Infrastructure Sustainability
Update 2015

ISCA Infrastructure Sustainability Council of Australia

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Contents

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Chairman's foreword

By David Singleton, Chairman of the Board, ISCA

David Singleton

New purpose and values

2015 was a pivotal year for the Infrastructure Sustainability Council of Australia (ISCA). Since the launch of ISCA and the IS rating scheme occurred in 2008, we have achieved many significant milestones: the formation of the Australian Green Infrastructure Council (AGIC); the development of the first Infrastructure Sustainability (IS) rating scheme; and the evolution to ISCA, to name a few. This, along with the success of the IS rating scheme and other ISCA activities was a catalyst for the ISCA Board to review the long-term strategy of ISCA. The revised long-term strategy lays the foundation for ISCA to evolve and grow over the coming years into much more than simply a rating scheme provider.

ISCA's purpose is to 'improve the productivity and livability of industry and communities through sustainability in infrastructure'. With this goal in mind, ISCA has also developed key values that are critical to success: openness, knowledge and value creation. ISCA aims to cultivate strong, diverse, collaborative, open relationships to lead sustainable outcomes. ISCA aims to be the leading authority in sustainability in infrastructure knowledge, and to create value through sustainability in infrastructure.

The ISCA Board believes that these purposes and values will guide ISCA to success over the coming years.

> *"ISCA aims to be the leading authority in sustainability in infrastructure knowledge, and to create value through sustainability in infrastructure"*

ISCA Board composition and activity

The ISCA Board provides essential governance for the organisation, but it is also a valuable team guiding the organisation to triumph. During 2015 the composition of the Board evolved, providing greater experience and gender diversity.

In 2015, Penny Townley and Nick Fleming resigned from their Core Director positions on the Board. We are grateful for their dedication and guidance through the formation of ISCA and the development of the IS rating scheme. To fill these vacancies, we appointed Marko Misko (Clayton Utz) to the Board; Marko is well known throughout the industry, as he speaks and publishes widely on infrastructure-related issues.

Additionally, the Board appointed two new Independent Directors: Leisel Moorhead and Alison Rowe. It is a sign of the maturity and success of our organisation that we are able to attract Board members of their calibre and experience. Both Alison Rowe and Leisel Moorhead are experienced corporate leaders with international experience as well as strong Australian engagement.

As a long-term champion of diversity in leadership, I am particularly pleased that their appointments increase the representation of females on ISCA's board.

New constitution

At the 2015 AGM, ISCA Members unanimously supported the adoption of a new constitution. ISCA's constitution had not been comprehensively reviewed since its adoption in 2008. At the time, ISCA drew upon the constitution of a kindred association. As ISCA matured, the suitability of the constitution to meet the needs of the organisation diverged. The Board proposed the adoption of a new constitution that reflects a form and content that are better aligned to the purposes of ISCA, and that set out matters associated with the governance of the organisation more clearly, and in greater detail.

Key changes include:

- changes to the nomenclature of Directors, and the establishment of three-year terms
- removal of retirement provisions, save that the terms for all Directors' terms expire after three years, when they are eligible for re-election
- better recognition of ISCA's activities in the Objects of the Company
- alignment with charitable requirements
- removal of organisation-type restrictions associated with the composition of the Board.

Reflections and aspirations

As the Chairman of the Board I would like to take this opportunity to thank my fellow Directors for their commitment and dedication to the organisation. And I want to thank the ISCA operations team, which constantly delivers value to our members.

ISCA has cemented its position as an essential stakeholder in Australian infrastructure. The traction achieved by the IS rating scheme will deliver improved productivity and livability of industry and communities. 2016 and beyond will see greater global appreciation of the leadership that ISCA has demonstrated in this industry.

While this publication reflects on the year that was, it is clear that the future is bright for ISCA.

"ISCA has cemented its position as an essential stakeholder in Australian infrastructure. The traction achieved by the IS rating scheme will deliver improved productivity and livability of industry and communities. 2016 and beyond will see greater global appreciation of the leadership that ISCA has demonstrated in this industry"

A message from the CEO

By Antony Sprigg, Chief Executive Officer, ISCA

Antony Sprigg

Collaboration counts

Sustainable development outcomes, whether grassroots or longer-term strategic initiatives, can ultimately only be achieved through collaboration. The role of our council is consequently to be a facilitator and, where possible, a catalyst for collaboration between the respective and numerous industry stakeholder groups associated with the funding, planning, procuring, delivery and operations of our infrastructure in the context of delivering more sustainable outcomes. Traction in IS ratings continues to grow, and we continue to work to ensure that the IS rating scheme is relevant and up to date – a summary of which I have provided further on in this article. However, these industry IS-rating-related successes are, and will continue to be, reliant on a collaborative, competitive, innovative and committed industry. Captured here are a few terrific examples of industry collaboration that have occurred over the last year. In 2013, there was a presentation on the IS scheme and ISCA at a sustainable-cities-related conference, where there was a large Chinese delegation in attendance. The presentation sparked a conversation that resulted in a vision and a memorandum of understanding 12 months later, finally culminating in a development plan and associated collaboration agreement. The aim of this is to establish an organisation similar to ISCA, and a rating scheme similar to IS, in China, for whole-of-China deployment. The agreement will be officially signed during Australia Week in China, and it reflects nation-to-nation collaboration in infrastructure sustainability.

ISCA has been partnering with Dr Sarath Mataraarachchi of the Faculty of Built Environment at the University of New South Wales, where the IS rating scheme and IS rating case studies have been used to inform the Sustainable Infrastructure course. Educating and empowering our country's graduates in applied infrastructure sustainability is crucial in ensuring that the next generation is able to continue the positive work that our industry has started.

Transport for NSW has been updating its Sustainability Design Guidelines, and has included ISCA in this process to ensure that where there is alignment between the IS scheme and the guidelines, they are recognised and associated efficiencies are built in. This is just another chapter in this long-term collaborative relationship between TfNSW and ISCA.

The New South Wales Government Department of Planning and Environment has mandated the assessment of Critical State Significant Infrastructure Projects using the IS rating scheme in the Standard Secretary's Environmental Assessment Requirements (SEARs).

The New South Wales Government Environment Protection Authority (EPA) collaborated with ISCA to develop industry case studies highlighting best practice diesel emission strategies, practices and approaches. The first case study was presented at the ISCA conference on 22 October 2015, with all case studies published on the ISCA and EPA websites.

Engaging with and collaborating across a wide range of New Zealand infrastructure stakeholders, particularly

> *Sustainable development outcomes, whether grassroots or longer-term strategic initiatives, can ultimately only be achieved through collaboration*

with respect a to a number of central government ministries, went from strength to strength last year. We also had our first New Zealand Founding Members join ISCA in 2015, which marks a significant step towards ISCA's remit to formally transition to an Australia and New Zealand peak body. These early movers are showing significant leadership and commitment to the New Zealand infrastructure industry.

The first Founding Members are:

- Auckland Airport
- AECOM
- BECA
- Panuku Auckland
- Tonkin + Taylor.

The contribution from Founding Members is going towards establishing communities of practice in New Zealand and, importantly, towards establishing an ISCA person on the ground to support IS ratings, training, and industry collaboration initiatives. We look forward to more Founding Members joining so we are able resource sufficiently to meet industry needs.

Institutional investors have been directly and indirectly involved with the establishment and support of ISCA and the IS rating scheme from its inception. Through two parallel collaboration initiatives, we are now taking steps to better understand institutional investor trends and needs in the context of infrastructure sustainability and investment risk – efficiency and revenue, as well as ESG reporting. The initiatives comprised:

- an investor workshop with superannuation/pension fund and fund manager representatives (hosted by Colonial First State) to discuss the trends, and the needs and the role of ISCA and IS
- the planned Australian launch of the GRESB infrastructure survey.

