June 2023

Brisbane 2032

Beyond Climate Positive

Leveraging the Olympics and Paralympics as a catalyst for change

Infrastructure Sustainability Council

AECOM

Acknowledgements

AECOM

Delivering a better world

Acknowledgement of Country

We acknowledge all the traditional lands on which the Games
will take place. We also acknowledge their deep connection to land,
water and culture, and pay our respects to their Elders past,
present and emerging.

Artist: Bianca Gardiner-Dodd
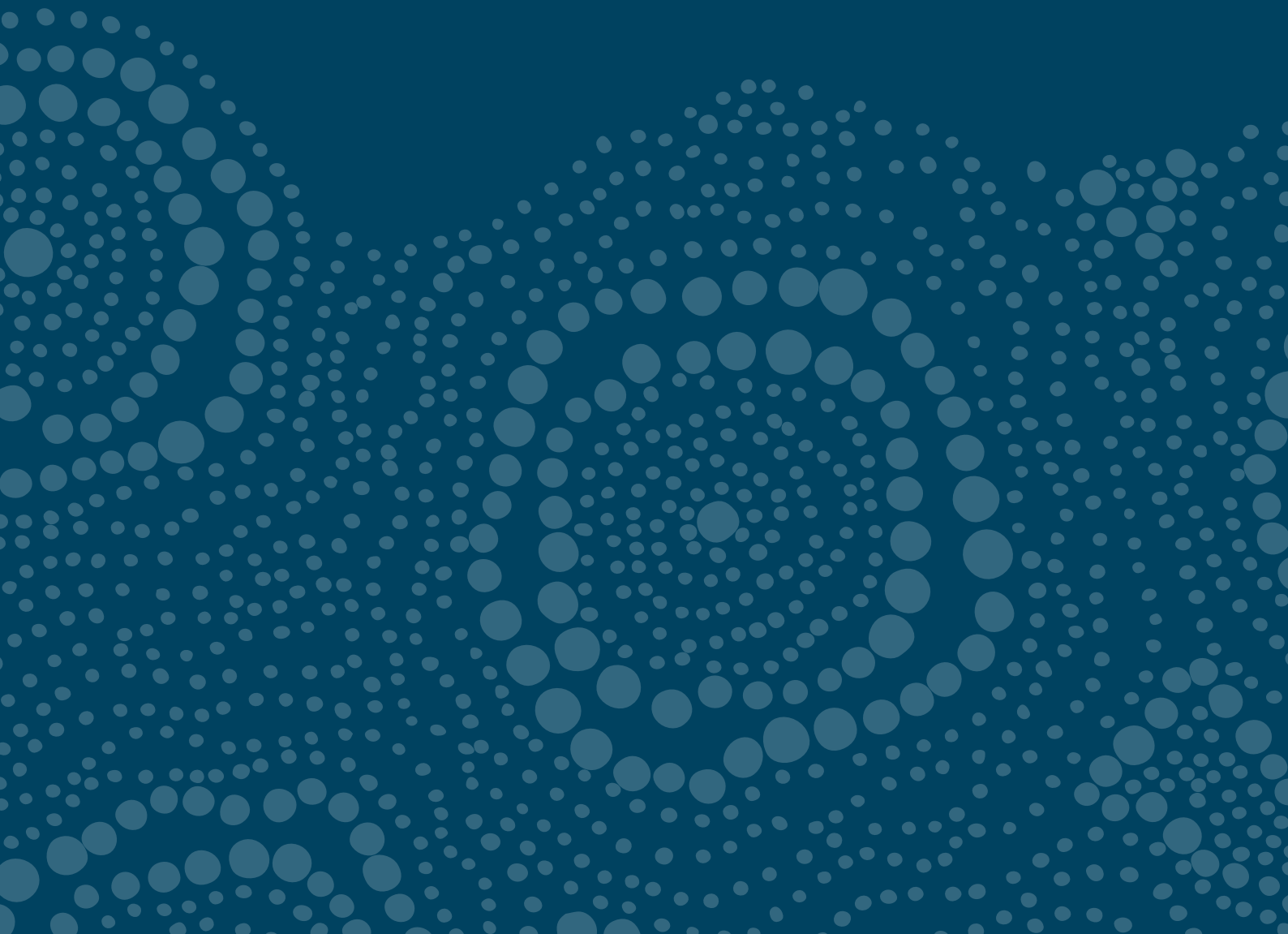
Foreword

Sports have the power to unite; so too does sustainability. The Brisbane Olympic and Paralympic Games in 2032 is a powerful catalyst for cumulative change - before, during and long after the event itself. Now is the time to come together for a positive infrastructure legacy that serves people, the environment and the economy.

The infrastructure sector wants to set the direction toward legacy, we are looking to provide answers. Much like the king in the parable of 'The Three Questions', by acclaimed author Leo Tolstoy, we are asking the questions; when is the best time? who are the best people? what is the most important thing to do?

The Infrastructure Sustainability Council is proud to have partnered with AECOM, and engaged with our members to develop this thought-leadership report, exploring the concepts of climate positive, resilience and nature-based solutions. This is the starting block for a collaborative process with the infrastructure sector to deliver a sustainable legacy through Brisbane 2032. As the fastest growing region for infrastructure in Australia, Queensland will benefit from the findings and develop well into the future, sharing well beyond the region.

This report highlights a number of opportunities from the outset, through strategy, by collaborating, innovating and continually learning.

As we set our ambition and go through the finish line, the answers to our questions are much like Tolstoy's hermit suggested to the king wishing to leave a legacy: The most important time is now. The most important people are those you are with. The most important thing is helping those around you – and with the addition of our findings – helping for today and for tomorrow.

With this is a race that must be won by delivering more resilient, inclusive, climate positive infrastructure enabling people and our sector to thrive.

Ainsley Simpson, CEO
Infrastructure Sustainability Council

Brisbane 2032's public commitment to deliver a climate positive 2032 Games presents an exciting opportunity for us as an industry. Sustainable infrastructure will play a vital role in achieving Queensland's goal of zero net emissions by 2050 and the Games will serve as a catalyst for change in how we plan and deliver infrastructure for large-scale events.

At AECOM, we are committed to leaving a positive, lasting impact on people and our planet through our Sustainable Legacies strategy. This paper is a valuable contribution towards the development of a climate positive Games and offers in-depth insights for industry leaders. Brisbane 2032's commitment will require a significant shift in the way the industry approaches infrastructure development, embracing sustainable practices and innovative technologies to reduce carbon emissions, mitigate climate risks and create a lasting legacy.

Thank you to the AECOM team and to all involved in partnering with the Infrastructure Sustainability Council to produce this collaborative thought leadership.

Looking towards the Brisbane 2032 Games, I am optimistic that, by working with visionary and enthusiastic industry leaders, we can forge a transformative path that not only shapes the future of Brisbane but also delivers a spectacular Games.

Richard Barrett, AECOM Chief Executive
Australia and New Zealand

Contents

1
Executive summary

The International Olympic Committee's (IOC) announcement that Brisbane will be the host of the 2032 Olympic and Paralympic Summer Games provides an almost unprecedented opportunity for change, growth and legacy for Brisbane, the South East Queensland region, Queensland, and Australia more broadly.

Brisbane 2032's publicly stated commitment to deliver a climate positive Olympic and Paralympic Games seeks to create lasting benefits to the climate and community and accelerate the transition to net zero emissions.[1] In leveraging this as a baseline for industry excellence and innovation, AECOM has partnered with the Infrastructure Sustainability (IS) Council to explore how the Games might provide an opportunity for resetting and refreshing the sustainability agenda for infrastructure and exploring what reaching and going beyond climate positive might mean for both infrastructure and industry.

The following paper seeks to explore this potential paradigm shift and how the legacy of Brisbane 2032 might leverage the delivery of a climate positive Games to transform how infrastructure is designed, built, operated and maintained for years to come. While content has been drawn from a range of sources and research it has been primarily shaped by:

- Feedback gathered during a workshop held on Day 2 of the IS Council's 2022 Connect Conference

- Consultation with the QLD Infrastructure Sustainability Community of Practice, and

- Research on priority areas and opportunities with related case studies.

[1] Reference: https://www.des.qld.gov.au/climateaction/climate-positive-games

Brisbane 2032 – areas for priority and opportunity:

Climate positive

Climate change is not just an environmental issue but a social and economic one as well. As we emerge from the COVID-19 pandemic and move towards 2030, a climate positive economy will help address a multitude of risks including extreme weather, biodiversity loss, social inequality and polarisation, and livelihood crises. While climate mitigation won't solve these global risks alone, minimising the impacts of future climate change scenarios will prevent the worst-case outcomes that would exacerbate social, economic, and environmental collapse.

Embedding resilience

Increasing uncertainty and a range of compounding externalities are shaping and changing the way industry is delivering across the built environment. These externalities include spanning extreme weather events and natural disasters, the impacts of a global pandemic and other health emergencies through to cyber-attack and digital network failure. Leveraging the goal of delivering a climate positive Games presents a unique opportunity to deliver truly resilient infrastructure and set a new benchmark for assets to be designed and delivered. The approach needs to be responsive in the face of a diverse range of shocks and stresses, while exploring opportunities to enhance the well-being and liveability of the communities they serve.

Nature-based solutions

Nature-based solutions (also commonly called green and blue infrastructure) use nature to address societal challenges designed and implemented with the engagement and consent of local and Indigenous communities. Momentum is growing to use nature-based solutions for the delivery of green infrastructure that is resilient and which delivers a wide range of benefits to society in terms of ecosystem services.

When people talk about legacy plans for Olympic and Paralympic Games, they often refer to the 10+10 – the 10 years before and leading up to the event and the 10 years after it, but given regional, national and international 2050 climate action targets, it can be argued this forecast needs to be extended to consider the 10+10+10 (refer Figure 1).

The areas of priority and opportunity within this paper, have been used to contextualise and investigate options to go beyond existing and publicised commitments to deliver a climate positive 2032 Olympic Games and to extend this influence beyond Brisbane and South East Queensland, to shape infrastructure communities across Australia and New Zealand.

Figure 1: A lasting legacy for our industry

Focus to define and deliver **climate positive** for the 2032 games.

By 2052, **infrastructure is providing restorative gains**, enabled by the 2032 games step change.

10 + 10 + 10

By 2042, BAU reflects our games legacy ahievement, driving **continued change to infrastructure design and procurement**.
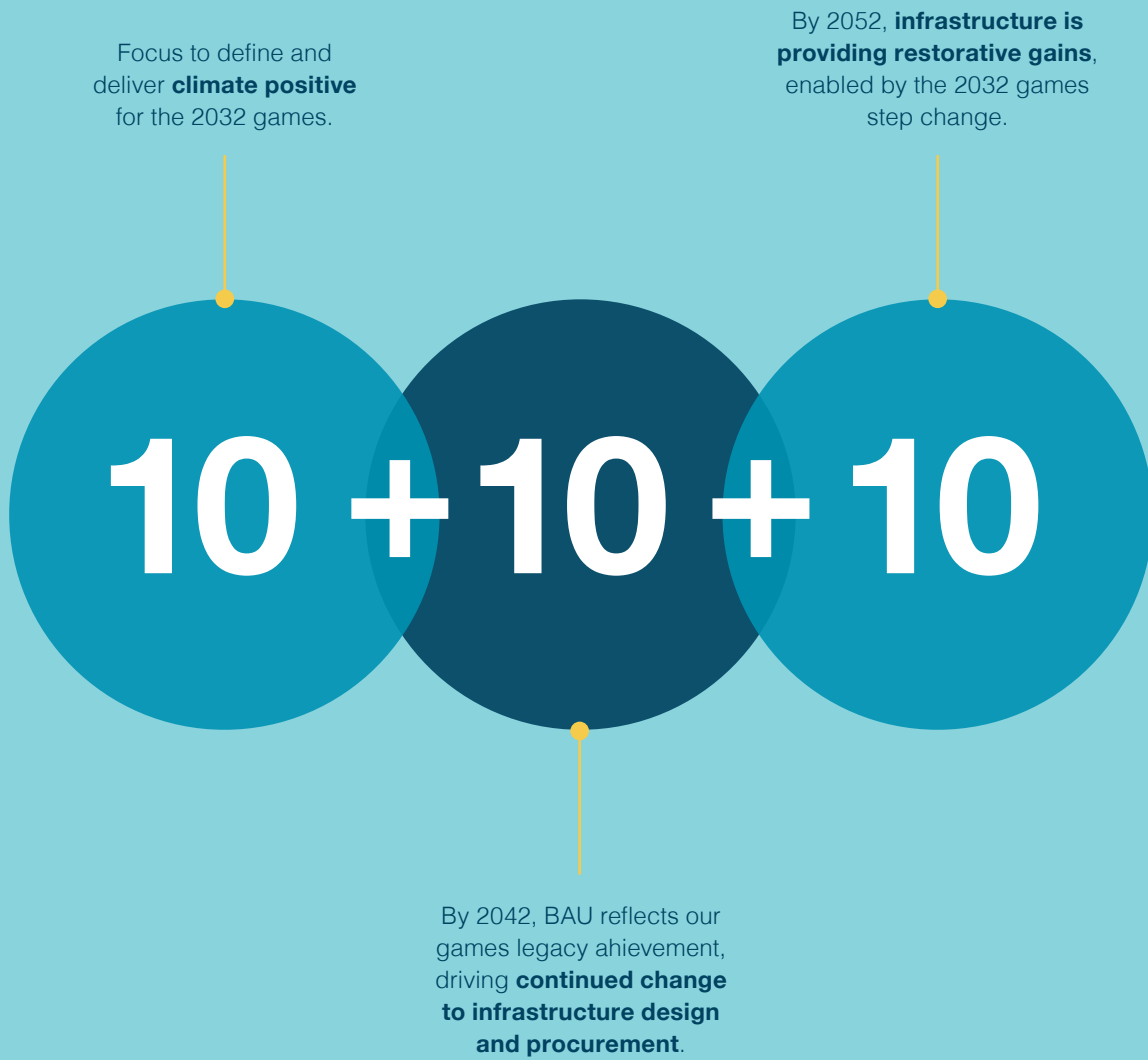
Industry reflections

During the IS Council's 2022 Connect Conference, AECOM and the IS Council facilitated a workshop session to explore how the Games might provide the impetus for rapid change across the infrastructure sector.

