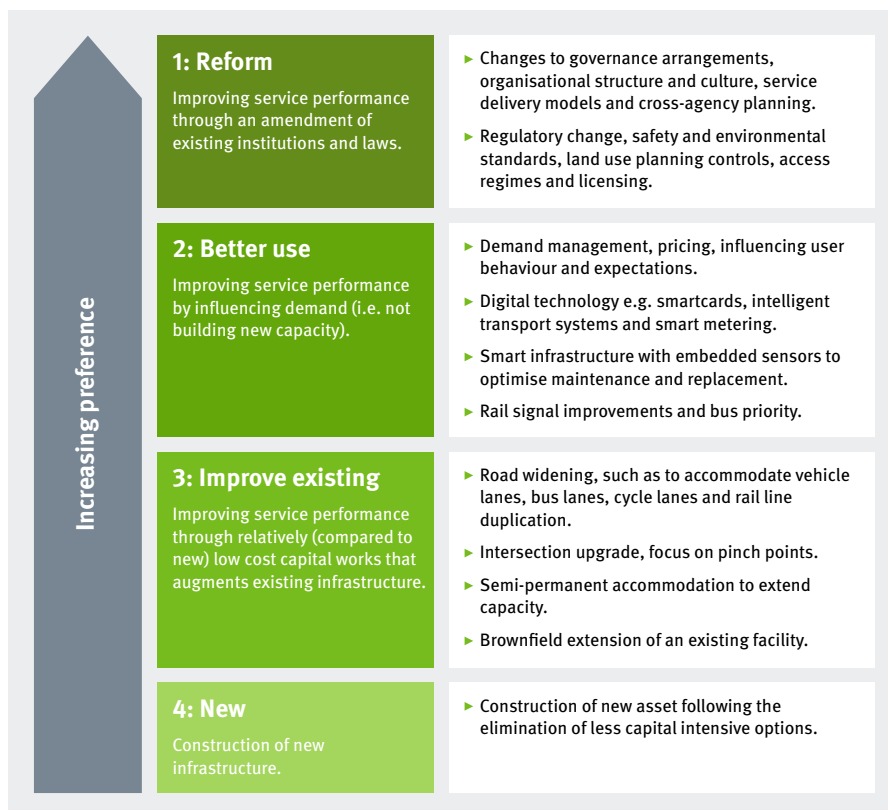
- The development and implementation of strategic infrastructure documents for the asset classes of water, energy, transport, social and digital. The Queensland Digital Infrastructure Plan is particularly relevant as digital connectivity is critical for smart infrastructure.

## Implementation action 12

- The Deputy Premier’s Infrastructure Innovation Challenge, which seeks innovative solutions to the state’s infrastructure challenges from industry leaders.

## Implementation action 14

- Establishing a joint industry-government Infrastructure Innovation Taskforce to, among other things, identify opportunities for using technology and data analytics to better use infrastructure and non-asset based solutions.



Queensland Government infrastructure planning prioritisation and framework

Source: State Infrastructure Plan

<sup>3</sup> State Infrastructure Plan Part A, Department of Infrastructure, Local Government and Planning, 2016



## Advance Queensland

Smarter solutions are a key part of the Queensland Government's agenda for future job creation and infrastructure investment.

The Queensland Government's \$420 million Advance Queensland initiative is designed to transform the Queensland economy through innovation – turning ideas into new products and services, building businesses, strengthening and diversifying the Queensland economy and creating jobs.

**Advance Queensland will help Queensland grow start-ups and build new high value industries that encourage and foster innovative solutions.**

Advance Queensland is a whole-of-government initiative, with investments that focus on five key foundations of innovation.

Advance Queensland programs and initiatives represent an opportunity for government, industry, research, entrepreneurs, not-for-profits and the community to work together to turn Queensland ideas into outcomes.

With the release of SIP and foundations of Advance Queensland the state government, through the combination of these initiatives, is progressing towards the smarter infrastructure future. These cross-sector partnerships spanning the digital, innovation and infrastructure sectors will help to further foster innovation in infrastructure.



**Inspire**

Inspiring Queenslanders to embrace new ways of thinking and working, and back themselves and their ideas.



**Discover**

Helping our young minds, big thinkers and doers deliver new solutions to improve our everyday lives.