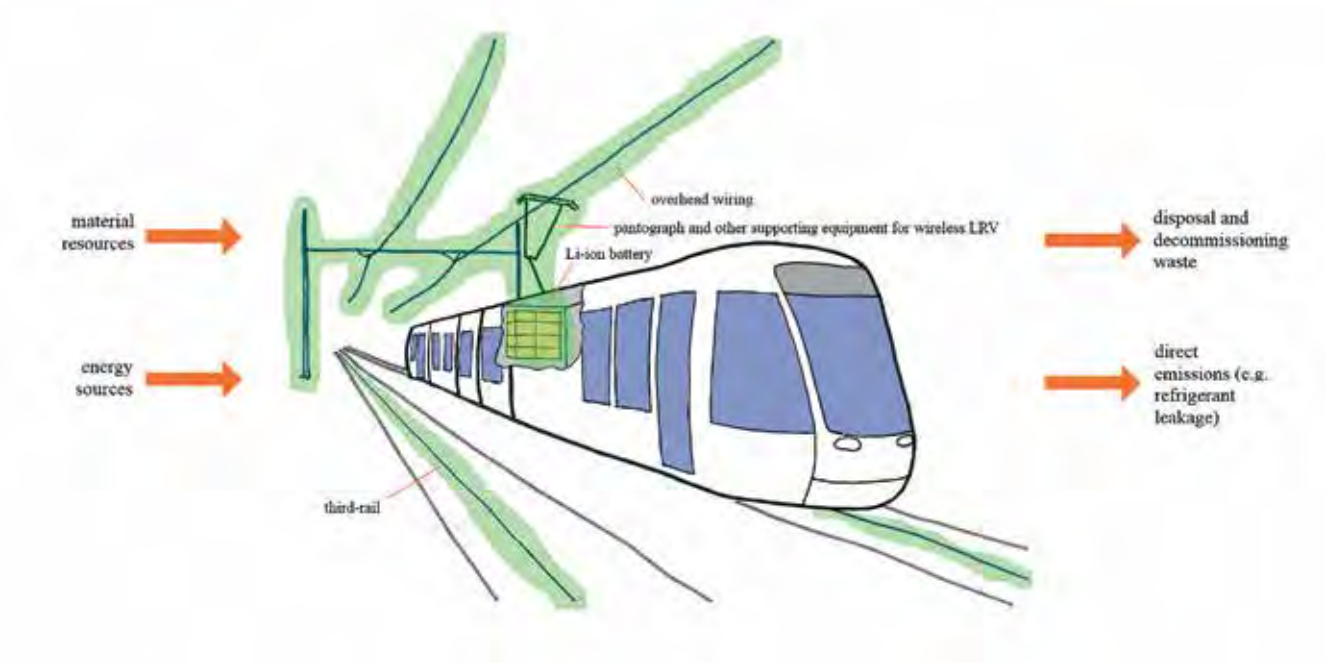
We have a number of active and engaged industry partners that we recognise and collaborate with regularly. This year, we welcome our newest industry partner, the Australian Institute for Landscape Architects. I would also like to mention the significant ongoing and hugely valued technical and knowledge-sharing collaboration between ISCA and the Green Building Council of Australia, and also with the Asset Management Council of Australia.

The team

I would also like to take this opportunity to thank our wonderful operations team for the dedication, initiative, intelligence and passion that they bring to membership, finance, industry engagement and collaboration, training and knowledge-sharing, IS ratings and tool development. During 2015, Kirsty Bauer and Nicole Boyd joined our team, and Shane Xia joined us during Eva Wang's maternity leave.

The value of whole-of-life thinking

Rob Turk and Duncan Blackburn, Arup



One of the key tenets that underpins the Infrastructure Sustainability (IS) rating scheme is that decisions are based on an understanding of whole-of-life costs and impacts, and that this understanding is built up through consideration of a broad range of project inputs.

When looking at projects in this light, the most material items in terms of energy use and carbon emissions quickly become apparent. Previous transport projects, including both road and rail projects, demonstrate the significance of the operational phase as the major life cycle source of emissions. Specifically, those are the emissions from the actual cars and trucks using the road, or locomotives using the rail infrastructure – or, for electrified rail, the electricity associated with traction – over the lifetime of the assets. IS rewards the determination of these scope 3 emissions – or, in the case of electricity, scope 2 – and the design initiatives, to reduce the whole-of-life emissions.

The ability to influence the energy consumption of vehicles using the asset is most influential early in the design process. Traditionally, designers are keenly aware of the technical, safety and functional requirements of a piece of infrastructure; however, knowledge of how the asset will ultimately influence the energy consumption of vehicles using a particular asset is becoming increasingly important. This process starts early in the design phase, and requires close integration across traditional design streams and sustainability and/or energy professionals.

Honing in on the operational phase, it is also important to consider the energy consumption of the vehicles across a whole-of-life perspective. Recent trends show that increasing adoption of battery technology, whether in trams or in electric or hybrid vehicles, is expected to continue over coming decades. The benefits of the increased electrification of transport appear intuitively apparent, but, in alignment with the philosophy of the IS rating scheme, they must be assessed from a life cycle perspective to ascertain the true impact (whether beneficial or otherwise). For example, there may be increased production impacts associated with battery production, compared with a traditional combustion engine; however, over the lifetime of operation, these impacts are typically offset during the operation of the vehicles.

In relation to the operational emissions benefit, it is very much dependent on, and influenced by, the carbon intensity of the electricity grid from where the electricity is drawn. For example, electric vehicles operating in Tasmania (with a low-carbon intensity, hydroelectricity-based electricity grid) show a clear reduction in emissions compared to conventional vehicles, while electric vehicles charging from the brown coal–dominated Victorian electricity grid will not demonstrate as great a benefit. These examples highlight the importance of whole-of-life thinking, which is imperative to providing a basis for informed decision-making and achieving a net environmental benefit.

Gold Coast light rail Stage one, Qld © Arup

More and more transport projects are being registered for an IS rating in Australia and New Zealand.

Arup is proud to be working closely with ISCA to ensure the delivery of sustainable infrastructure projects.

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ARUP

Sustainability in Infrastructure Awards

By Hayley Jarick, Membership and Marketing Manager, ISCA

ISCA was proud to present the second annual Sustainability in Infrastructure Awards on 21 October 2015 in Sydney. The Awards recognise projects, organisations and individuals who demonstrate leadership in advancing infrastructure sustainability; and they are an important element in the pursuit of ISCA's mission to improve the productivity and livability of industry and communities through sustainability in infrastructure, as they celebrate the success of the dedicated sustainability professionals in the infrastructure industry. The 2015 Awards were sponsored by Lendlease and WSP|Parsons Brinckerhoff.

The IS Project or Asset Award recognises the certified IS project or asset that has demonstrated the highest overall excellence and sustainability achievements. The winner of the 2015 IS Project or Asset Award was Sydney Metro Northwest Tunnels and Station Civil Works project. The judging

> *The Sustainability in Infrastructure Awards are an important element in the pursuit of ISCA's mission to improve the productivity and livability of industry and communities*

2015 IS Project or Asset Award winner Sydney Metro Northwest Tunnels and Station Civil Works project

2015 Organisational Leadership in Infrastructure Sustainability Award winner Aurecon Australasia

> *The Awards recognise projects, organisations and individuals who demonstrate leadership in advancing infrastructure sustainability*

2015 Individual Leadership in Infrastructure Sustainability Award winner Scott Losee

panel was impressed by how this large and complex project embedded sustainability at each stage.