The conference had 334 in-person attendees from Australia and New Zealand who were divided into 16 groups for collaborative discussions. The session sought to identify actions and initiatives that might prove useful in driving this agenda for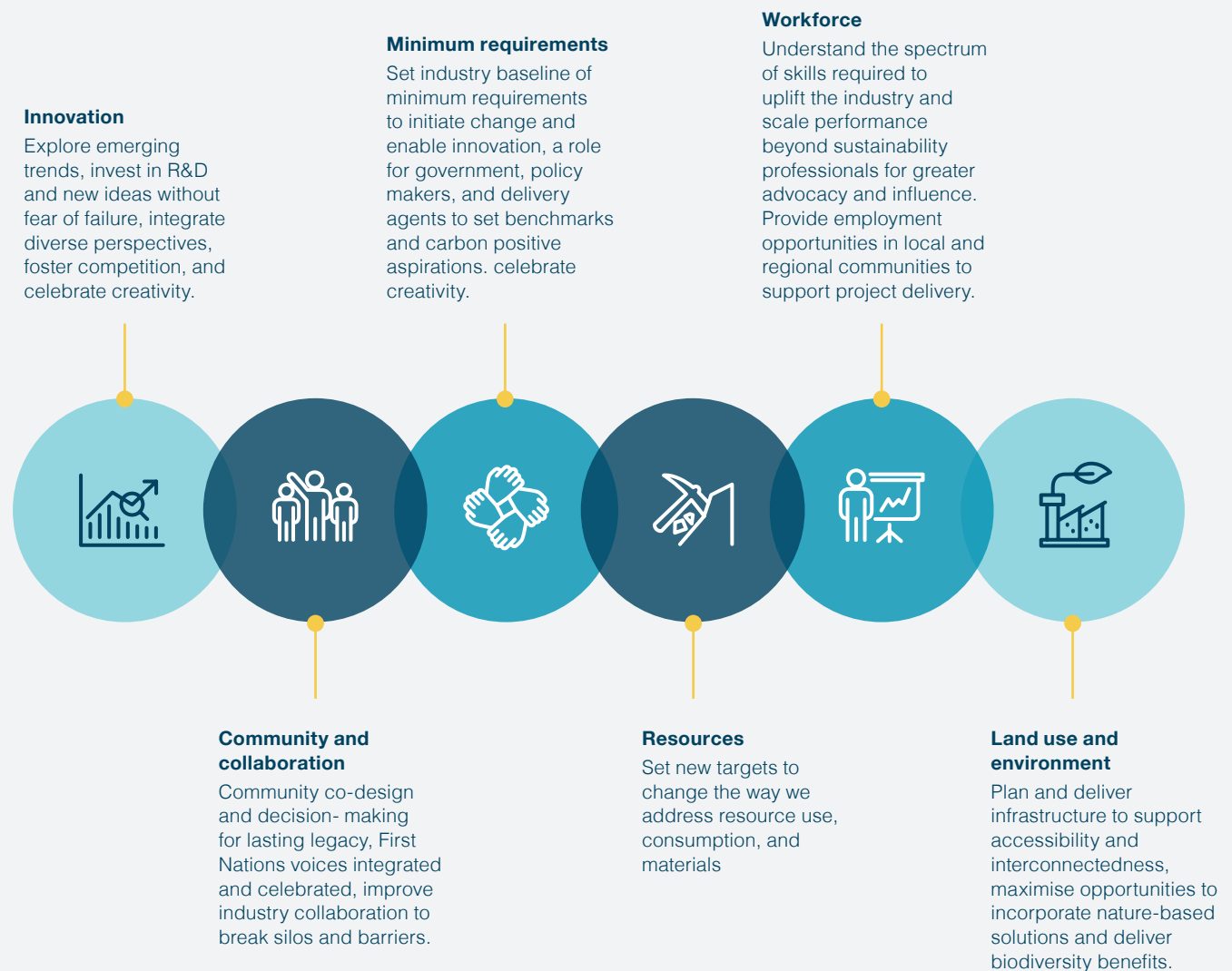ward across the priority and opportunity areas identified in the lead up to the conference. Of those potential solutions and responses provided by participants (and outlined within relevant sections of this paper - refer Section 7.1), the following (refer Figure 2) outlines a series of action areas which emerged during the post-workshop analysis. These broadly represent the focus areas where participants felt concerted action and investment was needed.

Figure 2: Action areas for industry - IS Connect Conference 2022

Innovation
Explore emerging trends, invest in R&D and new ideas without fear of failure, integrate diverse perspectives, foster competition, and celebrate creativity.

Minimum requirements
Set industry baseline of minimum requirements to initiate change and enable innovation, a role for government, policy makers, and delivery agents to set benchmarks and carbon positive aspirations. celebrate creativity.

Workforce
Understand the spectrum of skills required to uplift the industry and scale performance beyond sustainability professionals for greater advocacy and influence. Provide employment opportunities in local and regional communities to support project delivery.

Community and collaboration
Community co-design and decision- making for lasting legacy, First Nations voices integrated and celebrated, improve industry collaboration to break silos and barriers.

Resources
Set new targets to change the way we address resource use, consumption, and materials

Land use and environment
Plan and deliver infrastructure to support accessibility and interconnectedness, maximise opportunities to incorporate nature-based solutions and deliver biodiversity benefits.

Areas for exploration

Based on the areas of priority and opportunity within this paper, leading practice case studies have been identified and give rise to recommendations designed to stimulate action and implementation. These represent proposed areas for application intended to support the breadth and scale of delivery associated with strategic delivery, Games infrastructure (both direct and supporting), the redevelopment of existing facilities, along with program and resourcing requirements.

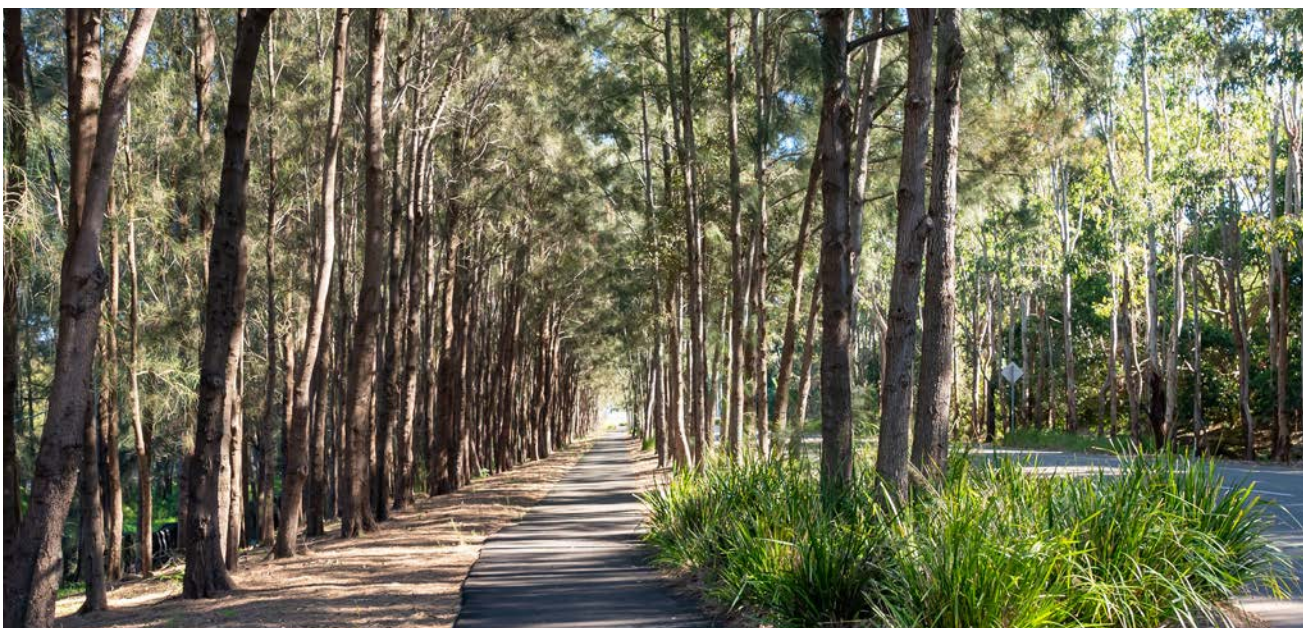*Table 1 Areas of priority and opportunity: key recommendations*

Climate positive

- Invest in carbon innovation – through research and development and be open to failure and learning from lessons.

- Operationalise strategies and targets – setting a clear path for delivery and continually monitoring and measuring progress through delivery – learning and adjusting as progress is made.

- Explore a full spectrum of opportunities for renewable solutions – onsite renewable generation; alternative fuel sources; purchase power agreements; offset purchases.

- Define what 'climate positive' means for the planning, delivery, and operation of infrastructure over the next decade and give permission for project teams to explore the means to decarbonise based on a range of criteria.

- Sector-wide commitment to prioritise decarbonising real emissions, with offsets used as a last resort.

- Set annual science-based carbon budgets for each infrastructure authority (capturing infrastructure delivery, maintenance, and operations) to align with national carbon reduction targets and drive reductions.

- Develop a mandatory, transition strategy for construction fuels and plant operators that is developed through a supportive and collaborative approach.

- Vastly improve accessibility to tools and capabilities for modelling impacts.

- Institute a robust nationwide standardised framework for carbon measurement, not just based on cost, but also efficiency, whole of life outcomes and effectiveness of solutions.

- Embed a carbon budget into asset planning, delivery and operations with financial incentives driving decision-making and behaviour with post-completion assessments. Alignment with PA 2080, to harmonise measurement and reporting.

Embedding resilience

- Establish networks and mechanisms to support and enable opportunities for cross-sector collaboration and creation.

- Invest and collaborate across local, state, and federal governments to develop an integrated approach to climate modelling and resilience measurement and build a common understanding of climate hazards and vulnerabilities for the region.

- Explore opportunities to leverage from the work started by the QCoast 2100 coastal hazards adaptation program to support climate readiness.

- Incentivise opportunities to foster creativity, innovation and collaboration leading to improved and enhanced resilience outcomes across the project lifecycle (i.e., feasibility through to operations).

- Undertake an inclusive co-design process for identifying and implementing resilience – including First Nations knowledge and input.

- Develop an overarching, systemic resilience strategy to guide the implementation of resilience at an individual project or asset level.

- Identify and maximise the delivery of co-benefits, for example, using place-based approaches, multi-use design, and nature-based solution design.

- Design and deliver assets that better support local communities and contribute to ongoing legacy and resilience endeavours up to and beyond the Games.

- Community-centred decision making should be a key consideration in developing strategies around legacy to help avoid instances where existing community members and groups feel pushed out or to the fringes.

- Build with flexibility and adaptability and identify the tools and technologies that will support greater resilience.

- Develop a better understanding of the 'Climate Readiness Pipeline' - the scale of work that needs to take place across communities for resilience and adaptive capacity with formal assessments and prioritisation criteria.

- Leverage Games-specific resilience strategies to support the well-being of athletes, attendees, staff, and the natural environment for long-term capability building. For example, the extreme heat policy and Queensland evacuation centre planning toolkit.