**Connect**

Connecting Queenslanders with local and international innovators and investors.



**Invest**

Increasing access to capital and positioning Queensland as a globally attractive investment destination.



**Grow**

Accelerating the growth and competitiveness of our businesses, industries and regions by opening the door to new ideas, opportunities and markets.

### Advance Queensland initiative focus areas

Source: Department of Science, Information Technology and Innovation

# Setting the context for Queensland

# Queensland's unique climatic, demographic, economic and geographic characteristics can present challenges for infrastructure and service delivery

Service delivery is further complicated by a constrained fiscal environment. Globally, governments are struggling to get more from their infrastructure investment with competing demands for scarce resources growing rapidly. These constraints drive the SIP's 'renew before new' approach to Queensland's infrastructure challenges.

The challenge for Queensland is to balance the demand for increased service capacity along supply chains and in urban areas with the need for service availability and coverage in remote areas.

Future infrastructure planning and investment will be influenced by the emerging megatrends affecting the state's economic and demographic landscape.

## Dispersed population

Queensland ranks third amongst Australian states for population density (at 2.8 persons per km<sup>2</sup>) with 93% of the state's landmass having population densities of less than 1.0 person/km<sup>2</sup>.

This presents challenges in ensuring all Queenslanders are adequately served by infrastructure that enables access to communities, critical services and employment opportunities.

## Resilience

Infrastructure must be resilient in the face of extreme weather or security events and chronic stresses. Queensland faces major challenges to improving the resilience of existing assets and incorporating this into the design and planning of new infrastructure.

With increasing risks to infrastructure resulting from climate change, robust planning and responsive policy will be key to ensuring the future resilience of our communities and our infrastructure.

Resilience also encapsulates the ability to respond efficiently and effectively to situations, such as coordinated emergency services responses, requiring resilient digital infrastructure networks.

## Case study: State Disaster Coordination Centre (SDCC)

Queensland's SDCC supports the state's disaster response capability by coordinating the whole-of-government operational capacity during extreme weather events. The SDCC gathers and analyses data from on-site teams as it becomes available, with the aim of identifying key and emerging issues and supporting the planning and prioritisation of state assistance to affected communities.

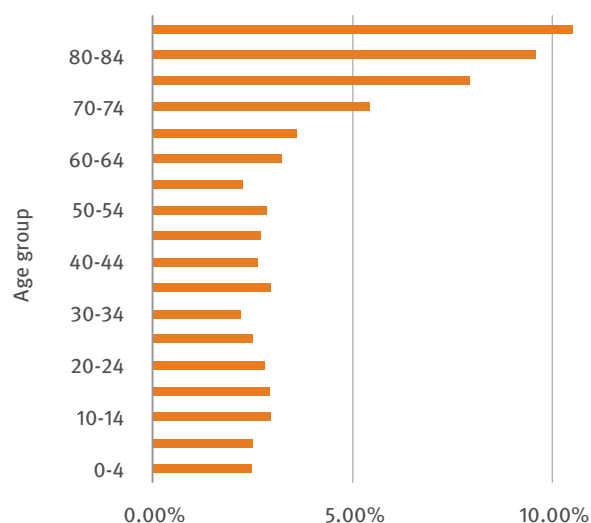
## Population trends

The changes in Queensland's population are affecting the nature and demand of the infrastructure and services needed. South East Queensland is forecast to grow materially faster (2.0% per annum) than the rest of Queensland (1.6% per annum). In response, innovation will be essential to maintaining and improving service delivery in both remote and regional communities and the complex urban environments of coastal cities.

### Investment planning is further complicated by the state's ageing population.

In Queensland, people aged 60–64 are the fastest-growing age group, with the state's six fastest-growing age groups being above 55 years.<sup>4</sup> People 85 and older are set to be the fastest-growing age group through to 2036, placing increased pressure on health services.

Queensland annual growth 2016–36



Age group growth rates

Source: QGSO

## Case study: autonomous hospital trolleys

In an Australian first, Sunshine Coast University Hospital has introduced autonomous trolleys to transport patient meals, linen and waste. This frees up hospital staff to focus more attention on patients and improve workplace health and safety outcomes.