The Organisational Leadership in Infrastructure Sustainability Award recognises the organisation that exhibits the most outstanding performance and leadership, and the greatest contribution to advancing infrastructure sustainability. The winner of the 2015 Organisational Leadership in Infrastructure Sustainability Award was Aurecon Australasia. In selecting Aurecon, the judging panel highlighted the organisation's scale, leadership and market influence, as well as its excellent ability to embed sustainability principles and frameworks in a large organisation.

The judging panel also gave a Highly Commended award to Icon Water for its commitment to community engagement – not simply engaging internally. Icon Water has rolled out its sustainability framework to ensure that economic, social, environmental and cultural elements of sustainability are integrated across the business and infrastructure projects.

The Individual Leadership in Infrastructure Sustainability Award recognises the individual who exhibits the most outstanding performance and leadership, and the greatest contribution to advancing infrastructure sustainability. The winner of the 2015 Individual Leadership in Infrastructure Sustainability Award was Scott Losee. The judging panel was impressed with Losee's leadership and contribution to ISCA as a start-up organisation, his passion as an early adopter, and his energetic longevity.

The judging panel also gave a Highly Commended award to Hollie Mapson from Laing O'Rourke, recognising her drive, commitment and success in influencing through communication and process. Mapson's enthusiasm and commitment has inspired many individuals, and her passion and drive for infrastructure sustainability has enabled her to challenge and lead change in the construction industry. Mapson leads Laing O'Rourke's Sustainability Function in the Australasian region, and is focused on developing and embedding the corporate sustainability strategy and framework to drive better infrastructure sustainability outcomes on all projects.

The 2015 Sustainability in Infrastructure Awards judging panel comprised:

- Tom Grosskopf, Director, Metropolitan Branch, NSW Office of Environment and Heritage
- Jessica Hall, General Manager, Infrastructure Policy, Australian Government Department of Infrastructure and Regional Development
- Jonathan Kennedy, Executive Director – Policy & Strategy, Infrastructure Partnerships Australia
- Megan Motto, CEO, Consult Australia.

Engineering the future

At Laing O'Rourke, we set ourselves a challenge: to ensure that sustainability becomes fundamental to the way we go to work for our clients, and to embed a sustainability culture across the business and through our supply chain.

By identifying sustainability as a core value, and establishing a global sustainability function, we have changed the way that we think about project delivery at every level – from procurement processes and waste material management, to community engagement and innovation.

Laing O'Rourke is committed to the continual pursuit of innovation to secure Australia's sustainable infrastructure future.

Solar solution

Laing O'Rourke is tackling the challenge of maintaining a sustainable power source on remote construction sites with the development of the world's first large-scale, portable and modular solar-diesel hybrid plant.

For years, our industry has grappled with the challenges associated with powering off-grid operations in remote locations. Working with the Australian Renewable Energy Agency (ARENA), our engineers brought the SunSHIFT idea to reality, providing a versatile, competitive alternative to traditional diesel-powered generators.

The plant can be delivered, unpacked and fully functional in just one week, and offers an energy alternative for off-grid communities, business operations and construction activities. When the user no longer requires the plant, it can be simply packed up and redeployed, or scaled up or down by adding or removing power modules as required.

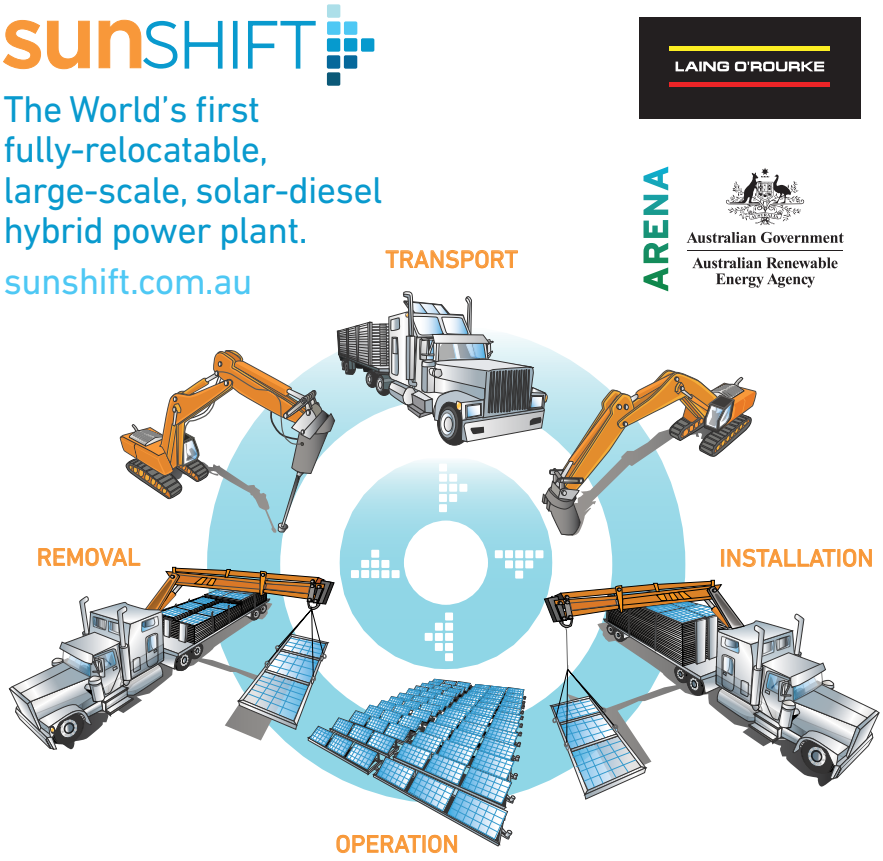
By bringing together our research and development, engineering, fabrication, delivery and plant hire business units, and the strong support from ARENA, we've ultimately produced an innovative solution that will potentially change the renewable energy landscape in regional and remote Australia.

We also believe that this innovation could have particular benefits for events that require rapid deployment of power units – such as disaster recovery. On a similar front, our recent corporate sponsorship of RedR Australia will enable us to apply our engineering thinking and program management expertise, as well as volunteering energies, to help benefit communities at home or abroad that have been impacted by disasters.

Innovation is a key component in driving sustainability at Laing O'Rourke, and our position in the top ten on *BRW*'s 50 Most Innovative Companies index two years in a row confirms our longstanding commitment in this area. The SunSHIFT solution also received further industry recognition at the 2015 New South Wales Government's Green Globe Awards, winning the environmental innovation category.

Laing O'Rourke is proud to be a member of the Infrastructure Sustainability Council of Australia. We are currently seeking an IS rating on a major New South Wales rail project as part of our commitment to pursue all elements of organisational and project sustainability in our industry.

By Hollie Mapson, Laing O'Rourke Sustainability Leader



SunSHIFT: the world's first large-scale, fully redeployable, solar-diesel hybrid power system

Public and social infrastructure expertise

Community and social enterprise support

Water treatment and processing plants

GREEN GLOBE Winner 2015

Award winning environmental innovation

Laing O'Rourke is committed to the continual pursuit of innovation to secure Australia's sustainable infrastructure future.

As Australia's largest privately owned construction and engineering organisation, Laing O'Rourke has delivered some of the largest and most technically complex projects in building construction, railway services, natural resources, materials handling, marine and civil infrastructure.