- Across the network and region, leverage accessible and inclusion Games goals to make infrastructure and its related services more accessible and inclusive to all.

- Use people-centred decision-making to support the delivery of a true legacy project that goes beyond the Games to shape, change, and influence Brisbane and beyond.

- Build local capacity and capability for materials, goods, and services to improve resilience to international supply chain disruption.

- Build stronger cross-sector links for interdependent risks and opportunities e.g. with the finance and insurance sectors.

- Define resilience early and establish its scope, and ensure non-climate shocks and stresses are considered such as pandemics.

Nature-based solutions

- Set targets aiming to avoid any loss of biodiversity - where this is not possible, actively minimise loss by setting net positive targets for the enhancement, rehabilitation and restoration of biodiversity associated with the planning, design and construction of all venues, accommodation and associated Games Infrastructure.

- Consider opportunities to position nature that celebrates Australia's natural heritage prominently within the Games infrastructure and precincts and beyond. Use the Games to showcase how nature-based solutions can be implemented and that they deliver a wide range of ecosystem services to society, communicating the benefits and building awareness.

- Build the investment case for nature-based solutions highlighting the co-benefits these can deliver – this should include developing metrics for assessing the performance and value of nature-based solutions.

- Provide the opportunity for the business case for nature-based solutions to be considered as a viable alternative to grey infrastructure in the procurement process of public infrastructure. This business case should consider the co-benefits of each approach, quantified or otherwise.

- Develop or adopt standards, guidelines, or strategies for different types of nature-based solutions that are context-specific. Standards provide reassurance for buyers of such services and verification of quality to help support and differentiate the offerings of suppliers.

- Integrate First Nations knowledge and practice to standards, guidance and practice to bring together the wisdom and knowledge of Country with modern insights such as biophilic design.

- Partner with nature focused, research organisations and First Nations groups to leverage existing skills and knowledge to scale and extend capability.

- Consider innovative solutions to support land conservation and promote nature-based Solutions. For example, this might include exploring options for conserving land for nature in Queensland, by designating a National Park for the Olympics and Paralympics as part of a climate and nature positive solution.

Call to action

At its core, this paper draws together the research, insights and learnings of multiple projects, industries, and people, to provide the beginnings of a blueprint from which industry can think beyond the target of delivering a climate positive Brisbane 2032 to address and embrace further areas for priority and opportunity. It is designed to stimulate thought, discussion and action to help deliver lasting and meaningful change to how we plan, build and deliver infrastructure and communities across both Australia and New Zealand.

Based on the breadth of information and material referenced, a series of strategic actions are offered (refer Figure 3). They provide the cornerstone essentials for driving change beyond the target of achieving a climate positive Brisbane 2032 to support wide-scale industry uplift.

Figure 3 Brisbane 2032 proposed strategic actions

Legacy

To deliver an enduring and meaningful legacy, planning with the end in mind will be critical. Early action and an integrated and collaborative approach to delivery, form critical success factors for delivering lasting community benefit. Including the consideration of the areas of priority and opportunity identified here within future business case frameworks for major infrastructure would drive lasting and profound change.

Strategy

Good governance, enabled by clear and strategic direction is repeatedly shown to support successful performance and project/business outcomes.[51] Delivering excellence, the creation of legacy, innovation and social inclusion and engagement must be driven from the top down through an inclusive and multi-faceted approach. As part of this, the findings of this paper should be incorporated into a broader strategy for industry and the community to provide a clear picture of what the Olympics and Paralympics can mean to Brisbane, the state and the region more broadly to demonstrate how legacy can continue beyond the Games to change and shape industry.

Collaboration

The need to collaborate and engage is a critical driver in creating and delivering successful strategies. A collaborative approach recognises that 'together we are stronger' and working inclusively and collectively provides opportunities to build networks, forge partnerships and breakdown silos. Cross sector collaboration enables opportunities to streamline approaches to review and change standards, create new policies and adopt new approaches to placemaking and creating communities.

Innovation

To change and challenge the way things have been done before and set a new course for action we need to create and embrace opportunities for innovation across many and varied fronts – energy, climate, environment, resources, materials and procurement, community, skills and workforce etc.

Continuous learning

Given the length of the program, both leading into the development of the Brisbane 2032 Games infrastructure, venues, and precincts, and in creating a model for post-Games success, a commitment to continuous learning and improvement will help inform successful delivery. Central to this should be a commitment to monitor, measure, report and disclose progress to enable appropriate updates and revisions where relevant.

In adopting the recommendations and actions outlined in this report, industry, supported by the IS Council and its members have the opportunity to advance practice and deliver a step change in how infrastructure and communities are delivered to provide a lasting and positive legacy.

2
Introduction

The Olympics and Paralympics provide an opportunity to revolutionise the built environment and set a new paradigm for industry.

2.1 Background

Not since the 1982 Brisbane Commonwealth Games and World Expo '88, has Brisbane, South East Queensland and by nature of flow on effect, the rest of Queensland, been provided such promise and potential. Events such as these, held in the global arena have the potential to shape, change, challenge and revitalise communities, cities and regions for decades to come. Indeed, this is a key reason the honour of hosting is so keenly sought after.

Alongside the celebrations and displays of athleticism, sporting prowess and comradery, the Olympics and Paralympics provide an opportunity to revolutionise the built environment and set a new paradigm for industry. Brisbane 2032 is committed to delivering a climate positive Olympic and Paralympic Games, creating lasting benefits to both the community and natural environment by accelerating the transition to zero net emissions.[2]

This paper explores this potential paradigm shift and how the legacy of Brisbane 2032 might leverage the delivery of a climate positive Games to transform how infrastructure is designed, built, operated and maintained for years to come. Content has been drawn from a range of sources and research and the paper is structured as follows:

- **Introduction** (this section): provides the background and context for exploration and sets the imperative for action beyond climate positive.

- **Key themes:** climate positive (Section 4.0), resilience (Section 5.0) nature-based solutions (Section 6.0): draws on the themes put forward during consultation with the QLD Infrastructure Sustainability Community of Practice and explores each concept in relation to the opportunity presented by Brisbane 2032. Each theme is supported by best practice case studies that seek to illustrate examples of how these themes have been (and could be) delivered, noting the policy and legislative context for these varies from that in which Brisbane 2032 will be delivered. Each theme is further supported by key recommendations that distil lessons gleaned from the case studies and reflections from the associated research.

- **Actions and next steps:** brings together the feedback provided at the workshop held at the ISC Connect Conference held from 10 – 12 October 2022[3] to propose a series of outcomes designed to focus future areas for investigation and follow up. The paper then concludes with a series of strategic actions that draw together the body of research, insights and recommendations presented throughout to issue a call to action for industry.

[2] Reference: https://www.des.qld.gov.au/climateaction/climate-positive-games
[3] Session 9: Workshop - World Class Infrastructure for a Sustainable Olympics and Paralympics Part 2

2.2 Context

The pace and scale at which Queensland has accelerated its commitment to embedding sustainability across key infrastructure assets and projects is considerable (refer Figure 4). In addition to its commitment to delivering a Climate Positive Brisbane 2032 Olympic and Paralympic Games, mega projects like Brisbane Metro and Cross River Rail, alongside city revitalisation infrastructure such as the Kangaroo Point Green Bridge are key pieces of infrastructure that will shape and make Brisbane fit for the future. In acknowledgement of this groundswell, in late 2022 the annual IS Connect Conference was held in Queensland. The event's location on the Sunshine Coast provided both a timely and relevant backdrop to discussions framed by the considerable investment in infrastructure upgrades and expanding surrounding master planned communities.

Figure 4: IS rating scheme outcomes by region*

Western Australia

To Date		FY22 IS Certifications		FY22 Innovations	
Total Certifications	11	v2.0 Bronze	1	World First	0
Total Registrations	29	v1.2 Commended As Built	3	Nation First	0
				Regional First	7

South Australia

To Date		FY22 IS Certifications		FY22 Innovations	
Total Certifications	5	v2.0 Gold As Built	1	World First	0
Total Registrations	4			Nation First	1
				Regional First	4

Victoria

To Date		FY22 IS Certifications		FY22 Innovations	
Total Certifications	41	v1.2 Leading Design	8	World First	2
Total Registrations	56	v1.2 Leading As Built	3	Nation First	15
		v1.2 Excellent Design	1	Regional First	14
		v1.2 Excellent As Built	2		
		v1.2 Commended Design	1		
		v1.2 Commended As Built	1		

Tasmania

To Date		FY22 IS Certifications	FY22 Innovations	
Total Certifications	0		World First	0
Total Registrations	1		Nation First	0
			Regional First	0
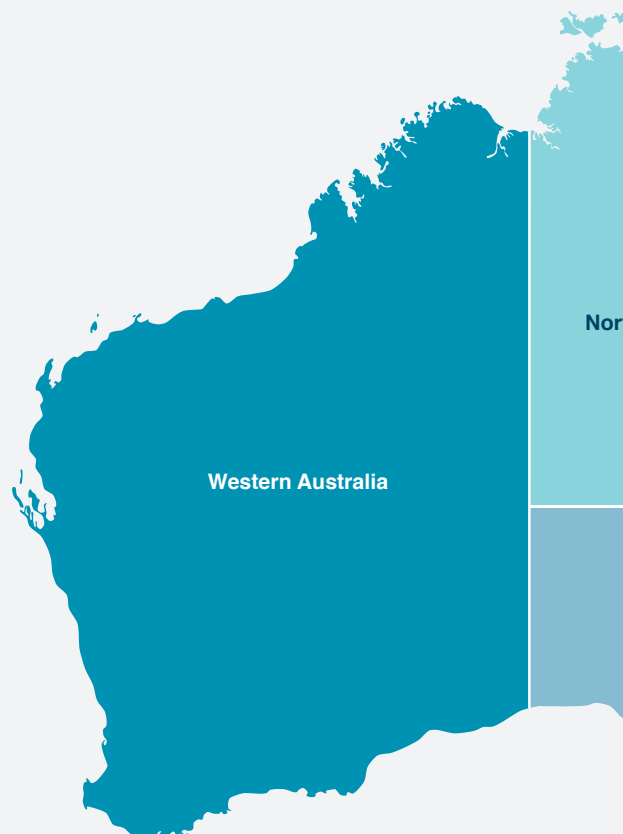
*Source: IS Council, 2022

Northern Territory

To Date		FY22 IS Certifications	FY22 Innovations	
Total Certifications	0		World First	0
Total Registrations	1		Nation First	0
			Regional First	0

Queensland

To Date		FY22 IS Certifications		FY22 Innovations	
Total Certifications	20	v1.2 Leading Design	4	World First	0
Total Registrations	28	v1.2 Leading As Built	1	Nation First	6
		v1.2 Excellent Design	2	Regional First	6
		v1.2 Excellent As Built	1		

New South Wales

To Date		FY22 IS Certifications		FY22 Innovations	
Total Certifications	29	v1.2 Leading Design	7	World First	2
Total Registrations	67	v1.2 Leading As Built	3	Nation First	10
		v1.2 Excellent Design	3	Regional First	10
		v1.2 Excellent As Built	3		

Australian Capital Territory

To Date		FY22 IS Certifications		FY22 Innovations	
Total Certifications	4	v1.2 Excellent As Built	1	World First	0
Total Registrations	2			Nation First	0
				Regional First	0

New Zealand

To Date		FY22 IS Certifications		FY22 Innovations	
Total Certifications	4	v1.2 Leading As Built	1	World First	0
Total Registrations	11			Nation First	1
				Regional First	2