Autonomous hospital trolleys

Source: Sunshine Coast Daily

<sup>4</sup> Queensland Government Statistician's Office, Queensland Regional Database, General demography – age by sex, accessed 14 August 2017.

## Workforce changes

The changing nature of Queensland's economy and the growing capability of automated systems will create a raft of challenges and opportunities for Queensland's workforce.

A number of the key industry sectors driving Queensland's economy are presently labour intensive, and are likely to experience changes in current job structures and responsibilities.<sup>5</sup> More peer-to-peer labour platforms, such as Uber and Airtasker, are likely to emerge.

While innovation may render some jobs obsolete, it will create new, higher value and more knowledge-intensive roles in existing and emerging industries.

To keep pace with anticipated changes, secondary and tertiary institutions are adapting in response to emerging industry needs which will support Queensland's smarter infrastructure future.



Start-up precinct, Fortitude Valley

<sup>5</sup> D. H. Autor, F. Levy, and R. J. Murnane, "The skill content of recent technological change: An empirical exploration," Q. J. Econ., vol. 116, no. 4, pp. 1279–1333, 2003.



# The challenges

# The adoption of smarter infrastructure introduces challenges for industry, government, and the broader community

Initially five key challenges for the implementation and effective use of smart infrastructure have been identified, however further discussion may highlight other challenges.

## Working with existing infrastructure

In striving for fiscal responsibility and infrastructure innovation, the SIP promotes reform, better use of, or improving existing assets, before building new. Queensland has an extensive network of infrastructure which could be used more efficiently. The challenge is that it can be difficult and costly retrofitting new technology, however is often cheaper than traditional upgrades.

Where there is a need for appropriate systems, compatibility and interoperability may raise issues, particularly for older or remotely located assets. In these instances, consideration of when infrastructure replacement becomes more cost-effective than retrofitting existing is required.

Leveraging private sector expertise to explore potential applications of smart technologies, can help to drive innovation and encourage investment.

**How can existing infrastructure be retrofitted in a way that effectively integrates new technology?**

## Case study: European Train Control System (ETCS)<sup>6</sup>

The ETCS facilitates the collection of train speed and location data, and its direct transmission to drivers of trains on the network. This system eliminates the need for trackside signalling, and enables trains to operate with reduced headways, thus increasing network capacity and efficiency.

The rollout of the ETCS across the Brisbane inner-city network is expected to deliver \$265 million in productivity benefits to the Queensland economy.



Source: TMR

<sup>6</sup> ETCS – Inner city project business case, Building Queensland, May 2016.

## Supporting innovative procurement and planning

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How procurement is approached can dramatically affect the ability to deliver a smart and innovative outcome. Procurement must articulate the desired outcomes while not over specifying a solution precluding others.

The data collection and analysis capabilities of smart infrastructure can provide insights into evolving customer behaviours and usage patterns. Operators can then modify or upgrade their delivery models and capabilities in response to these changing demands and emerging trends and can be used to future proof any given asset's economic and social utility.

**How can infrastructure planning and procurement be structured to encourage smarter and more innovative infrastructure solutions?**

## Legislation, regulation and policy framework

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New technologies emerge and develop rapidly, whilst the regulatory or policy reform process can be relatively slower. This can produce outcomes whereby the full and intended application of different solutions may be constrained.

Commentators have described Australian legislation to be reactive, rather than proactive and able to accommodate technological and social change.<sup>7</sup> Policy needs to evolve to ensure proposals advocating non-traditional assets, funding structures and procurement models are assessed and supported.

**How can Queensland ensure its legislation, regulation and policies keep up with, and encourage infrastructure innovation and new technologies?**



Port of Brisbane, Brisbane

Source: *ShapingSEQ* South East Queensland Regional Plan 2017

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<sup>7</sup> Jost: *Pace of reform is too slow*, Stuart Kennedy, *InnovationAus*, 29 March 2017.

## Government and industry roles

Smart technologies need to be considered in the context of increased private sector involvement in innovation and infrastructure delivery. How can government better leverage the private sector's experience in smart infrastructure delivery and drive innovation and value-for-money during all stages of the project lifecycle?

Whilst Public Private Partnerships (PPP) remain a popular model, especially for social and transport infrastructure,<sup>8</sup> other delivery models can be more conducive to participation by start-ups and small-medium enterprises, and have the potential to boost innovation in infrastructure.