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Making sustainable outcomes standard practice

By Dr Caitlin Richards, Approvals, Environment and Sustainability Manager, CPB John Holland Dragados

Figure 1 – Tunnel boring machine Isabelle breaks through at Epping, completing her tunnelling job

I have worked on major transport infrastructure projects for two decades, and I've seen fundamental changes in the way that they are managed. Initial views that add-on pollution control techniques can protect the environment have given way to the design and construction of comprehensive environmental solutions. These aim to greatly improve the impacts of core construction and operational processes. While the notion of sustainability has created an accepted dialogue on environmental issues, the question of how to effectively manage our environments has never had more answers. The Infrastructure Sustainability (IS) rating scheme provides a framework for critical and considered decision-making to ensure that infrastructure projects are more sustainable, and it helps the industry in stepping up to this challenge.

The $1.15 billion Tunnels and Station Civil Works (TSC) design and construction contract for the Sydney Metro Northwest was awarded in June 2013 to CPB John Holland Dragados (CPBJHD) (formerly Thiess John Holland Dragados). The TSC works included 15-kilometre twin tunnels, civil works for five new stations and two services facilities, and a precast factory to make 100,000 concrete tunnel-lining segments. The Transport for NSW (TfNSW) project deed required CPBJHD to register with ISCA and achieve 'Excellent' IS 'Design' and IS 'As Built' ratings, with a score of at least 65. When the deed was signed, the parent companies were already involved with ISCA (Thiess was a founding member, John Holland Group's Director and Executive General Manager People & Policy Russell Cuttler and CPB Contractor's Group Environment and Sustainability Manager Craig Tucker are current members of the ISCA Board), but the highest rating achieved was at a 'Commended' level. The requirement for an 'Excellent' rating was therefore groundbreaking.

To understand exactly what the client wanted, we asked TfNSW a lot of questions about sustainability via information requests during the tender period. We quickly concluded that for TfNSW, meeting the program timetable and providing high quality and value for money to New South Wales taxpayers were of equal importance to delivering their groundbreaking sustainability vision. We pondered how to align these potentially conflicting objectives in a hard-dollar design and construction tender process, and decided to set out and cost our IS delivery strategy before signing the contract.

The IS rating scheme had only been applied to a handful of projects, so we sought advice on what we could do to achieve key IS credits. Fin Robertson, Director of Sustainable Asset Strategies

and an IS verifier, was engaged to set out an IS strategy for the project. The biggest challenge was attempting to align the many sustainability requirements set out in our contract, including performance targets, while ensuring a focus on outcomes. Our approach to sustainability leadership, IS process innovation, building capability and our diesel emission case study, which was developed in partnership with ISCA and the NSW Environment Protection Authority, are set out below.

Ahead of the Game

While constructing a high-quality, value-for-money asset, we have worked collaboratively to find sustainability initiatives that reduce environmental impacts on communities; ensure that sites are safe for workers and the community; and maximise social benefits. The leadership team, led by Project Director Terry Sleiman, had a clear vision, and communicated the underlying values and behaviours expected of everyone who works on the project.

Figure 2 – The values that guided employee behaviours and shaped an aligned culture on the project

Our Ahead of the Game vision is based on our extensive experience undertaking similar projects in Sydney. We have proven the critical importance of developing an aligned culture that drives the desired behaviours and outcomes. Our vision and its guiding values of One Team, Integrity and Accountability focus effort towards proactively identifying sustainability opportunities well ahead of construction. It is a multidisciplinary and collaborative approach. The values and 'non-negotiables', which are safety and environmental rules, clarify expected behaviours. They are displayed at each worksite, and are clearly explained to staff and workforce in inductions, toolbox meetings and training programs. By living our values, CPBJHD is building a positive legacy of responsive community engagement and sensible controls.

Our sites were designed and set up with state-of-the-art environmental management controls, while also blending into the environment to minimise visual impacts. By embedding sustainability within our leadership vision, we ensured that sustainability is front of mind in everything we do. Individuals and teams who developed sustainable innovations on the project have been recognised and rewarded, alongside more traditional safety, quality and production initiatives.

IS process innovation

Our Ahead of the Game vision was also applied to the IS rating scheme. On reviewing the IS rating scheme, we realised that the verification process could benefit from face-to-face interaction to facilitate a greater understanding of the unique project scope, to clarify IS requirements more effectively, and to reduce ISCA's workload without compromising outcomes. CPBJHD wrote to ISCA suggesting that its assessment of the TSC works would be an excellent opportunity to trial the benefits of face-to-face meetings during the IS verification process. ISCA agreed, and rolled out a trial including the TSC works as one trial rating. We found the meeting useful, as it helped us to understand the key drivers behind questions that IS verifiers raised when reviewing our IS Design submission. ISCA is currently conducting a holistic review of the verification process, and will consider the outcomes of this, as well as other face-to-face meeting trials, as part of the final determination.

We also realised that some assessment methodologies within credits did not align with the nature and scale of a

Figure 3 – An aerial view of the Cherrybrook site, which was situated in a suburban area

major tunnelling project. We invested considerable time and resources to prepare Credit Interpretation Requests to better apply the unique elements of the TSC works within the IS rating scheme. This also ensured that the realities of major infrastructure design and construction – tunnel projects in particular – were better reflected:

- Lan-3 Ruling Ref: Lan-3.02 – clarifies the requirements for contamination assessment and management, and independent review
- Dis-1 Ruling Ref: Dis-1.03 – better aligns water management requirements with other stringent requirements, including New South Wales Environment Protection Authority (NSW EPA) Licence and relevant guidelines
- Dis-2 Ruling Ref: Dis-2.02 – allows for adaptive management of construction noise as reflected in NSW EPA Licence requirements and relevant guidelines
- Dis-3 Ruling Ref: Dis-3.02 – applies to tunnels only, and recognises that absolute compliance with human comfort levels is not realistic for short-term construction impacts in urban areas.

These Dis rulings allow best practice construction management using existing management documents to be scored under the IS rating scheme, separate from operational requirements, without the need to produce additional documents solely for IS assessment. Overall, we aim to lead the industry in moving beyond compliance to achieve efficiencies and innovations, and to make sustainable practice our standard practice.

Building capability

CPBJHD has committed to building capability while delivering the TSC works, with an unprecedented level of training and reinforcement for both staff and workforce. We had an unusually long time to plan and invigorate the workforce through a comprehensive onboarding process. This was possible due to the 13-month period between contract award and arrival of the first tunnel boring machine (TBM) to Australia in July 2014.

The TSC works are different from other construction contracts in Australia, as CPBJHD directly engages the specialist workforce to operate TBMs and road headers, rather than subcontractors. While up to 90 per cent of workers are subcontracted on some major infrastructure construction projects, CPBJHD employed more than 550 tunnel workers. This was at a time when employment opportunities in Australia's mining industry were reducing, and the New South Wales Government was planning more tunnel projects in Sydney. We saw a unique opportunity to address both current and future skills shortages while delivering the project.

Construction companies usually set up an induction process involving a few hours of PowerPoint presentations on safety, quality and environmental management systems. CPBJHD realised that to be 'Ahead of the Game', we had to provide a step change in onboarding training. Five key training and reinforcement programs, specific to the TSC works, were therefore developed and rolled out:

- Game Plan training – a week-long program for all staff, covering the project's key document management and financial systems, and briefings on safety, environmental and community plans
- Underground Induction Certificate with five competency units developed jointly with New England TAFE
- 'See the Difference' behavioural safety training for all construction employees and managers
- Indigenous Pre-employment Program
- CPBJHD TV – a low-budget, weekly television program shown at worksites to promote project values, such as safety and quality, and to celebrate achievements and milestones.