Northern Territory

Queensland

South Australia

New South Wales

Australian Capital Territory

Victoria

Tasmania

New Zealand
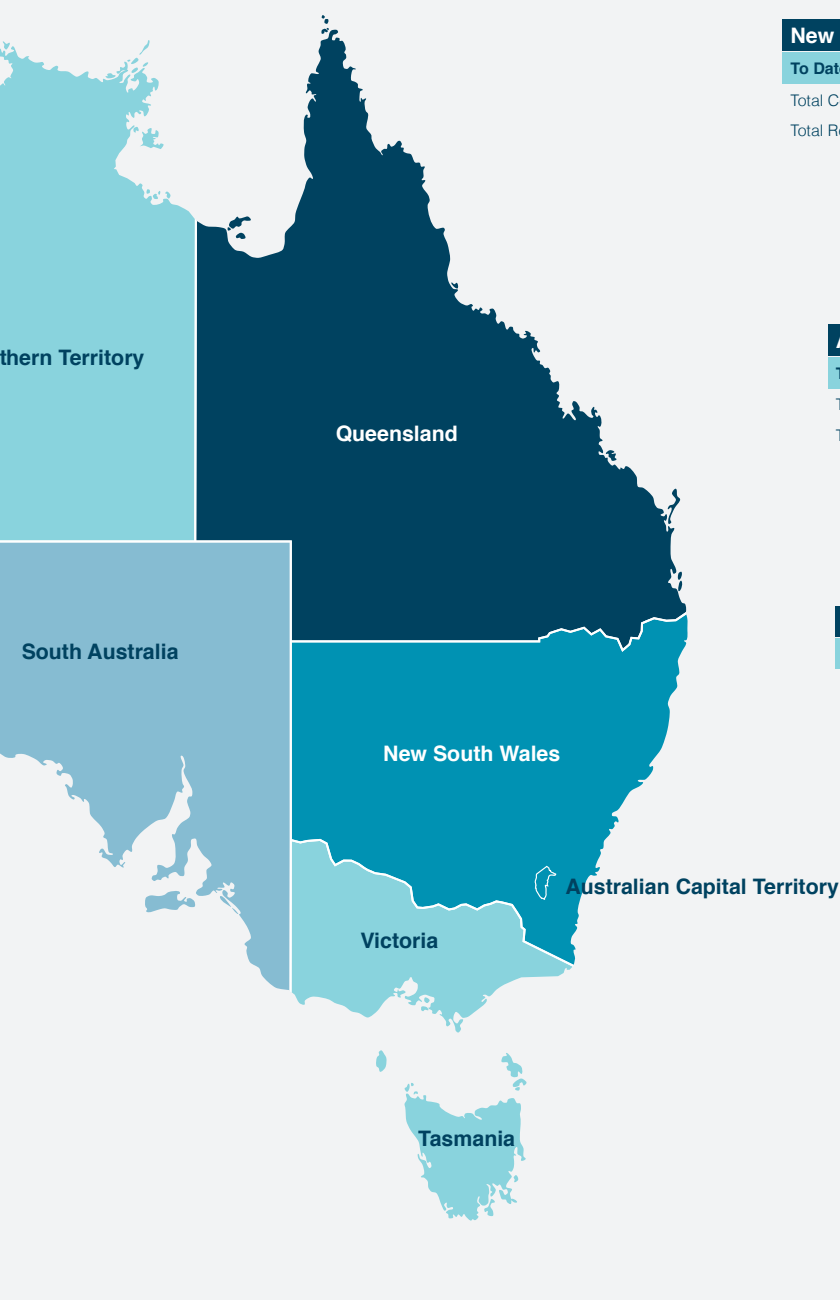
Figure 5: Development of inputs to this Paper

Community of Practice (CoP)
inputs and agreed areas of priority and opportunity

IS Connect Workshop

Workshop Outputs

Case Study Development
based on the areas of priority and opportunity agreed by the CoP

- An initial planning workshop was held prior to IS Council 2022 Conference
- This involved IS Council's Queensland Sustainability Community of Practice
- Identified areas for priority and opportunity associated with change beyond the 2032 Olympics and Paralympics (see Section 4.0), these were:
  – Climate positive
  – Embedding resilience
  – Nature-based solutions

At the 2022 IS Council Conference AECOM facilitated an IS Connect Workshop

The outcomes of the workshop have been collated across six broad categories:
1. Innovation
2. Community & collaboration
3. Minimum requirements
4. Resources – energy, waste, water & materials
5. Land use & environment
6. Workforce

The outcomes discussed across these themes have been summarised in Section 3 as Industry Reflections.

To further explore opportunities and develop the start of a series of recommendations AECOM expanded on the three areas for priority and opportunity developed by the Community of Practice (and which were further discussed in the Conference Workshop). For each of:
  – Climate positive
  – Embedding resilience
  – Nature-based solutions

AECOM reviewed relevant case studies which, alongside a review of Brisbane 2032 already stated commitments in these areas, have assisted in the development of a suite of recommendations for Government and industry to consider for the Games and beyond.

In the lead up to the IS Council Annual Conference in October 2022, AECOM and the IS Council partnered to explore how Brisbane 2032 might provide an opportunity for resetting and refreshing the sustainability agenda for infrastructure and explore what reaching and going beyond climate positive might mean for both infrastructure and industry.

As part of this collaboration, the IS Council and AECOM facilitated a workshop session on the final day of the conference, to explore how the Games might provide the impetus for accelerated uptake across the infrastructure sector and identify actions and initiatives that might prove useful in driving this agenda.

This session was informed by an initial planning workshop with the IS Council's Queensland Sustainability Community

of Practice. This is a cohort of sustainability professionals and proponents from across industry assisted with identifying areas for priority and opportunity reflecting those aspects considered critical in driving change beyond the Games' existing climate positive target[4] (refer Section 4.0).

Feedback from this group advocated for a targeted approach to embedding resilience (refer to section 5.0) and delivering nature-based solutions (refer to section 6.0) in addition to delivering against the target of being climate positive.

This paper explores each of these themes in greater detail and presents the findings from the IS Connect Conference workshop alongside overarching strategic recommendations for action.

[4] Refer: https://www.qld.gov.au/about/Brisbane2032/climate-positive-games

Brisbane 2032 – areas for priority and opportunity

Climate positive

Climate change is not just an environmental issue but a social and economic one as well. As we emerge from the COVID-19 pandemic and move towards 2030, a climate positive economy will help address a multitude of risks including extreme weather, biodiversity loss, social inequality and polarisation, and livelihood crises. While climate mitigation won't solve these global risks alone, minimising the impacts of future climate change scenarios will prevent the worst-case outcomes that would exacerbate social, economic, and environmental collapse.

Embedding resilience

Increasing uncertainty and a range of compounding externalities spanning extreme weather events and natural disasters, the impacts of a global pandemic and other health emergencies through to cyber-attack and digital network failure are shaping and changing the way industry is delivering across the built environment. Leveraging the goal of delivering a climate positive Games, presents a unique opportunity to deliver truly resilient infrastructure and set a new benchmark for assets to be designed and delivered to be responsive in the face of a diverse range of shocks and stresses while exploring opportunities to enhance the well-being and liveability of the communities they serve.

Nature-based solutions

Nature-based solutions (also commonly called green and blue infrastructure) use nature to address societal challenges designed and implemented with the engagement and consent of local and Indigenous communities. Momentum is growing to use nature-based solutions for the delivery of green infrastructure that is resilient and which delivers a wide range of benefits to society in terms of ecosystem services.

2.3 Current state of play

The IOC and Queensland's successful bid for the Brisbane 2032 Olympic and Paralympic Games has already created a platform from which industry can make a rapid transition that would see climate positive outcomes as a business-as-usual goal. It also presents an opportunity to close the gap on inaction and drive more impactful policy across a range of areas.

In response to the growing climate crisis, the IOC is aligning with the Paris Agreement, and aims to become a climate positive organisation[5]. Drawing on a strong sustainability foundation (e.g. Sydney 2000; London 2012) the trajectory of recent and upcoming Games reflects this desire to focus and direct efforts to address emissions. There is an increasing level of commitment being cited and reflected as part of development and delivery efforts (refer Figure 6).

Figure 6: IOC evolution of carbon and climate actions

Tokyo 2020

Aspirations identified linked to emissions reduction and use of hydrogen

Paris 2024

Targets set to focus and prioritise delivery of a carbon positive Games

LA 2028

Radical Reuse Strategy - no new permanent infrastructure

Brisbane 2032

Contractual requirements (mandated) to achieve carbon positive outcomes for the Games

[5] Refer: https://olympics.com/ioc/sustainability/climate-positive-commitment

In addition to these recent advancements, the IOC have identified five sustainability focus areas[6] which are reflected in the publicly stated commitments by the Queensland Government and its partners to deliver Brisbane 2032 and summarised below.

Brisbane 2032 Games sustainability and climate positive commitments

The sustainability and climate positive commitments made by the Brisbane 2032 Games Partners (including the Queensland Government) is outlined in the Future Host Questionnaire Response[7]. These commitments span across the five IOC sustainability focus areas: infrastructure and natural sites; sourcing and resource management; mobility; workforce and climate. The proposed approach involves 'hard-wiring' sustainability obligations and monitoring into all Organising Committees for the Olympic Games (OCOG) and Olympic Coordination Authority (OCA) operations and activities, with stakeholder engagement intrinsic and critical to the success of the overall programme.

An OCOG Legacy and Sustainability Directorate will lead the programme with a Legacy and Sustainability Working Group responsible for delivery including the carbon budget, environmental initiatives, sustainability strategy and United Nations Sustainable Development Goals (UNSDG) deliverables. Monitoring and assurance are part of the governance around sustainability with the intent to develop a third party assured ISO20121 Event Sustainability Management System (ESMS) and attain high level competency in ISO20400 Sustainable Procurement. A summary of planned actions by Games host partners for each focus area is provided below:

Focus area 01   **Infrastructure and natural sites**

Focus area 02   **Sourcing and resource management**

Focus area 03   **Mobility**

Focus area 04   **Workforce**

Focus area 05   **Climate**

[6] Refer: https://stillmed.olympic.org/media/Document%20Library/OlympicOrg/Factsheets-Reference-Documents/Sustainability/2017-03-21-IOC-Sustainability-Strategy-English-01.pdf

[7] Refer: https://stillmed.olympics.com/media/Documents/International-Olympic-Committee/Commissions/Future-host-commission/The-Games-of-The-Olympiad/Brisbane-2032-FHC-Questionnaire-Response.pdf

Focus area 01

Infrastructure and natural sites

- Use of existing and temporary venues will be maximised with new permanent infrastructure only used where there is a clear long-term legacy need.

- Prioritise the use of previously developed or downgraded land over greenfield sites for the development of new venues and infrastructure where these can provide sustainability benefits for the local community.

- No new permanent venues will be constructed on protected natural or cultural areas.

- Maintain conservation status for any natural or cultural protected areas utilised for the Olympic and Paralympic Games.

- Any activity on or around a protected area will be carefully planned & closely monitored to minimise impact.

- Optimise environmental performance of Olympic and Paralympic venues (e.g. impacts on air, water, soil, biodiversity, climate and raw materials availability).

- Games infrastructure will incorporate technologies that support low carbon operations as appropriate, for example, electric vehicle charging infrastructure.

- All new vertical infrastructure projects or significant upgrades will target 6 star (world leadership) Green Star for Buildings ratings from the Green Building Council of Australia (GBCA), where relevant.

- All new linear infrastructure or significant upgrades target an Infrastructure Sustainability (IS) rating of excellent or greater from the Infrastructure Sustainability Council (ISC).

- As part of the Green Star and IS rating approach, capital programmes will target zero net waste and 100% renewable electricity and fuel use for construction phases and deliver assets that achieve the same in operation.

- All existing venues will be audited for energy efficiency and on-site renewable energy retrofit, and all cost-effective abatement options with less than ten-year return on investment will be considered.

- Avoid displacement of existing homes and businesses and adverse impacts on Indigenous people and land rights; where unavoidable, consult and provide fair compensation and support, in accordance with local regulations.

Focus area 02

Sourcing and resource management

- Develop an aspirational Sustainable Sourcing Code and Resource Management Plan to manage risk and drive positive supply chain impacts

- The code will optimise design for circularity; influence 'hire over buy' outcomes and sustainable purchasing in line with the Queensland Government Procurement Policy

- Implement effective processes to design out waste and achieve circular, low carbon outcomes that maximise local benefits.

Focus area 03

Mobility

- Sustainable transport solutions, all Games fleet vehicles will be electric, with ambition to extend to buses and truck and charged from 100% renewable energy

- Target 90% public and active spectator transport to venues over the Games period

- Set strong targets for increasing the update against current baseline of sustainable and accessible tourism accreditations in Queensland.