As a community, we need to explore what these models look like, how they provide value for money and whether they can be implemented effectively in the Queensland context.

**How can public and private groups better collaborate in delivering infrastructure?**

## Attracting and retaining skills

Expertise in design, engineering and data analytics are essential for delivering and maintaining smart and connected infrastructure. However, in an increasingly mobile world with intense competition for talent, how can we attract the best and brightest?

In a more knowledge-based economy with disruptions in traditional workforces, there is an increased focus on science, technology, engineering and mathematics (STEM) skills in curriculums for example the *Advancing skills for the future: a strategy for vocational education and training in Queensland*. Developing an industry and public service culture that supports new ideas and with a measured risk appetite will also be important. This will all help to encourage both innovative thinking and ensure that Queensland has the skills needed to support a smarter infrastructure future.

**How can Queensland attract and retain the necessary expertise and resources for smarter infrastructure?**

<sup>8</sup> Australian PPP transactions reaching final close, *InfraDeals*, accessed 3 August 2017.

# The opportunities



# Smarter infrastructure presents opportunities to improve the connectivity, liveability and sustainability of Queensland's communities

The ability to capture, analyse and interpret large datasets is creating unprecedented opportunities to understand our asset and resource usage, and make decisions that improve the resource efficiency of existing assets, whilst promoting new industries that will create the knowledge-based jobs of the future.

## Keeping people connected

Supporting safe and connected communities is a core objective for the Queensland Government. Connectivity is critical for social well-being and smart infrastructure will help ensure essential services are accessible to all residents.

Sufficient attention needs to be paid to infrastructure now to ensure that service delivery can be scaled to meet emerging demands at future times. Making communities readily accessible through provision of reliable smarter infrastructure can improve liveability and foster economic development and growth.

**How can we ensure communities and services are connected now, and into the future?**



## Better customer experiences

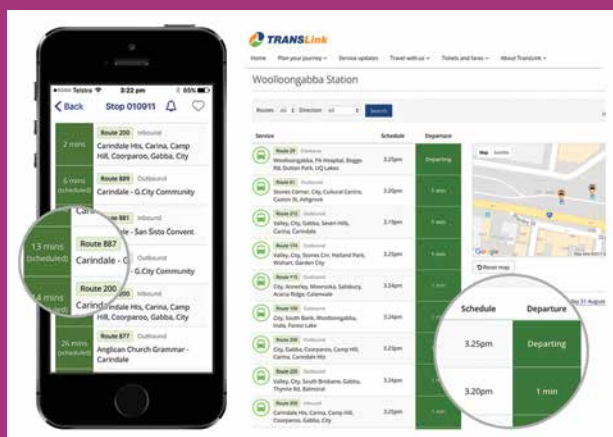
The Queensland Government is committed to delivering high quality front-line services across the state. Data collection and information management strategies will be an essential component of understanding and meeting evolving customer expectations to improve infrastructure and service delivery.

Prudent use of the data collected can add value to infrastructure and services, improving management and delivery, and ultimately the customer experience. This can also occur without necessarily removing the personal nature of critical services like health and education.

### How can customer experiences be improved through smarter infrastructure?

#### Case study: real time public transport information

The buses, trains and ferries that comprise Queensland's public transport fleet each contain GPS tracking devices. These devices feed vehicle location, speed and direction data back to a central database, which predicts the vehicle's estimated time of arrival at a stop.



Source: TransLink

## Better use of existing assets

The SIP priorities have improved asset efficiency, including by applying smart solutions over new asset construction.

Smart technologies can materially improve the resilience of, and reduce the maintenance costs and requirements for large infrastructure assets. Greater data insight allows design redundancies to be reduced, improving asset utilisation and productivity.<sup>9</sup>

By efficiently monitoring and managing the use and condition of assets, sensor technology and data analysis can materially extend the life, and enhance the capabilities of a broad range of assets. For example, a 2015 Telstra study predicted smart technologies could reduce the need for new road construction by 60% over 35 years.<sup>10</sup>

Improved infrastructure efficiency can also reduce maintenance requirements, minimising an asset's down time and therefore maximising its value to the community.