CPBJHD recognised the importance of practical training, and set up a $1.2 million Tunnel Simulation and Training Centre. The Centre includes a mock tunnel complete with infrastructure and services, and a computer room with state-of-the-art, 3D virtual reality technology using Oculus Rift equipment, which gives students the feeling that they are underground on a TBM.

CPBJHD's team has an unprecedented 14 IS Accredited Professionals (ISAPs), including the Design Manager,

> *"Sustainability cannot be reduced to a specialist discipline that can be outsourced to consultants"*

Figure 4 – The Castle Hill team after completing excavation of the rail crossover cavern

Commercial Manager, Construction Manager and Training Manager. Our capability building has helped us to continually improve our performance outcomes. We have also trained all subcontractors and emergency service personnel, which is fundamental to this success, and which gives something back to the industry. The extent of our training is helping to transform the construction industry so that it is moving towards more sustainable project delivery. It has already helped many newcomers to join the construction industry.

Diesel emission case study

ISCA is partnering with the NSW EPA to better understand and share ways that the construction industry can improve air quality by reducing diesel particulate matter emissions from non-road diesel equipment. The air-quality monitoring and adaptive management program that CPBJHD developed is an important initiative to minimise workers' and community exposure to harmful gases and particles. During design, we set the target for in-tunnel airflow of 0.75 metres per second in the tunnels – well beyond the minimum 0.5 metres per second in an underground environment – to reduce airborne contaminants such as diesel emissions.

Diesel-powered heavy plant and equipment was substituted with electric plant, where possible, during procurement. If diesel power was necessary, we ensured that plant was either new, or fitted with new engines to conform to European Stage IIIB emission standards (the highest standard at the time of design in 2013). During construction, administrative controls were implemented, including:

- comprehensive awareness and behavioural safety leadership training
- the use of low-sulphur biodiesel (B5)
- restrictions on the number of plant items working in areas at one time
- idling reduction programs: on-site idling reduction policy, and off-site heavy-haulage vehicle no-idling policy, implemented through a heavy-vehicle driver code of conduct.

Regular and ongoing exposure monitoring of the air quality both on the surface and in the tunnel was undertaken by collecting diesel particulate matter and gaseous samples to assess the effectiveness of controls, and to encourage continual improvement. It is hoped that the tools in CPBJHD's case study will help the construction industry to minimise off-road diesel emissions.

Conclusions

Sustainability cannot be reduced to a specialist discipline that can be outsourced to consultants. While they can add considerable value to specific technical areas, our journey to more sustainable infrastructure must be led by our project directors and senior leadership teams. Sustainability is not something that can be siloed – it must be a key consideration early on in project planning and throughout delivery, and across all functional disciplines. Clients cannot expect to specify a rating target and then sit back and leave it to the managing contractor to deliver. Just as TfNSW did, they must complete their own due diligence around what is achievable, and they need to decide which areas they would like to target and focus on themselves. Unless there is collaboration with all stakeholders, and alignment between technical specifications, program and sustainability requirements, we sell ourselves short, and our potential to achieve sustainable outcomes will be limited.

Award-winning sustainability

CPB John Holland Dragados achieved a 'Leading' IS Design rating, with a score of 83, on the TSC works – the highest rating issued to date. It also won the 2015 IS Project or Asset Award, which recognises the certified IS project or asset that has shown the highest overall excellence and sustainability achievements. In 2015, CPB (formerly Leighton Contractors) became the CIMIC Group's construction company, integrating the people, expertise and projects of Thiess.

About the author

Dr Caitlin Richards specialises in providing strategic advice throughout the major infrastructure project life cycle. She draws on three diverse experiences: working for a regulator, proponents and in the construction industry. Caitlin is passionate about finding the best solutions to provide value for money, cut through red tape and maximise environmental and community benefits. Caitlin holds a Bachelor of Town Planning (Hons. 1), Master of Business Administration and a Doctorate of Philosophy in Infrastructure Planning.

Swinburne University of Technology
Centre for Sustainable Infrastructure

The Centre for Sustainable Infrastructure focuses on sustainable research solutions for the improvement of civil infrastructure performance. The Centre is an established preeminent structural engineering group in the nation and is developing a very strong reputation in geotechnical, water and construction management. The transport group has also emerged as a national leader in electric vehicles and railways research. This research capability is supported by well equipped testing facilities including the Smart Structures Laboratory, the Geotechnical laboratory and a Water Laboratory. Over 1000 undergraduate and postgraduate students from civil engineering, mechanical engineering and construction management make use of these laboratories for hands on practicals and laboratory demonstrations.

Collaborate with us

If you would like to visit Swinburne's infrastructure facilities or learn more about how to collaborate with us on the following projects, please contact us:

www.swin.edu.au/csi

Smart Structures Laboratory
The Smart Structures Laboratory provides state-of-the-art technology for large-scale testing of civil, mechanical, aerospace and mining engineering components and systems. The laboratory includes a three-dimensional reaction system and the most advanced loading equipment for large-scale studies of structural behaviour under a wide range of loading conditions and hazards. A comprehensive range of hydraulic actuators, pumps, fire furnaces and environmental chambers as well as a variety of data acquisition systems allows for the application of static, dynamic, cyclic/corrosion fatigue and high-temperature tests of structural systems, components, connections and materials.

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Industry partner:
Groundline Engineering Pty Ltd

The structural testing and assessment of full scale poles and pole cap assemblies which have been removed from service to determine their residual capacities.

Industry partner: Powercor

Timber cross arms with different types and levels of defects have been tested and analysed to assist asset managers in optimising replacement strategies.

Industry partner: AusNet Services

SUSTAINABLE PAVEMENTS AND FOOTPATHS

The development of methods to utilise waste in civil and geotechnical engineering applications. This waste includes demolition glass and bricks, biosolids and dredged spoils. Several footpaths and pavements have been constructed in Australia based on this research.

Industry partner: Sustainability Victoria

LOW CARBON CONCRETE

The development of a design handbook for Geopolymer concrete. This concrete utilises industrial by-products such as fly ash and slag to create concrete which is a sustainable alternative to the conventional concrete as the conventional cement is responsible for carbon emissions second only to fossil fuels.

Industry partner: CRC for Low Carbon Living.

Other research projects under investigation include:

Repair and Rehabilitation of Structures for Extreme Loads: Structural damage mitigation, repair, and rehabilitation for conditions related to natural and other disasters such as fire, blasts, impacts, ocean waves and windstorms.

Fatigue and Fracture Testing of Structural Systems: Testing and modelling of the cyclic behavior, low- and high-cycle fatigue, crack growth and fracture of metals and composites.

Life-Cycle Performance and Durability Assessment of Structural Systems: Sensing, non-destructive testing, and health monitoring of structures to study degradation mechanisms, life prediction and durability enhancement of structural materials and components.

High-Temperature and Humidity Testing: Extreme temperature testing, cyclic temperature testing and moisture resistance testing to study the temperature-dependent physical properties of materials, including viscosity, thermal conductivity, surface tension, thermal stability, strength, and corrosiveness.

SWINBURNE UNIVERSITY OF TECHNOLOGY

Personal resilience in sustainability change leadership

By Scott Losee, Director, Scott Losee Consulting

While overseeing sustainability on the master plan for a transit-oriented development, I reviewed the site drainage design with an engineer. I asked how his design differed from what he'd usually do. While I appreciated his direct response – that it didn't – it provoked my glib reply that his design was, therefore, almost by definition not sustainable.

Change and sustainability go together like ramma lamma lamma ka dinga da dinga dong. I like to quip that to practice sustainability, one must ruffle feathers, step on toes and get in people's faces. If you are leading sustainability on a large infrastructure project, you are upsetting the status quo.