Focus area

04

Workforce

- A workforce strategy to reflect the 10 UN Global Compact principles in governance and management of human rights, labour rights, environment and anti-corruption

- Games diversity and inclusiveness benchmarks

- Improved carbon positive/circular economy skills and capacity

Focus area

05

Climate

The climate positive commitments are seen to present an opportunity to accelerate action towards Queensland's emissions reduction and renewable energy targets and showcase climate credentials and future focused economy. They cover the operations of the Games themselves (i.e. 4 weeks of sport); and the legacy infrastructure, once constructed, in time for the Games. Key actions include:

- Minimise emissions in line with the Paris Agreement before compensating more than 100% of residual emissions

- Continuous improvement in emissions forecasting and measurement to support evidence-based decision making

- Consistency and transparency across the event lifecycle to promote accountability and comparability

- Influence to create change and deliver verifiable climate positive outcomes within host communities, including by promoting and enabling shared responsibility

- Certified carbon neutral event in accordance with the Climate Active Carbon Neutral Standard for Events

- Climate risk and adaptation planning

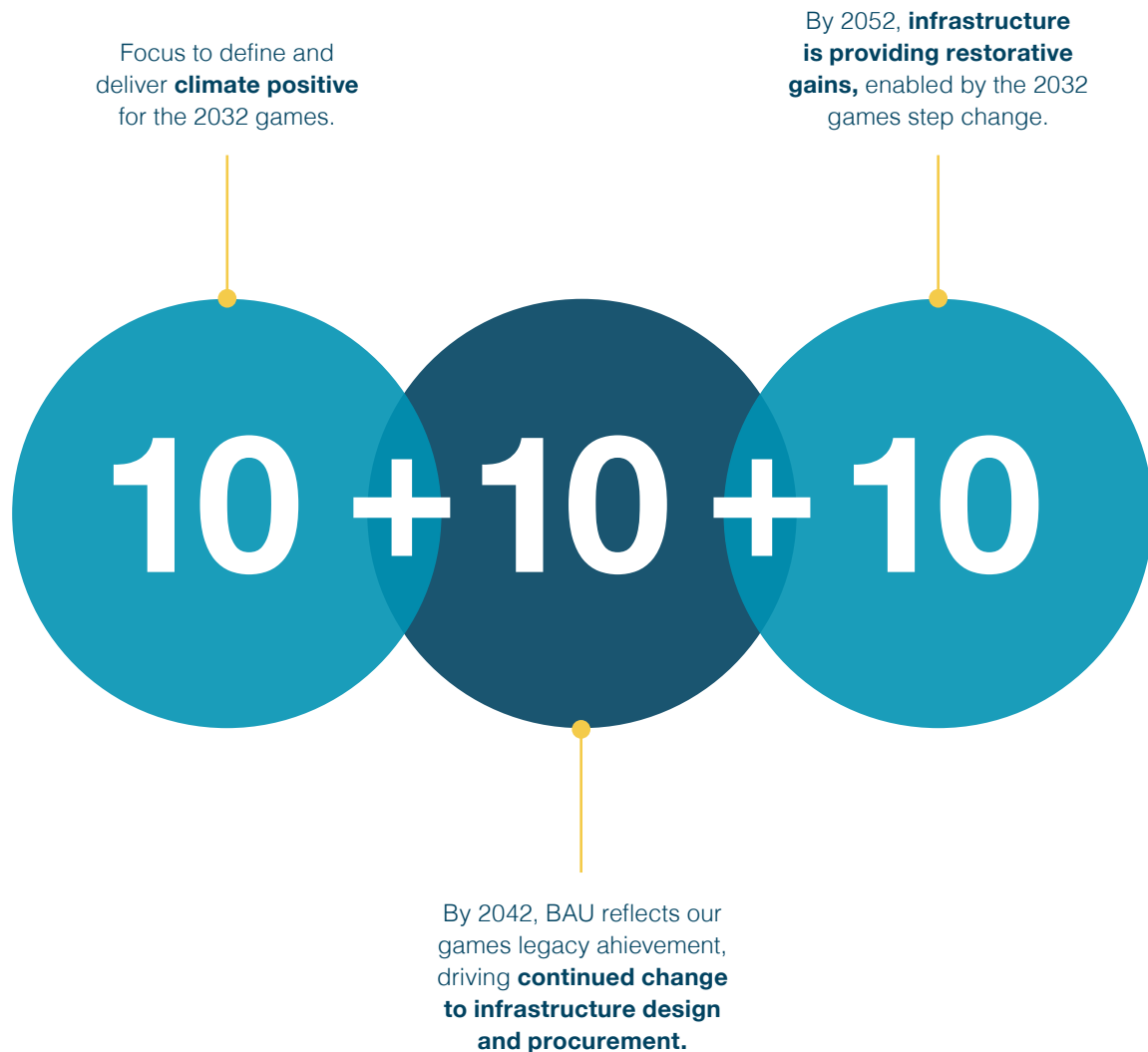# 2.4
The imperative for action

The Olympic and Paralympic Games create change and renewal through lasting legacy. They can create a common platform for building unity, charged with adrenaline and energy. Social cohesion is enhanced for a period of time through a shared story. Events on a global stage such as this, drive a high level of change across the city and beyond the physical legacy they leave – that which is designed, constructed, curated, and extended into the decades that follow. These legacies also influence local culture and identity. Investments such as Brisbane's South Bank Parklands have created the fabric for cultural exchange in the heart of Brisbane. This legacy has influenced many lives and will continue to pay dividends for decades to come.

> When the closing ceremony is over, and the athletes long gone, we snap back to reality. Life returns to normal programming – if we let it. This decade to 2030 is crucial to preventing the worst impacts of climate change and delivering a truly climate positive Brisbane 2032 Games could serve as a model for the whole industry in the decades to come.

When people talk about legacy plans for Olympic and Paralympic Games, they refer to the 10+10 – the 10 years before and leading up to the event and the 10 years after it, but given regional, national and international 2050 climate action targets, it can be argued this forecast needs to be extended to consider the 10+10+10 (refer to figure below).

Figure 7: A lasting legacy for our industry

Focus to define and deliver **climate positive** for the 2032 games.

By 2052, **infrastructure is providing restorative gains,** enabled by the 2032 games step change.

10 + 10 + 10

By 2042, BAU reflects our games legacy ahievement, driving **continued change to infrastructure design and procurement.**

These considerations, coupled with the proposed areas of opportunity and priority, provided the launchpad from which workshop participants at the 2022 IS Connect Conference workshop were encouraged to consider how industry might move forward in going beyond the target of achieving a climate positive games. A summary and supporting analysis of these inputs is presented in the next section.

3
Industry reflections

The workshop held during the IS Council's 2022 Connect Conference looked to identify recommendations and suggestions aligned to the key priority and opportunity areas identified in the lead up to the conference with the IS Council's Queensland Community of Practice.

3.1 Feedback from workshop participants

As highlighted (refer Section 2.2) during the IS Council's 2022 Connect Conference, AECOM and the IS Council facilitated a workshop session to explore how the Games might provide the impetus for rapid change across the infrastructure sector and sought to identify actions and initiatives that might prove useful in driving this agenda forward. Specifically, the workshop looked to identify recommendations and suggestions aligned to the key priority and opportunity areas identified in the lead up to the conference with the IS Council's Queensland Community of Practice (refer Section 2.2) and presented in the following sections of this paper (refer Sections 4.0 through 6.0). The conference had 334 in-person attendees from Australia and New Zealand who were divided into 16 groups for collaborative discussions.

The following outlines outcomes from this session, based on the responses received, a series of key themes and action areas came to the fore by participants which can be broadly categorised as follows:

Innovation: the need to explore new and emerging trends and technologies, investing in research and development and applying new ways of thinking – being allowed to ideate and create without the fear of failure; drawing in the voices and perspectives of different groups and stakeholders, creating competition, and celebrating creativity.

Community and collaboration: community-centred decision making, and co-design is critical to creating a lasting legacy – one that delivers meaningful change and renewal. As part of this, the voices and perspectives of First Nations groups need to be collected, reflected and celebrated. Beyond the voice of the community, there is a need to connect and collaborate across industries and sectors to work collectively and breakdown barriers and silos and enable real change to be delivered.

Minimum requirements: a baseline and starting point for industry needs to be set. Establishment of minimum requirements serve to initiate change and enable innovation and opportunity to be leveraged. There is a role for government, policy makers and those driving delivery to clearly set the benchmark and outline what is required to achieve (beyond) climate positive aspirations, both for Brisbane 2032 and beyond.

Resources – energy, water, waste and materials: the climate and environmental crises are being acutely felt, industry needs to set new and exacting targets to change and re-write the way we address resource use, consumption and materials.

Workforce: there is a growing need to understand and recognise the full spectrum of skills needed to enable industry uplift and development, beyond sustainability professionals - how do we scale the transition and who do we need to advocate and influence. In addition, it is important to provide opportunities for local and regional communities to be upskilled and employed to support project delivery.

Land use and environment: consider how we plan and deliver infrastructure to support accessibility, connectivity and interconnectedness. As part of this, look to maximise opportunities to incorporate nature-based solutions to deliver broader biodiversity benefits alongside natural alternatives to traditionally hard engineered solutions.

These themes form the basis for categorising the actions and recommendations received by workshop participants and are consolidated below (refer Table 2). The measures seek to summarise the action and direction participants felt was needed in order to carry forward a climate positive Brisbane 2032 agenda.

Table 2 IS Connect Conference climate positive Brisbane 2032 - workshop outcomes

Innovation

1. **Co-invest for innovation** – Reward design teams/ constructors with grants and funding. Provide conditions with the grants that innovation must be communicated back to industry/shared in an open-source way enabling the Games to provide a repository of information and ideas that can be taken forward and replicated by others.

2. **Knowledge sharing** – Develop an Infrastructure Sustainability Council Register of Innovations that goes beyond the successes to share mistakes and challenges. Reward the sharing of positive and negative experiences.

3. **Smart infrastructure for agility** – Designing and delivering intelligent infrastructure which adapts to the needs of 'current' society.

4. **Transferable learnings for emerging innovation areas** – Leverage the level of investment and spend to develop and expand sustainability industry into new areas of exploration (e.g. masterplanned circular economy).

5. **Embed long-term outcomes in procurement** – Prioritise long-term, outcomes-based procurement with clear innovation KPIs. Provide the time to fail fast and fail safe to allow and enable industry to innovate and share lessons on successes and failures around procurement, products, technologies and materials.

6. **Harness competition as a positive force** – Incentivise innovative design through competition celebrate successful applications. Competition to be open across multiple sectors e.g. industry, education, community.

Community and collaboration

1. **Working together to drive change** – Focus on sharing and collaborating to deliver the best for project and planet outcomes. Don't let the competitive spirit get in the way of collaboration.

2. **Seat and voice at the table** – Sustainability sector should be represented on and have a seat at relevant steering committees and planning teams.

3. **Community co-design** – Meaningful and empowered community engagement and participation.Consult to the community to gather ideas and engage with community to understand and meaningfully address impacts (both positive and negative).

4. **Integrated planning and design across the system** – Development of an overarching multi-faceted (supra) reference group to support integrated design and enable co-design - to be represented by members of design and construction industry but also, community members, First Nations communities, people with accessibility challenges, owners and operators to articulate and embed a single purpose and common set of goals.

5. **Co-design for post Olympics and Paralympics use** – Community assessment and consultation to support inclusive and accessible end of life usage of sporting infrastructure.

6. **Indigenous participation at the forefront of programs and projects** – Meaningful co-design, inclusion and engagement with First Nations Peoples and celebration and reflection of Indigenous cultures as a key delivery theme.

7. **Industry engagement in policy development** – Industry reference groups to inform and influence the Australian Olympic Committee to take a leading role to drive policy change.

8. **Cross sector collaboration for productivity** – Work collaboratively (cross-sector) to set upclear processes to enable quick and efficient approvals for the use of innovative products and non-standard innovations and materials.

9. **Alignment of rating tools** – Explore opportunities to better integrate sustainability rating tools (e.g. GBCA and IS Ratings) to deliver holistic sustainability solutions across Games venues and villages and supporting infrastructure.

Minimum requirements

1. **Embed sustainability into business case** – Planning stage and business cases should setrelevant targets and required / desired sustainability outcomes.

2. **Shared sector ambition, shared sector accountability** – All Government and Nongovernment Organisations should work to an aligned and single set of sustainability goals and objectives that all organisations are required to plan, design (and operate) in accordance with.

Resources (energy, water, waste, and materials)

1. **Mandating renewable energy** – Embed renewable energy as part of planning requirements for all new infrastructure. Create a policy for net zero beyond the Games and across industry to stimulate innovation and uptake of renewable energy and energy efficient products.

2. **Integrating circular economy** – Target zero waste for Brisbane 2032 and prioritise investment and growth of circular economy principles.

3. **No more waste** – Overhaul of waste planning to ensure there are the relevant waste resources and processes to account for future growth (beyond the Olympics and Paralympics), examples include:

- Offtake and waste policy

- Processing facilities for circular economy and/or energy production

- Improving current capacity where possible (rather than constructing new facilities)

- Undertake a wide-spread community campaign to address increased levels of business

- Waste during the Games and as a result of future growth

4. **Define and plan the end outcome** – Define what 'climate positive' means and develop a roadmap for industry.

5. **Provide capability to support innovation and change** – Create a hub to provide targeted funding and connections to support innovation and procurement, develop new products, increase local capacity and boost knowledge sharing.