### How can existing infrastructure be used more efficiently?

#### Case study: Amsterdam Scenario Coordination Module (SCM)

Amsterdam's SCM uses traffic flow sensors, traffic light cameras and number plate recognition technology to monitor traffic flow, identify potential traffic jams, and present a range of different traffic scenarios (over 700) based on differencing inputs for factors such as lane allocation, traffic light coordination and ramp metering.

The user interface includes a decision support system to help operators identify the most appropriate solution. The SCM has helped reduce congestion and improved network-wide traffic flow in Amsterdam by up to 10%.

<sup>9</sup> *Evaluation of the Scenario Coordination Module, a Traffic Network Management Control System*, Yubin Wang, Jos Vrancken and Ying Ma, Delft University of Technology, 2012.

<sup>10</sup> How digital infrastructure can substitute for physical infrastructure, Hugh Bradlow, The United States Studies Centre, 2015.

## Protecting the environment

Resource management and efficiency are key tenets of Queensland's environment protection policy. Through the SIP, the state is striving to derive 50% of power demand from renewable sources by 2030.<sup>11</sup> This will impact the role and viability of legacy infrastructure assets.

Natural tourism is a key economic driver. With the Great Barrier Reef alone generating \$6.4 billion annually and supporting 64,000 jobs, a healthy and well-managed environment is essential for Queensland's economic and social wellbeing.<sup>12</sup>

Data collection and analysis through smart infrastructure presents opportunities to monitor resource use and align it with economic and environmental outcomes.

Advances in sensor technology and connected objects is also allowing environmental conditions to be accurately tracked to enable the identification of emerging trends.<sup>13</sup>

The insights derived from these new capabilities can be applied to improve the resilience of both infrastructure assets and the environment they serve.

### How can smart infrastructure help protect the environment and manage natural resources?

#### Case study: Sydney Central Park water recycling plant

Central Park Plus, established as Sydney's Central Park development, will be home to the world's largest Membrane Bioreactor (MBR) recycled water facility.

The MBR will recycle 40%–50% of drinking water used in the development, significantly reducing costs and reliance on mains water supplies.



**Coopers Gap Wind Farm**

Source: State Infrastructure Plan

<sup>11</sup> *State Infrastructure Plan Part B, Department of Infrastructure, Local Government and Planning, 2016.*

<sup>12</sup> *Great Barrier Reef 'too big to fail' at \$56b, Deloitte Access Economics report says, Louisa Rebgetz, ABC News, 26 June 2017.*

<sup>13</sup> *Smart Farming: leveraging the impact of broadband and the digital economy, CSIRO, 2013.*



## Improved decision-making

Extensive data collection and analysis capabilities are enabling more informed decisions than were previously possible. Further opportunities are present when considering open data initiatives, and the ability to combine multiple datasets.

With smart infrastructure and connected objects generating 2.5 billion gigabytes of data each day,<sup>14</sup> effective analysis of big data can drive asset and resource efficiency for a range of applications and assets.

The emergence of Building Information Modelling (BIM) as a design tool applies data sets and modelling techniques to help architects and engineers develop an accurate representation of an asset's lifecycle resource usage, maintenance requirements and stress loads.<sup>15</sup>

The resulting ability to mitigate design redundancies allows maintenance to be performed and resources expended only as necessary which maximises utilisation and significantly improves whole-of-life efficiency. Data driven decision-making can generate greater value from infrastructure by mitigating time lost and resources wasted through inefficient asset use and maintenance.

### How can smarter infrastructure enable more informed decision-making?

## Case study: Building Information Modelling (BIM) for Wulkuraka Depot

In Queensland, the \$190 million New Generation Rollingstock Maintenance Centre at Wulkuraka was the first time that BIM had been used on a project this large by the Department of Transport and Main Roads (TMR).

BIM enabled the early detection and resolution of over 3000 design issues, thereby expediting the delivery timeframe.

## Case study: road congestion analytics and modelling

TMR uses smarter congestion analytics to help determine costs associated with different causes of congestion. This improves decision-making by identifying and prioritising future congestion management initiatives, refining current measures and benchmarking performance.

This also has applications for a future with autonomous vehicles and on demand transportation.