Rather than beginning by ruffling feathers, it is more advisable to draw from the extensive body of knowledge about managing change, such as Kotter's eight steps. The essential thing is to realise that you are managing change, not surreptitiously nudging a project onto a more sustainable trajectory.

Being the change-leader has its pitfalls. The resistance you encounter in promoting sustainable changes can include scepticism and conflicts of values. Climate change is an obvious example – you can get bogged in a quagmire of denial that oozes from politics, not science. Value conflicts, like the underwater bulk of an iceberg, are hidden, but hazardous. I remember a road engineer who accepted the *Book of Genesis*'s guidance that it was man's duty to subdue nature.

To these challenges, you could add bureaucratic inertia, bean-counting, office politics, and silos. On top of this, we have endemic employment turmoil due to the nature of project engagements, and the very definition of projects: that they come to an end.

While licking your wounds from these worries, you can reflect on your deep-seated personal concern that no matter what society does now, it may be too late to avoid stuffing the earth completely. Personal resilience is the sort of thing that would be useful at this point.

I am reluctant to comment on personal resilience; it just seems so… personal. To be credible, I feel that I have to be resilient myself. The outward evidence is that I haven't lost it yet, but a quick check of the *beyondblue* K10 checklist put me at moderate risk of anxiety and depression. We ISCA people love a checklist!

What pop-psychology idea could I call up as a model for personal resilience? One that comes to mind is the notion of body, mind and spirit. These dimensions could even mirror my favourite sustainability Venn diagram of environment, society and economy.

Attending to these three dimensions, I cycle to work, walk Holly the cocker spaniel, and do strength exercises and yoga. I enjoy eating a variety of healthy foods, take my fish oil, and don't drink too much – except coffee. For 13 years, I gave up coffee annually for Lent. I recently learned that this was a time that my co-workers dreaded.

For my mind, I take some of my time off for more creative things like playing music, but as I age, I know I need to do more for my brain.

Scott Losee

Spiritually, I admit that I am not religious. Sharing my life with Kerrie and seeing my daughters Emma and Caitlin experience theirs feeds my soul.

But all sustainability leaders do have a precious opportunity to invest their working efforts towards realising a future vision of a healthier relationship between people and the environment.

I've described some of the things that I fill my body, mind and soul circles with on my personal Venn diagram. What can you put in yours?

There is an outside chance that, as an ISCA verifier, I contribute to some of the frustration that sustainability change-leaders experience. I hope they know that I salute their courage, honour their efforts and wish them good mental health.

Steel as a sustainable material for infrastructure projects

A key means of using steel to improve sustainability in infrastructure projects is by reducing the impact of materials. This can be achieved by:

1. reducing the total steel quantity
2. re-using existing structural elements
3. recycling steel materials at the end of life.

1. Reducing the total steel quantity

Higher-strength grades can facilitate the use of lighter structural sections in place of heavier sections, reducing the tonnage of material required and thereby reducing the use of raw materials.

Non-standard products can contribute to improved sustainability through minimising wastage. Customers can select the specific thickness, width and length combination according to their project requirements, reducing the amount of waste at the end of the fabrication process. Wind towers are an example of where non-standard dimensional products have assisted in minimising waste and considerable cost savings.

2. Re-using existing structural elements

Steel can readily be welded or bolted, adding new elements to existing structural members in a functional, aesthetically pleasing and efficient manner.

The benefits of incorporating existing structures into projects include:

- material saving
- energy saving
- reducing recycling costs of the material removed from site.

Wind towers in Codrington, Victoria

3. Recycling steel materials

At the end of a structure's life, a key sustainability consideration is the amount of material that can be recovered and recycled. The overall recovery rate for steel in buildings at the end of their life in Australia is estimated to be greater than 90 per cent. Steel is 100 per cent recyclable.

Putting sustainability on the priority list

By Ashley Stevenson, Professional Engineer, Aurecon

While we are moving closer to a time when sustainability is considered a priority on a project, there is still work to be done before it becomes an integral consideration in project planning and delivery.

One of the biggest shifts in infrastructure in recent times is the growing adoption of sustainability principles into projects. We only have to look at the role of the Infrastructure Sustainability Council of Australia (ISCA) and its Infrastructure Sustainability (IS) ratings to see that sustainability is becoming a major priority for our sector – and for our clients.

Yet, balancing the pillars of sustainability – namely, environmental, economic, social and cultural influences – is no easy task. Although there is an increasing need and demand for sustainable design and construction practices, it can be difficult to quantify what is truly 'sustainable'. And identifying the contribution that sustainability principles can make to an infrastructure project becomes especially difficult when sustainability only starts to be considered once a project is well underway.

Much like value engineering, the ability to incorporate sustainability principles decreases, or sustainability becomes economically prohibitive, the further along the project life cycle it is introduced. By making sustainability a priority up-front, as well as consistently and continuously during a project, we can encourage clients to consider factors such as location, environmental footprint, and how the infrastructure integrates and interacts with its surrounds. This can lead to sustainable design that makes a positive contribution to the local community, environment and economy. Incorporating sustainability early gives clients greater flexibility later; seeking ISCA IS ratings becomes possible at any stage.

Taking a multidisciplinary approach

Sustainability is a complex interplay of different elements and systems that calls for non-traditional approaches and innovative solutions. What makes sense, therefore, from both sustainability and financial viewpoints, is to take a multidisciplinary approach that incorporates sustainability principles, promotes sustainability leadership, and fosters innovation from the beginning of a project. This approach has been adopted with much success on the Torrens Road to River Torrens Project (T2T) in Adelaide for the Department of Planning, Transport and Infrastructure (Aurecon is a member of the T2T Alliance). This project is currently in the design phase, and aims to achieve an Excellent IS rating. Sustainability has been embedded in the design of T2T, as sustainability principles and planning for the IS rating were incorporated into the early development stages of the project; these continue to be prioritised throughout the design process.

> *"By making sustainability a priority up-front, as well as consistently and continuously during a project, we can encourage clients to consider factors such as location, environmental footprint, and how the infrastructure integrates and interacts with its surrounds"*

Following these principles throughout the entire infrastructure life cycle – from the earliest stages of prefeasibility and business case preparation through to the operation and maintenance phases – can have a major influence on the sustainability outcomes of projects. These include savings of materials, transport, energy and water; improving the community and environment; and, importantly, reducing associated greenhouse gas emissions.

For instance, in our road infrastructure projects, Aurecon is including sustainability initiatives in the design processes. We have done extensive work in analysing various manuals and rating systems that are available in the market or under development, in order to gain an understanding of the quantification of sustainability, and what our clients are looking for when they seek sustainable design and construction.

> *Sustainability leadership in organisations and project teams also fosters innovative thinking, and allows everyone to step outside the comfort zone of 'business as usual' design to explore ways to improve and innovate. Indeed, one of the most exciting features of sustainability is the new possibilities it creates*

It is important that, as an industry, we consider the opportunities for sustainability that are covered by these rating systems and guides in all that we do – despite their use not yet being industry-wide – so as to not discount their use in future stages of a project.

Harnessing local knowledge

Harnessing the knowledge and experience of the local community can also maximise the sustainability impact of a project. Communities in close proximity to an infrastructure project can provide deep insights into what is needed, and provide a clear understanding of how the project will affect them. Community insights provide opportunities to incorporate design solutions into projects early on, rather than having to make modifications down the track in response to public pressure.

Community issues can be greatly improved through small changes in infrastructure design. For instance, a community may have an issue with crime in a park adjacent to a road improvement project. Such an issue could be addressed by increasing lighting in the park or along pathways – a minor change from a design perspective, but one that could provide a significant improvement for the local community.