Workforce

1. **Inclusive transition for local jobs** – Prioritise opportunities for regional areas to source materials and workforce locally

2. **Explore what the 'right people' means** – Many skills are needed to support this uplift, industry needs to review and focus on those skills and fields needed to support a low carbon economy and climate positive society. How do we build out the skills of those already in the industry (designers, engineers, drafters, contractors, etc.)

   to enable them to advocate for and influence sustainable and climate positive outcomes – we need more than just 'sustainability professionals'

3. **Scale the influence of sustainability through skills** – Support skills development and investment in sustainability professionals - consider integration within broader sections of university curriculum, linking to visa streams to encouraged skilled migrants.

Land use and environment

1. **Develop a plan to scale nature-based approaches** – formally consider and plan how natural and green areas are incorporated to maximise benefit. Explore opportunities to protect, sustainably manage, and/or restore natural ecosystems, with a view to addressing broader societal challenges such as climate change, human health, food and water security, while considering opportunities to deliver biodiversity benefits.

2. **Inclusive and sustainable transport** – Prioritise transport infrastructure planning to consider both provision but also accessibility and interconnectedness (mode-share, interchanges, hubs etc.)

In reflecting on these outcomes, it is also important to consider what the future of industry could and arguably should look like. As part of this and alongside identifying actions and recommendations, it is also useful to review potential barriers that can often impinge and limit progress as well as exploring and celebrating lessons learned and best practice from those who have come before. The following sections examine the areas of priority and opportunity within this paper[8] to contextualise and investigate options to go beyond existing and publicised commitments to deliver a climate positive 2032 Olympic and Paralympic Games and extend this influence on industry beyond Brisbane and South East Queensland, to shape infrastructure communities across Australia and New Zealand. The following sections present leading practice case studies supported by recommendations for consideration by Government and industry to stimulate action and implementation.

These actions represent proposed areas for application intended to support the breadth and scale of delivery associated with strategic delivery, Games infrastructure (both direct and supporting), the redevelopment of existing facilities, along with program and resourcing requirements.

[8] Note: the sustainability themes explored within this paper have been informed by independent research and consultation and do not comprise the official sustainability response or strategy under development by Queensland State Government.

4
Climate positive

Climate change is not just an environmental issue, it is also a social and economic one.

4.1 Overview

Climate change is not just an environmental issue, it is also a social and economic one. Emerging from the COVID-19 pandemic and heading towards 2030, the need for a climate positive economy, one which helps address a multitude of risks including extreme weather, biodiversity loss, social inequality and polarisation, and livelihood crises is being increasingly accepted.

This decade, to 2030, is crucial to preventing the worst impacts of climate change, and while climate mitigation alone will not solve these challenges, minimising the future impacts of climate change will help reduce the projected worst-case outcomes.

A climate positive Games brings unique opportunities to address legacy issues and offer an unprecedented opportunity to explore new industries. For regional centres currently reliant on fossil fuel extractions it presents the prospect to reimagine new and emerging industries. The scale of the Games creates a unique opportunity to explore how we might best implement circular economy principles and create a working model for deployment across the

South East Queensland region and beyond. Climate positive infrastructure will also increase social cohesion, delivering tangible benefits through a better understanding of First Nations' management of the land and the restoration of biodiversity using nature-based solutions.

The scale of what can be achieved through design, construction and operation will depend on many factors. These include critical aspects such as collaboration, leveraging competitive markets, intelligent procurement, holistic emissions boundaries and accounting, and the robustness of the overarching sustainability and decarbonisation strategy and policy settings.

To be climate positive, Brisbane 2032, will need to go beyond achieving net zero carbon emissions to create an environmental benefit by removing additional carbon dioxide from the atmosphere.[9] This means reducing and offsetting more emissions than are released and taking other positive actions to help restore the environment.[10]

[9] Refer: https://www.fastcompany.com/40583176/climate-positive-carbon-neutral-carbon-negative-what-do-they-mean
[10] Refer: https://carbonpositiveaustralia.org.au/learn/about-carbon/carbon-neutral-to-carbon-positive/

4.2 Success spotlight – case studies of excellence

Science has clearly shown that in order to avoid the worst impacts of climate change and to preserve a habitable planet, global temperature rise needs to be limited to no more than 1.5°C above pre-industrial levels. Today, the Earth is already warming by more than 1.1°C compared to the late 19th century, and emissions continue to rise. To keep global warming below 1.5°C, as called for in the Paris Agreement, emissions need to be cut by around 45% by 2030 and reach net zero by 2050.[11]

As highlighted in Figure 6, the journey undertaken by the IOC to support and drive these endeavours across the network of Olympic Games events and legacies is considerable. It also is a work in progress and is often a journey of incremental, but transformational steps. The following case studies seek to showcase leading examples of projects that have sought to meaningfully and proactively address the climate and carbon challenge by investigating and implementing a combination of practical and innovative measures.

In looking at the Tokyo 2020[12] Olympic Games, the following explores lessons learned from their strategy around hydrogen, while the second case study evaluates how Sydney Metro's ambitious targets around climate, carbon and sustainability are being implemented to drive leading outcomes.

[11] https://www.un.org/es/climatechange/net-zero-coalition
[12] Note: the 2020 Tokyo Olympic Games were delayed due to the COVID-19 global pandemic and as a result took place from 23 July – 8 August 2021.

Tokyo Games use of hydrogen points the way towards a carbon-free future

Climate positive drivers:

Technology; innovation; hydrogen; carbon

Project name:

Tokyo Games Hydrogen Strategy

Location:

Tokyo, Japan

Delivery agency:

Tokyo Organising Commitee of Olympic and Paralympic Games (TOCOG)

Project overview

Before being postponed due to the global COVID-19 pandemic, the 2020 Tokyo Olympic Games were initially billed as the 'Hydrogen Games' owing to plans to power much of the event's infrastructure on hydrogen. While the scale of the initial program (which included fuelling the Olympic cauldrons, the entire Olympic Village, one hundred hydrogen-fuel-cell-powered buses and 500 hydrogen powered cars to transport staff and competitors between venues) had to be scaled back, significant technological progress and innovation was realised.[13] Final delivery resulted in hydrogen powering a key building within the Olympic Village, 100 fuel cell buses and approximately 500 Mirai cars.[14] The initiative has helped catalyse broader aspirations for the Japanese government to transition to a hydrogen economy.[15]

[13] Source: https://www.scientificamerican.com/article/the-hydrogen-olympics-lit-a-torch-for-the-clean-fuels-future1/
[14] Refer: https://www.sustainable-bus.com/fuel-cell-bus/fuel-cell-buses-tokyo-olympic-games/
[15] Refer: https://www.ft.com/content/2b9dd655-6b64-416c-a83f-1fe1002da7d5

Examples of climate positive progress/excellence

- The Tokyo Games achieved a beyond carbon neutral result by reducing carbon emissions and compensating more than the remaining emissions; reusing or recycling 99% of non-consumable items and recycling 62% of waste[16]

  - In addition, CO_2 emissions from the Games fell by 800,000 tonnes due to the fact the Games were held with almost no spectators.

  - Through the Tokyo cap-and-trade program and Saitama Target Emissions Trading System, as many as 217 businesses provided certified Excess Reduction Credits, amounting to 4.38 million t-CO_2 available to offset the Games. This amount exceeds the calculated total carbon footprint of 1.96 million t-CO_2 by 2.42 million t-CO_2 enabling the Games to go beyond carbon neutrality.

- Hydrogen was used for the first time as fuel for the flame of the Olympic torch and the cauldron; in addition, 475 fuel cell electric vehicles provided by Worldwide Olympic/Paralympic Partner Toyota were utilised for transportation.

- Electricity generated using pure hydrogen fuel cells was used to supply power to some of the residential buildings and the athlete leisure area, "Relaxation House", at the Olympic and Paralympic Village, under a Tokyo Metropolitan Government initiative.[17]

Project highlights

- Technical innovation - led to the creation of a Research Centre for a Hydrogen Energy Based Society (ReHES)[18]

- Linked energy ambitions to national energy policy (not just for the Games) to help drive change

  - Under Japan's hydrogen vision, the country has set a target of 800,000 fuel cell vehicles by 2030 and a network of filling stations. There are currently 135 hydrogen refuelling stations in Japan, more than any other country.[19]

  - Japan has a target to be carbon neutral by 2050 and sees hydrogen as a key piece of the carbon puzzle, the 2020 Olympic Games helped galvanise research, action and investment in this space.

- The Tokyo 2020 Games were planned and delivered in alignment with the five main sustainability themes: climate change, resource management, natural environment and biodiversity, human rights, labour and fair business practices, and involvement, cooperation and communications (engagement).

[16] Source: https://olympics.com/ioc/news/tokyo-2020-goes-beyond-carbon-neutrality-and-helps-create-a-more-sustainable-society
[17] Source: https://olympics.com/ioc/news/tokyo-2020-goes-beyond-carbon-neutrality-and-helps-create-a-more-sustainable-society
[18] Refer: https://www.nature.com/articles/d42473-020-00546-6
[19] Refer: https://olympics.com/ioc/news/at-tokyo-2020-hydrogen-shows-promise-of-a-carbon-free-future

Sydney Metro: from strategy to action, to reduce emissions

Climate positive drivers:
Strategy implementation and ongoing delivery; emissions reduction; materials substitution; sustainability excellence; onsite renewables; Purchase Power Agreements

Project name:
Sydney Metro

Delivery agency:
Sydney Metro Delivery Authority

Location:
Sydney, Australia

Capital Cost:
AUD $30B. Note this is across delivered and future stages of work[20]

Project overview

Sydney Metro is Australia's biggest public transport project. Consisting of three projects under construction: City and Southwest, West and Western Sydney Airport, plus the operational Metro North West Line. Bringing together transport for the Greater Sydney CBD with 113km of new metro rail, and 46 stations across 4 metro lines. This rail project is expected to be completed in 2030.

[20] Refer: https://infrastructurepipeline.org/project/sydney-metro

Examples of climate positive progress/excellence

- Development of Sydney Metro Sustainability Framework with a principle to tackle climate change

- 133,000 tonnes of CO_2 emissions saved in FY21 and FY22

- 43% Portland cement replaced using supplementary cementitious materials

- 97% (almost 172,000 tonnes) of construction and demolition waste recycled and diverted from landfill

- 1,100 kilowatts peak (kWp) of solar photovoltaics installed for the Metro North West Line · the newly completed Sydney International Speedway in Western Sydney Parklands (as part of Sydney Metro West project enabling works) includes 100 kilowatts peak of on-site solar panels.

- The City and Southwest project design includes over 800 kilowatts peak (covering approximately 6400 square metres) of solar photovoltaic panels across 13 sites.

  - On average, the solar panels on the City and Southwest project will supply around 3% of the total electricity required for the above ground stations and maintenance facilities.

- Further opportunities for solar photovoltaics are being investigated on Sydney Metro West and Sydney Metro– Western Sydney Airport projects.

- Sydney Metro has also committed to purchasing zero emission electricity for all Sydney Metro operations. Sydney Metro used zero emission electricity for its operational consumption through the purchase and retirement of large-scale generation certificates (LGCs) from the Beryl Solar Farm in regional NSW.[21]

- Tunnels, Stations and Excavation achieved a leading IS Rating (96.38 points) and Sydenham Station achieved a leading IS Rating (91 Points).

Project highlights

- Creating a framework enables outcomes to be considered from the early planning stages of a project and not just at the delivery stage.

- Created a holistic approach (integrated strategy) to delivering climate positive aspirations, informed by the creation of six key principles to support efforts to embed sustainability[22] across all aspects of work.

  - Demonstrate leadership

  - Tackle climate change

  - Manage resources efficiently

  - Drive supply chain best practice

  - Value community and customers

  - Respect the environment

- Focus on developing effective and appropriate responses to climate resilience, energy security, land use, liveability, employment, diversity and inclusion.

[21] Source: https://www.sydneymetro.info/sites/default/files/2023-01/Sydney_Metro_Sustainability_Report_2022_WCAG.pdf
[22] Refer: https://www.sydneymetro.info/our-approach-sustainability

4.3
Key recommendations

These key recommendations have been directly informed by the learnings derived from the preparation of this paper, research into the case studies outlined above; and from feedback provided during the ISC Council 2022 Conference workshop and preparatory Community of Practice session.

- Invest in carbon innovation – through research and development and be open to failure and learning from lessons.

- Operationalising strategies and targets – setting a clear path for delivery and continually monitoring and measuring progress through delivery – learning and adjusting as progress is made.

- Explore a full range/spectrum of opportunities for renewable solutions – onsite renewable generation; alternative fuel sources; purchase power agreements; offset purchases.

- Define what 'climate positive' means for the planning, delivery, and operation of infrastructure over the next decade and give permission for project teams to explore the means to decarbonise based on a range of criteria. E.g., not just based on cost, but also efficiency, whole of life outcomes and effectiveness of solutions.

- Embed a carbon budget into asset planning, delivery and operations with financial incentives driving decision-making and behaviour with post-completion assessments.