Gateway Motorway, Brisbane

Source: TMR

<sup>14</sup> *How will new technologies transform industry and society?*, Tan Wee Kwang, Enterprise Innovation, 5 February 2017.

<sup>15</sup> *Constructing with the power of digital*, Autodesk, 2016.

## Stimulating innovation

The growing momentum of technological change is fundamentally altering how we live and work. Advancements in connected objects and sensor technologies are creating new opportunities to respond to traditional infrastructure challenges.

The SIP sets out Queensland's infrastructure priorities and a clear vision to foster innovation in planning and delivering infrastructure. Cross-sector partnerships will become increasingly important in delivering the innovation that drives more effective infrastructure solutions.

Initiatives such as Data61 and RiverCityLabs, which partner the research and development expertise of organisations such as the CSIRO with the ideas and visions of entrepreneurs, lay the foundations for Queensland's future infrastructure by supporting the development of emerging technologies and data-driven business models.

**How can we best harness innovation in Queensland's infrastructure sector to support the growth of smart infrastructure?**

### Case study: CSIRO Data61

CSIRO's Data61 is a data science, design and engineering consultancy that assists businesses with research, decision-making, proof of concepts, product and platform development to revolutionise existing industries and create new ones. Data61 deploys its cumulative expertise and experience to drive innovation and build Australia's digital and technological capabilities in a commercially-exploitable manner.

## Improving community safety and security, including cybersecurity

The SIP identifies digitally-connected infrastructure as a cornerstone of public safety. Smart infrastructure has a range of applications that can detect, mitigate and respond to identified risks improving community safety and preparedness.

As the capacity of smart infrastructure evolves to provide insights on everything from an individual's location to their house's flood risk, cybersecurity strategies become essential for risk management to mitigate socially and economically disruptive data breaches.

Meanwhile, tools such as facial recognition are becoming essential for coordinating responses to safety threats, and predicting the occurrence of future threats.<sup>16</sup> Their uptake allows authorities to deliver significantly better public safety outcomes.

**How can smart infrastructure improve personal, corporate and governmental security and safeguard the data generated?**

### Case study: London 2012 Olympics Control Room

The surveillance and response capabilities of the Metropolitan Police Service's command and control systems were significantly upgraded prior to the London 2012 Olympics.

Three command centres monitored more than 30,000 cameras and controlled more than 1300 traffic signals to detect incidents, control traffic and coordinate police responses.

<sup>16</sup> One year. Three Miami neighbourhoods. 8,280 bullets, David Smiley, Miami Herald, 29 July 2016.



# **Smarter Infrastructure for Queensland Summit**

# Have your say

To help position Queensland as a leader in smarter infrastructure, we encourage you to share your experiences and insights in response to this paper.

## Online survey

A short survey is available online and the findings from this will directly influence the Smarter Infrastructure for Queensland Summit's focus and activities.

To participate, please visit [qld.gov.au/smarterinfrastructure](https://qld.gov.au/smarterinfrastructure)

## Written submissions

The Department of Infrastructure, Local Government and Planning welcomes written submissions from individuals and organisations regarding the application of smart infrastructure within a Queensland context.

Submissions may be lodged via [qld.gov.au/smarterinfrastructure](https://qld.gov.au/smarterinfrastructure) by Friday 13 October.

To assist in the preparation of submissions, a summary of the questions posed throughout this paper are listed below. These are intended to serve as a guide only and submissions will be accepted in any format.

## Questions

- How can existing infrastructure be retrofitted in a way that effectively integrates new technology?
- How can infrastructure planning and procurement be structured to encourage smarter and more innovative infrastructure solutions?
- How can Queensland ensure its legislation, regulation and policies keep up with, and encourage infrastructure innovation and new technologies?
- How can public and private groups better collaborate in delivering infrastructure?
- How can Queensland attract and retain the necessary expertise and resources for smarter infrastructure?
- How can we ensure communities and services are connected now, and into the future?
- How can customer experiences be improved through smarter infrastructure?
- How can existing infrastructure be used more efficiently?
- How can smart infrastructure help protect the environment and manage natural resources?
- How can smarter infrastructure enable more informed decision making?
- How can we best harness innovation in Queensland's infrastructure sector to support the growth of smart infrastructure?
- How can smart infrastructure improve personal, corporate and governmental security and safeguard the data generated?

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