Leading from the top

While introducing sustainability at the start of a project and consulting with the public are significant components of what makes a sustainable project, they are far from the whole picture. Addressing the sustainability and climate change challenge requires a holistic approach.

The ability to include sustainability in all stages of a project relies heavily on the project management team's leadership. Under their guidance, a project team of multidisciplinary professionals can understand that sustainability is everyone's issue, rather than perpetuating the idea that sustainability is an 'environmental issue', or that it is mainly influenced by the materials used in construction.

As sustainability professionals, we must share our knowledge with others and support our project team leaders to demonstrate that leadership is essential to ensuring a consistent approach to sustainability throughout a project. This has been undertaken with great success on the T2T Project. Within the Project Management Team on this project, a Sustainability Manager has been appointed who attends all design meetings, ensuring that all discipline leads understand sustainability and their roles in the sustainability success of the project.

Top-down support and promotion of sustainability initiatives is just as important as the visibility of sustainability professionals within project teams. If sustainability experts are not readily accessible and visible to project teams, the knowledge-sharing required to make sustainability everyone's issue is diluted. It is therefore vital that support for sustainability comes right from the top of the organisation, not just from within project teams.

Inspiring innovation

Sustainability leadership in organisations and project teams also fosters innovative thinking, and allows everyone to step outside the comfort zone of 'business as usual' design to explore ways to improve and innovate. Indeed, one of the most exciting features of sustainability is the new possibilities it creates. We are finding that clients are more willing to look at new technologies to shape their infrastructure projects, even if the technologies are not within their current specifications.

Innovations in infrastructure sustainability are evolving at a rapid pace, and by being open and flexible to these, Aurecon is constantly reviewing, testing and adapting to what's possible. We are looking at non-traditional approaches and fresh solutions. Einstein said, 'We cannot solve our problems with the same thinking we used when we created them,' and this is true of sustainability, which, by definition, is a moving target. What is considered sustainable and innovative now will be standard practice in years to come.

While embedding sustainability into projects and organisations is still a work in progress, it is progress that counts. As an industry, we must continue to strive for the betterment of our environment, community and economy. Contributions are being made by infrastructure companies, by the individuals within those businesses, and by clients willing to embrace new design thinking and technologies – all of which are moving us closer to the day when sustainability principles will be a natural part of planning in all infrastructure projects.

Building sustainable relationships

The success of any infrastructure project is measured by far more than great engineering. The best outcomes depend on how well the organisation delivering a project engaged with, included and satisfied the diverse requirements of the surrounding community.

Every project leaves its mark on the minds of the people who were in any way affected by its implementation, especially the neighbours, commuters, workers and communities interested in the social, historical and natural amenity of their local environment.

The industry term for managing these interests is 'social licence to operate' (SLTO). It is predominantly about managing relationships, and all of the complex interactions needed to keep everyone (and their diverse expectations) on the same page.

SLTO can make or break a company's reputation. For McConnell Dowell, effective SLTO is a key component of every project. Our work in remote locations in Queensland, Western Australia and the Philippines demonstrates McConnell Dowell's sensitivity to Indigenous culture and our commitment to maximising the benefits that our workforce brings to small-town communities.

McConnell Dowell is now using its SLTO experience to deliver an increasing number of projects in urban environments. These include a recent upgrade to Balaclava railway station in Melbourne, and long-term beach replenishment on the south coast of Queensland.

Urban environments are inevitably more restrictive, busier and more likely to involve a greater number of competing public interests. Delivering projects under such circumstances puts greater pressure on the constructor to implement effective SLTO.

Constructing a new platform and ticketing area at Balaclava station came with distinct challenges. The station continued to operate throughout the project, which meant managing peak travel times as smoothly as possible. It also required McConnell Dowell staff members to work effectively in very close proximity to commuters.

Our ongoing beach replenishment work on the Gold Coast came with a different set of SLTO challenges, including collaborating with representatives of the local surfing community, who were concerned about the effects of the project on one of Australia's most iconic surf beaches. Such public feedback informed key components of the project, including re-establishing reefs and sandbank profiles. As a result, McConnell Dowell now has strong community support as we enter the long-term management stage. Our SLTO work will also continue throughout this 20-year period.

To achieve this level of sustainability, SLTO is embedded throughout McConnell Dowell. Staff members regularly undertake comprehensive SLTO-related training, so that every conversation – from boardroom to worksite – conveys the same consistent and respectful message. This is why the quality of our external relationships directly reflects McConnell Dowell's company culture. We believe that people who are appreciated and enjoy their work make the most authentic ambassadors for our projects.

The most positive construction outcomes occur when there is early involvement from a contractor. This enables greater due diligence in preparation, including consultation. Earlier involvement gives public representatives and stakeholders more time to interpret what is about to happen around them. It also gives them greater ownership of the process: their thoughts and ideas become ingrained in the project, so the overall outcome is far more likely to suit everyone's needs.

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WE DID!

The Te Mihi Geothermal Plant in New Zealand is just one example of how we are driving progress for tomorrow. Today.

Why turn the page when the future is right in front of you?
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IS AS BUILT V1 EXCELLENT

BUILDING CIVIL ELECTRICAL FABRICATION MAINTENANCE MARINE MECHANICAL PIPELINES RAIL TUNNELLING

Minister's message

By the Hon. Warren Truss MP, Deputy Prime Minister and Minister for Infrastructure and Regional Development

I am again pleased to contribute to the Infrastructure Sustainability Council of Australia's annual *Update*, and to congratulate the Council for its wide-ranging and energetic contributions to creating a more efficient and sustainable Australian infrastructure framework. The Council's work is an important part of ensuring that Australia's infrastructure is fit for the nation's future needs. The great value of this work has been underlined by both national and international developments over the past year.

The demand for new infrastructure in Australia is very high, and it will sharply increase over the coming decades – particularly in our cities, where pressure on many key urban road and rail corridors is projected to exceed current capacity by 2030. The costs of congestion in our capital cities, estimated at $16.5 billion in 2015, are expected to increase to around $30 billion in 2030, unless we curb them.

This growing demand underlines the importance of carefully managing the national infrastructure 'bill' and selecting projects that meet the nation's long-term needs – and balancing these with the need to make our cities and regional communities more livable.

The Australian Government has been active in delivering our infrastructure investment commitments. These include our record $50 billion investment in transport and other infrastructure projects, and an additional $1 billion to fund priority infrastructure in regional communities. These programs are addressing high-priority needs in our transport systems, and a diverse range of other infrastructure projects around the nation. We have clearly signalled our intention to fund transport infrastructure projects on the basis of their projected performance, rather than focusing on an exclusive transport mode.

Our focus on transforming the nation's infrastructure is also underlined in our commitment of more than $29 billion in equity funding for the National Broadband Network – infrastructure that is already delivering the benefits of high-speed broadband directly to Australian homes and workplaces.

Our infrastructure investments are creating major economic and social benefits in Australia's cities and regions, and are helping to better position the nation for the rise of the Asia-Pacific economies in our own geographic neighbourhood.

These investments are therefore critically important, but, as the Council understands very well, a national infrastructure framework is not a static collection of assets. It is a dynamic system, and developing the full potential of these systems must be a continuing work in progress for any nation. In addition to our direct investments, the Australian Government is therefore pursuing major reforms to better align infrastructure development with the nation's infrastructure needs. This represents a major structural reform to how infrastructure is planned, delivered and managed in Australia.