- Sector-wide commitment to prioritise decarbonising real emissions, with offsets used as a last resort.

- Set annual science-based carbon budgets for each infrastructure authority (capturing infrastructure delivery, maintenance, and operations) to align with national carbon reduction targets and drive reductions.

- Develop a mandatory, transition strategy for construction fuels and plant operators that is developed through a supportive and collaborative approach.

- Vastly improve accessibility to tools and capabilities for modelling our impacts.

- Institute a robust nationwide standardised framework for carbon measurement, based on PAS 2080, to harmonise measurement and reporting.

5

Embedding resilience

Resilience relates to a community's capacity to accommodate, recover, transform, and thrive.

5.1 Overview

Resilience relates to a community's capacity to accommodate, recover, transform, and thrive in response to shocks and stresses and to realise positive economic, social, and environmental outcomes. In delivering a climate positive Brisbane 2032, industry and government has an unprecedented opportunity to design, deliver and maintain resilient infrastructure – infrastructure designed to be responsive to a diverse range of shocks and stresses and enhance the well-being and liveability of the communities it serves.

Exploring community resilience

Shocks

Shocks cause a sudden and significant disruption to assets, infrastructure, or the community. While they include events like those associated with natural disasters such as floods, bushfires, extreme storms and cyclones, they also include a greater and more encompassing scope of impacts such as those experienced as a result of digital network failure; cyber terrorism; physical terrorism; infrastructure failure etc.

Stresses

Stresses are long-term and chronic conditions influencing the consequence and likelihood of a shock event and the capacity of the community to cope or recover. They include impacts associated with trends and drivers related to societal, environmental and economic issues. These include challenges spanning a range of areas such as housing affordability; lack of transport availability and accessibility; access to healthcare; biodiversity loss; antisocial behaviour and crime rates; racism and social injustice.

To minimise the impacts of shocks and stresses, infrastructure and the communities they serve need to become more resilient to the range of mega trends; pinch points and barriers they face to help support the capacity of individuals, organisations and business to not only recover, but to flourish.

Queensland is recognised as the most disaster-affected region in Australia.[23] The 2021-2022 summer recorded the costliest flood event in Australian history[24] further highlighting the need to address threats posed by climate change and extreme events.

Beyond climate change and the impacts of natural disasters, ongoing challenges facing Brisbane, Queensland and the Australia and New Zealand region generally include:

- ongoing recovery efforts from the impacts of the COVID-19 pandemic,
- severe labour and skills shortages,
- inflation and the cost of living crisis, and
- insufficient housing levels.

The need to address and respond to these trends shape the context in which the Brisbane 2032 Games will be planned and delivered and underpin the need to embed resilience across future infrastructure across all phases of planning, design, delivery and post games legacy. Leveraging the goal of delivering a climate positive Games to address a broader sustainability agenda presents a unique opportunity to deliver truly resilient infrastructure.

Against a background of ever-increasing natural disasters and environmental emergencies, Australia and New Zealand face a growing and pressing need to be climate ready and responsive rather than reactive.

[23] Source: https://www.qra.qld.gov.au/sites/default/files/2020-02/0501_Resilient%20Queensland%20in%20Action_V22_LR_February2020.pdf
[24] Source: https://insurancecouncil.com.au/resource/updated-data-shows-2022-flood-was-australias-costliest/

5.2 Success spotlight – case studies of excellence

Understanding the extreme, sharp shocks alongside the chronic and often compounding stresses likely to undermine infrastructure and communities is an often detailed and revealing process.

Those shocks likely to playout when planning the Olympic and Paralympic Games event in and of itself often differ quite significantly to those needing consideration as part of the remaining legacy beyond the closing ceremony. Much promise and stock are put into successful host nations using the Games to help address and alleviate community and societal stresses and pressures, but the ability to create and maintain lasting change is often questioned.

The case studies selected below seek to highlight examples of infrastructure that has helped address both areas of consideration. The first explores the economic and community legacy delivered by the London 2012 Olympic Games, with the second specifically focusing on infrastructure designed to address climate shocks associated with flooding and extreme storms.

London 2012 – A legacy of community, economic regeneration, and renewal

Climate positive drivers:
Strategy implementation and ongoing delivery; emissions reduction; materials substitution; sustainability excellence; onsite renewables; Purchase Power Agreements

Project name:
Queen Elizabeth Olympic Park[25]

Delivery agency:
London Legacy Development Corporation (formerly Olympic Delivery Authority)

Location:
Stratford, south-east London, UK

Capital Cost:
£12B

For completeness, it has been recorded actual costs for development, including monies spent in the 10 years post-games is closer to £24 bn[26]

Project overview

Queen Elizabeth Olympic Park spans 560 acres of previous green and brownfield land in Stratford, south-east London. It took four years and 80,000 thousand workers to construct.[27]

The legacy of the project spans recreational and sporting facilities; community amenity and parklands; retail and commercial hubs and a significant investment in community development.

[25] Refer: https://www.queenelizabetholympicpark.co.uk/
[26] Source: https://cityterritoryarchitecture.springeropen.com/articles/10.1186/s40410-017-0066-0
[27] Source: https://romanroadlondon.com/ten-years-on-queen-elizabeth-olympic-park/

Examples of climate positive progress/excellence

- 110,00 new jobs reported across the immediate districts of London which hosted the Games.[28]

- Development of new neighbourhoods, business parks and cultural areas have helped transform previously deprived areas of London into key areas for culture, sport, business and education.

- Investment and provision of transport links alongside education and health facilities to support current and planned communities.[29]

- The initial plan for the athletes' village planned to create 2,818 new homes of which about 40% would be affordable homes for low- and middle-income families and disabled people.[30]

- Current estimations report over 10,000 homes have been completed and, two of five new neighbourhoods under construction with over 55,000 people living on and around Queen Elizabeth Olympic Park by 2031.[31]

- Dedicated and ongoing funding to support community initiatives and networks which promote and foster community cohesion, connectivity and support.[32]

Project highlights

- Ongoing delivery and management: Initial Olympic Delivery Authority, superseded by the Olympic Park Legacy Company and replaced by the London Legacy Development Corporation (LLDC) have continued to coordinate and drive delivery.

  - A critical success factor for the ongoing legacy created was the establishment of the Olympic Park Legacy Company (now the LLDC) at the same time as the Initial Olympic Delivery Authority – the organisations worked in tandem through a co-design process to demonstrate and enable London's commitment to legacy from inception.

  - LLDC is responsible for the regeneration legacy from the London 2012 Games including overall responsibility for the Park, ownership of the permanent venues and development powers.[33]

- Dedicated and ongoing funding to support community initiatives and networks.[34]

- Collaborative and cross-sectoral investment, engagement and collaboration to achieve outcomes.

[28] Source: https://olympics.com/ioc/news/mayor-reveals-olympic-host-boroughs-as-london-s-fastest-growing-area
[29] Source: https://www.queenelizabetholympicpark.co.uk/the-park/homes-and-living/schools-and-services
[30] Source: https://www.geographycasestudy.com/case-study-london-olympics-2012/
[31] Refer: https://www.queenelizabetholympicpark.co.uk/the-park/homes-and-living
[32] Refer: https://www.queenelizabetholympicpark.co.uk/media/press-releases/lldc-neighbourhood-priorities-fund
[33] Refer: https://nla.london/members/london-legacy-development-corporation
[34] Refer: https://www.queenelizabetholympicpark.co.uk/media/press-releases/lldc-neighbourhood-priorities-fund

The "Big U" a lesson in flood defence and urban amenity

Climate positive drivers:
Stresses: Sea level rise; lack of public amenity; social cohesion; connectivity

Project name:
East Side Coastal Resiliency (ESCR) Project[35]

Delivery agency:
City of New York, Rebuild by Design

Location:
Lower-Manhattan, New York, USA

Capital Cost:
USD$1.5B[36]

Project overview

The ESCR Project was conceptually designed in response to the extensive flooding and devastation that followed Superstorm (Hurricane) Sandy in 2012. Hurricane Sandy devastated not only the Financial District, but also 95,000 low-income, elderly, and disabled city residents. The low-lying topography of Lower Manhattan is home to approximately 220,000 residents and is the core of a $500 billion business sector that influences the world's economy.

Initially conceived as design competition run by Rebuild by Design, ESCR comprises the first segment of a 10-mile flood protection system that extends around lower Manhattan, referred to as the "Big U.[37] The project has been envisaged to form a 'ribbon' of connected and networked flood defences to help build resilience to the significant levels of infrastructure within the 10-mile perimeter that were damaged or destroyed leaving transportation and communication cut off, and thousands without power or running water.[38]

[35] Source: https://www.dezeen.com/2018/07/20/big-u-storm-flood-defences-east-side-coastal-resiliency-manhattan-move-forward/
[36] Source: https://www.jacobs.com/projects/east-side-coastal-resiliency
[37] Source: https://www.jacobs.com/projects/east-side-coastal-resiliency
[38] Source: https://www.rebuildbydesign.org/work/funded-projects/the-big-u/#:~:text=PROPOSAL,impacts%20of%20a%20changing%20climate

Examples of resilient progress/ excellence

Key project goals of the ESCR project include:

• Flood risk reduction

• Improved waterfront access and enhanced public spaces.

    - The project will not only protect vulnerable areas and critical infrastructure from future flooding but will also make communities safer and more vibrant.

• The ESCR flood protection system covers a very dense, vibrant part of New York City (NYC) that runs parallel to NYC's major east side highway, the FDR Drive.

• Project area includes the East River Park waterfront parks, critical infrastructure, and residential and commercial neighbourhoods.[39]

• On completion, the project will deliver a strengthened coastal defence system incorporating infrastructure resiliency upgrades, stormwater drainage management improvements, enhanced community access to waterfront parks, and improved park amenities, environmental habitats, and park facilities.

• A key project goal is to not only protect City-wide and neighbourhood critical infrastructure from future flooding but also make the communities safer and more vibrant.[40]

Project highlights

• Foster design innovation, excellence and creativity through competition. The Big U was initially conceived in response to an international design competition.

    - The Rebuild by Design Hurricane Sandy Design Competition changed the way the federal government responds to disaster and became the model now used in other regions to prepare communities for future uncertainties. Its success has also inspired other efforts.

    - In 2014, President Obama launched the National Disaster Resilience Competition, which awarded $1 billion to 13 cities and states across the country to fund resilience-building projects.

    - Internationally, The Rockefeller Foundation, in partnership with the USAID and The Swedish International Development Agency, developed the Global Partnership for Resilience based on the Rebuild by Design competition model and collaborative approach.

    - The competition model's success also led to the formation of the Rebuild by Design organisation, which is helping cities and communities around the globe become more resilient through collaborative research and design.[41]

• Cross-sectoral collaboration and support – the design competition behind the Big U was led by Rebuild by Design which was formed out of the U.S. Housing and Urban Development (HUD), Municipal Art Society, Regional Plan Association, NYU's Institute for Public Knowledge, The Van Alen Institute, with support from The Rockefeller Foundation and others.[42] It is now being driven by the City of New York with input and support by New York State Battery Park City Authority.

[39] Source: https://www.jacobs.com/projects/east-side-coastal-resiliency
[40] Source: https://sustainableinfrastructure.org/project-awards/east-side-coastal-resiliency/
[41] Refer: https://www.rebuildbydesign.org/hurricane-sandy-design-competition/
[42] Source: https://www.rebuildbydesign.org/hurricane-sandy-design-competition/

5.3
Key recommendations

The following set of recommendations draw specifically on key insights from the case studies and research conducted in the preparation of this paper and from feedback provided during the ISC Council 2022 Conference workshop and preparatory Community of Practice session. They are designed to support industry action and direction to forward the resilience agenda for both Brisbane 2032 and beyond.

- Establish networks and mechanisms to support and enable opportunities for cross-sector collaboration and creation.

- Invest and collaborate across local, state, and federal governments to develop an advanced and harmonised approach to climate modelling and resilience measurement and build a common understanding of climate hazards and vulnerabilities.

- Explore opportunities to leverage off the work started by the QCoast 2100 coastal hazards adaptation program to support climate readiness.

- Incentivise opportunities to foster creativity, innovation and collaboration leading to improved and enhanced resilience outcomes across the infrastructure project lifecycle (i.e. feasibility through to operations).

- Undertake an inclusive co-design process for identifying and implementing resilience measures – including First Nations knowledge and input.

- Develop an overarching, systemic resilience strategy to guide the implementation of resilience at an individual project or asset level. This includes implementing the use of the IS Rating Scheme to assess sustainability of projects and/or assets.

- Identify and maximise the delivery of co-benefits, for example, using place-based approaches, multi-use design, and nature-based solution design.