> *"The Australian Government has been active in delivering our infrastructure investment commitments. These include our record $50 billion investment in transport and other infrastructure projects, and an additional $1 billion to fund priority infrastructure in regional communities"*

The work of Infrastructure Australia (IA) forms an important part of these

The Australian Government is providing $676 million to the Gateway WA project. Image by Gnangarra

efforts. The progress that it has achieved in this work over the past year is a national dividend from the reforms to IA's structure and operations that the government put in place in 2014.

The Australian Government passed amendments to IA's enabling legislation to establish it as a truly independent statutory authority, governed by an independent Board. The reforms will help all levels of government to focus on delivering nationally significant infrastructure, securing better value for money from their infrastructure investments, and maximising productivity.

In May 2015, IA delivered Australia's first top-down audit of nationally significant infrastructure. The audit provides a comprehensive and strategic view of where the pressures on Australia's infrastructure networks will be most acute in 2031. For the first time, for example, Australia has critical information that aligns future productivity pressure points with infrastructure demand at a national priority level. This includes more detailed information on the performance of our infrastructure at a regional level, and the contribution and potential impediments to economic growth in the future.

The audit raised 10 key challenges to ensuring that Australia's infrastructure systems meet future needs. These include population growth, funding shortfalls and the need to limit the environmental impact and improve the resilience of infrastructure assets and systems. As the Infrastructure Sustainability Council of Australia recognises, there is a very close association between addressing funding shortfalls on the one hand, and improving the environmental sustainability and resilience of national infrastructure on the other. A more sustainable infrastructure asset is more likely to deliver whole-of-life economies than an asset that falls short on environmental performance.

Meeting Australia's infrastructure challenges will require a sustained national effort – but the Australian Infrastructure Audit and Plan will add to the essential tools that are available to governments to ensure a robust evidence base for planning and investment decisions.

Our infrastructure efforts are also, of course, assisted by ISCA's own Infrastructure Sustainability (IS) rating scheme. Since its launch in 2012, the rating tool has proven its worth across a range of infrastructure areas. The continuing enhancement of the rating tool is making a very important contribution to better infrastructure performance. I am pleased to say that several projects supported by the Australian Government through my own portfolio are benefiting from its application.

Australia's cities are vital economic assets

> *The supply of modern and effective infrastructure is essential for ensuring that the population growth in our major cities is translated into a real national gain. This, in turn, places a premium on the need to expand the share of infrastructure funding and financing that is borne by the private sector*

Sydney's WestConnex motorway project, for instance, is a very significant addition to the infrastructure networks of New South Wales and the nation. The WestConnex Sustainability Strategy was released in September 2015, and describes how sustainability will be integrated into the planning, construction and operation of WestConnex. It defines the project's sustainability vision, commitments, guiding principles, objectives and overarching targets across a range of sustainability themes. The Strategy includes a commitment for each major stage of the project to achieve an IS rating of 'Excellent'.

In the west, the Gateway WA project involves the upgrade of roads around Perth Airport, and is a vital project for Perth and for the west generally. The Australian Government is providing $676 million to this $986 million project. ISCA's formal review for the 'Design' rating was carried out in July 2014, and the project scored a 50.6 ('Excellent') rating. The target for the 'As Built' rating is 46 ('Commended').

It is, of course, highly gratifying that this project exceeded its target.

In South Australia, the Torrens Road to River Torrens Project is of major significance to Adelaide's future transport needs. The Australian Government is providing $448 million to this $896 million project, which is expected to be completed in 2018.

The project has been registered to pursue a 'Design' and 'As-built' rating under the IS rating scheme. It is expected that the registration of the project for an IS rating will drive sustainability initiatives throughout all project phases. This will create a sustainable performance baseline for future projects, and will enable the South Australian Government to benchmark this project on a national basis against other major infrastructure projects.

These are all important and forward-looking commitments, and I congratulate all of the participants in the Sustainability Scheme for their actions and results. Their efforts underline how infrastructure projects have a broader significance that extends beyond their immediate purposes, and helps to ensure that the net benefits of these projects are maximised and contribute both to Australia's overall economic development, and to the sustainability of our national infrastructure.

Regional Australia makes major contributions to Australia's prosperity, and our infrastructure investments reflect this significance by focusing on vital infrastructure assets around the country. These commitments include the Toowoomba Second Range Crossing, where we are investing $1.37 billion in the construction of a vital new link in the national land freight network, and $6.7 billion on upgrades to the Bruce Highway. We are also investing $5.64 billion to complete the duplication of the Pacific Highway along the New South Wales coast – around 62 per cent of the highway has now been duplicated, bringing major economic benefits to the regions along its route. We are investing $893 million in the construction of major sections of Victoria's Western and Princes Highways. Western Australia's regional roads are receiving upgrades through the Australian Government's $669 million contribution to the Swan Valley Bypass section of the NorthLink WA project; a $340 million contribution to projects on The Great Northern Highway; $173 million to the North West Coastal Highway; and $11 million to the construction of the Western Australian component of the Outback Way.

We are also conscious that infrastructure development is an international as well as a national issue, and we are making significant efforts and investments in developing Australia's international infrastructure connections. In many important respects, these align with ISCA's own international efforts.

In 2014, the Australian Government put infrastructure investment at the centre of a G20 agreement to lift global growth by two per cent by 2018.

Leaders at the G20 Summit in November 2014 made the decision to proceed with Sydney's Global Infrastructure Hub. The Australian Government will be a major contributor to the Hub, providing $30 million over five years. The United Kingdom, China, Saudi Arabia, New Zealand, the Republic of Korea, Mexico and Singapore have also committed to making financial contributions, which together total about $20 million. Christopher Heathcote has been appointed as the inaugural CEO of the Global Infrastructure Hub, to help unlock $2 trillion in investment and create millions of new jobs.

Australia is also a founding member of the Asian Infrastructure Investment Bank (AIIB). The AIIB will address Asia's major infrastructure financing gap, which is estimated at US$8 trillion over the current decade.

This is a global multilateral initiative that aims to bring best practice for the delivery of much-needed infrastructure to the region. It will spark private-sector investment, and will co-finance projects with other development banks and private sector financiers.

Australia's engagement in the AIIB underlines both the importance of Asia to our prosperity and economic growth, and the increasingly international character of infrastructure development.

The Australian Government recognises the particular needs of both regional and metropolitan Australia, and we have placed a strong emphasis on Australia's major cities agenda. This reflects some increasingly critical realities. The Infrastructure Audit emphasised that greater Sydney, Melbourne, Brisbane and Perth are projected to house more than two-thirds of Australia's people by 2031.

Australia's cities are vital economic assets, and the populations of our four largest cities underline the significance of the government's cities focus. They also underline three other considerations.

The supply of modern and effective infrastructure is essential for ensuring that the population growth in our major cities is translated into a real national gain. This, in turn, places a premium on the need to expand the share of infrastructure funding and financing that is borne by the private sector. It makes good commercial sense for the private sector to invest in infrastructure and fully engage in other aspects of its development.

The Australian Government is committed to leveraging this interest. Our efforts have included the establishment of the Asset Recycling Initiative to provide incentives to the states to invest in infrastructure renewal, and to the private sector to expand their infrastructure role by purchasing established infrastructure assets. The Initiative has already been taken up by the New South Wales and Australian Capital Territory Governments.

We have also provided a $2 billion concessional loan to accelerate the M5 East section of the WestConnex project, and we have created a $5 billion investment facility to support our northern Australia initiative. We will continue to pursue other approaches to leveraging greater private-sector engagement in infrastructure.

Our infrastructure developments need not only to provide better transport and service corridors, but they also must be sustainable in their economic and environmental dimensions. It is clear that the demand for sustainable infrastructure will only increase into the future.

This highlights the importance of ISCA's efforts, and I wish you well with your ongoing work.