- Design and deliver assets that better support local communities and contribute to ongoing legacy and resilience endeavours up to and beyond the games.

- Community-centred decision making should be a key consideration in developing strategies around legacy to help avoid instances where existing community members and groups feel pushed out or to the fringes.

- Build with flexibility and adaptability and identify the tools and technologies that will support greater resilience.

- Develop a better understanding of the 'Climate Readiness Pipeline' - the scale of work that needs to take place across communities for resilience and adaptive capacity with formal assessments and prioritisation criteria.

- Leverage Games-specific resilience strategies to support the well-being of athletes, attendees, staff, and the natural environment for long-term capability building. For example, the extreme heat policy and Queensland evacuation centre planning toolkit.

- Across the network and region, leverage accessibility and inclusion Games goals to make infrastructure and its related services more accessible and inclusive to all.

- Use people-centred decision-making to support the delivery of a true legacy project that goes beyond the Games to shape, change, and influence Brisbane and beyond.

- Build local capacity and capability for materials, goods, and services to improve resilience to international supply chain disruption.

- Build stronger cross-sector links for interdependent risks and opportunities e.g. with finance and insurance sectors.

- Define resilience early and establish its scope, for example, ensure non-climate shocks and stresses are considered such as pandemics.

6

Nature-based solutions

Nature-based solutions play a fundamental role in increasing the climate change resilience of cities, communities and infrastructure services.

6.1 Overview

Global and local drivers to improve our collective response to biodiversity loss are now well established. The United Nations Convention on Biological Diversity (COP15) highlighted the importance of biodiversity to human health & wellbeing, economic prosperity for all, our food systems, energy, water and clean air, security from natural disasters as well as recreation and cultural inspiration. It established that biodiversity is now deteriorating worldwide at unprecedented rates, faster than at any time in history.

Nature-based solutions supported by policies, legislation, all levels of government, corporate commitments and community action are the practical response to the historic decline of biodiversity on the planet.

Nature-based solutions play a fundamental role in increasing the climate change resilience of cities, communities and infrastructure services.[43] In addition, it is estimated nature based solutions could contribute over one third of the total climate mitigation needed by 2030 to stabilise warming below 2°C (alongside deep fossil fuel reductions),[44] while simultaneously providing other ecosystem services such as increased biodiversity, soil health, air and water quality.

The Brisbane 2032 Games provides both Brisbane and the wider South East Queensland region with the

opportunity to integrate nature-based solutions into delivery. This could be undertaken across several areas, spanning the provision of new and upgraded venues through to the construction of supporting transport and other infrastructure to help deliver a long-lasting legacy for the whole community with multiple co-benefits.

The driver to be climate positive means nature-based solutions will be fundamental in assisting the Queensland Government achieve its target. To achieve a climate positive outcome more than 100% of residual emissions from the design, construction and operation of the Games will need to be offset utilising Queensland's existing Land Restoration Fund as one vehicle to achieve this outcome.[45]

The International Union for Conservation of Nature (IUCN), defines nature-based solutions as "actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits." Green infrastructure is defined as incorporating "green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas.

A green infrastructure approach considers conservation values and actions related to land development, growth management, and built infrastructure planning." They define natural infrastructure as "restoring structure, function, and composition of ecosystems to deliver ecosystem services." It also defines ecosystem services as "the benefits that nature provides to people – delivering solutions to global challenges such as climate change and sustainable development. They include carbon storage and sequestration, water provision, recreation and tourism, opportunities for income, and many other benefits".

[43] https://publications.iadb.org/publications/english/document/Increasing-Infrastructure-Resilience-with-Nature-Based-Solutions-NbS.pdf
[44] https://www.pnas.org/doi/10.1073/pnas.1710465114
[45] Refer: https://www.qld.gov.au/about/Brisbane2032/climate-positive-games

6.2 Success spotlight – case studies of excellence

The benefits derived from the incorporation of nature-based solutions are diverse and wide-reaching. From improving outcomes for biodiversity and ecosystem rehabilitation through to improving amenity and health and wellbeing, exploring opportunities to consider nature-based solutions offer multiple returns. The following case studies illustrate examples of how best practice nature-based solutions have been applied to deliver enhanced outcomes for the legacy of the Sydney 2000 Olympic and Paralympic Games and as part of an urban waterway renewal project in Brisbane.

Sydney Olympic Park – excellence in ecosystem restoration

Climate positive drivers:
Brownfield site restoration providing multiple benefits

Project name:
Sydney Olympic Park Wetlands

Delivery agency:
Sydney Olympic Park Authority

Location:
Sydney Olympic Park, NSW

Project overview

Sydney Olympic Park (the Park) is a large urban park containing both remnant and constructed landscapes that underwent significant ecological restoration in preparation for the 2000 Olympic Games. Ecological restoration efforts sought to rebuild functional and naturalistic ecosystems within an urban parkland environment. This included restoring remnant eucalypt forest and estuarine wetlands, restoring tidal flushing to land locked estuarine wetlands improving migratory bird habitat and constructing freshwater ponds and wetlands as habitat for the Green and Golden Bell Frog.

Following the 2000 Sydney Olympic and Paralympic Games, the Sydney Olympic Park Authority (SOPA) were given the role of managing legacy assets from the Games including all of the public places, 430 hectares of parkland and seven sporting venues. SOPA has also been responsible for the conservation and enhancement of the Park's biodiversity, over half of the 430 hectares of parklands is managed for nature conservation which includes over 400 native plant species and over 250 native animal species. This rich biodiversity makes an important contribution to the economic and social values of the Park through enriching visitor experience (with some 2.8 million visitors/ annum), providing a living classroom for environmental education programs, and attracting businesses and residents seeking proximity to nature.[46]

[46] Source: sopa.nsw.gov.au

Examples of nature-based solutions excellence/progress

- The wetlands at the Park are known as biodiversity hotspots in urban Sydney.

- They host the largest population of endangered green and golden bell frog *(Litoria aurea)* in the Sydney basin.

- Features the largest coverage of coastal saltmarsh on the Parramatta River estuary and the single largest contiguous stand of grey mangrove *(Avicennia marina)* on this River.

- The long-living resident pairs of breeding white-bellied sea-eagle *(Haliaeetus leucogasterin)* in the Park have been an attraction for millions of online wildlife enthusiasts through Sea-eagleCAM.

- The Park's wetlands provide significant feeding and roosting habitats for seven species of migratory shorebirds, including Latham's snipe *(Gallinago hardwickii)*, sharp tailed sandpiper *(Calidris acuminate)* and bar-tailed godwit *(Limosa lapponica)*.

- Due to their suitability and significance, the wetlands of the Park are now the ideal demonstration site for endangered green and golden bell frog, a preferred site for techniques of restoring coastal saltmarsh and a popular destination for wetland professionals and nature-lovers in this highly urban parkland.[47]

- Collaborative and cross-sectoral investment, engagement and collaboration was employed to achieve outcomes.

Project highlights

- SOPA have a long-standing organisational commitment to protect and enhance the ecology of the area that is essential to the future of the Park's biodiversity.

- The project demonstrated that large-scale and complex site remediation can be achieved in an environmentally sensitive manner with positive ecological outcomes.

- Ecological restoration works benefited from the environmental framework established for Olympic development.

- The high public profile and inflexible timeframe of the 'Green Games' provided a strong social driver for fast-tracking these works and led to their integration with ecologically sustainable development initiatives occurring as part of the Games development.[48]

- A long-term ecological monitoring programme has been in place at the Park for over 20 years (for certain species). This monitoring has helped to target habitat modifications to successfully encourage and increase biodiversity such as the increase in structural diversity and complexity of key areas of the Park to support woodland birds.

- New habitat management plans for ecologically sensitive areas of the Park are being developed to better guide biodiversity conservation on a precinct level. Ongoing ecological management works, and managing the impacts of human disturbance, will be essential to conserving the ecological values of the Park.

[47] Source: dcceew.gov.au/water/wetlands – Author: Dr Swapan Paul, SOPA
[48] Source: Sydney Olympic Park Authority – www.sopa.nsw.gov.au - Fact Sheet, Restoring Wetlands, Jan 2015

Hanlon Park/Bur'uda Rejuvenation: natural solutions deliver on multiple fronts

Climate positive drivers:
Provide a more natural solution with multiple benefits
to the community

Project name:
Stones Corner Precinct - Hanlon Park / Bur'uda
Rejuvenation project

Location:
Hanlon Park, Bur'uda, Stones Corner, Brisbane

Delivery agency:
Brisbane City Council

Project overview

Norman Creek in the Hanlon Park area was once notable for the ageing concrete channel, almost total lack of life in the creek and extent and nature of flooding following extensive rain events.

Hanlon Park /Bur'uda was a large, open green space in the heart of Stones Corner that has been revitalised by removing the concrete drain and returning Norman Creek to a natural waterway through the park. The park has been transformed into an attractive and versatile public space that supports the growing Stones Corner Precinct – creating a vibrant urban oasis with more to see and do. There is a new nature-themed play area that provides natural play opportunities for children aged 0-12 years, as well as shelter and seating areas for the community.[49]

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[49] Refer: https://www.brisbane.qld.gov.au/clean-and-green/natural-environment-and-water/creeks-and-waterways/protect-our-waterways/norman-creek-2012-2031-project/stones-corner-precinct-hanlon-park-buruda-rejuvenation-project

Examples of nature-based solutions excellence/progress

Hanlon Park is a successful example of how a nature-based solutions approach can be used to restore the creek, mitigate floods from the creek, restore natural habitat and increase biodiversity in the city. In addition, as part of revitalisation efforts, opportunities to provided additional amenity and recreation facilities have also been incorporated.

The formerly channelised creek has now been reconfigured with a meandering low-flow channel, and a wide high-flow channel which is able to handle large volumes of water when the creek is in flood.

Freshwater habitats are supported by riparian planting and far more animals and birds are now seen in the park. Simple infrastructure design allows movement of floodwaters with minimum impact due to flood resilient design.

The concept plan was developed through community consultation in 2018, including a co-design workshop, online survey and extensive technical investigations.

Project highlights

The Stones Corner Precinct - Hanlon Park / Bur'uda Rejuvenation project:

- revitalises Norman Creek, which runs through the park

- increases the area's resilience in flood events

- enhances the environment with more trees and natural spaces

- increases recreational and social opportunities for residents and visitors

- enhances connectivity and accessibility within the park and local area

- boosts local economic vibrancy with a new place to relax and enjoy.[50]

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[50] Source: https://www.brisbane.qld.gov.au/clean-and-green/natural-environment-and-water/creeks-and-waterways/protect-our-waterways/norman-creek-2012-2031-project/stones-corner-precinct-hanlon-park-buruda-rejuvenation-project

6.3
Key recommendations

The following set of recommendations draw specifically on key insights from the case studies and research conducted in the preparation of this paper and from feedback provided during the ISC Council 2022 Conference workshop and preparatory Community of Practice session. They are designed to support industry action and direction to forward the resilience agenda for both Brisbane 2032 and beyond.

- Set targets aiming to avoid any loss of biodiversity - where this is not possible, actively minimise loss by setting net positive targets for the enhancement, rehabilitation and restoration of biodiversity associated with the planning, design and construction of all venues, accommodation and associated Games Infrastructure.

- Consider opportunities to position nature that celebrates Australia's natural heritage prominently within the Games infrastructure and precincts and beyond. Use the Games to showcase how nature based solutions can be implemented and that they deliver a wide range of ecosystem services to society, communicating the benefits and building awareness.

- Build the investment case for nature-based solutions highlighting the co-benefits these can deliver – this should include developing metrics for assessing the performance and value of nature-based solutions.

- Provide the opportunity for the business case for nature-based solutions to be considered as a viable alternative to grey infrastructure in the procurement process of public infrastructure. This business case should consider the co-benefits of each approach, quantified or otherwise.

- Develop or adopt standards, guidelines, or strategies for different types of nature-based solutions that are context-specific. Standards provide reassurance for buyers of such services and verification of quality to help support and differentiate the offerings of suppliers.

- Integrate First Nations knowledge and practice to standards, guidance and practice to bring together the wisdom and knowledge of Country with modern insights such as biophilic design.

- Partner with nature focused, research organisations and First Nations groups to leverage existing skills and knowledge to scale and extend capability.

- Consider innovative solutions to support land conservation and promote nature-based Solutions. For example, this might include exploring options for conserving land for nature in Queensland, by designating a National Park for the Olympics and Paralympics as part of a climate and nature positive solution.

7
Actions and next steps

This paper offers a blueprint from which industry can think beyond a climate positive Brisbane 2032.

7.1 Strategic actions and next steps

This paper offers a blueprint from which industry can think beyond a climate positive Brisbane 2032. It draws together the research, insights and learnings of multiple projects, industries and people, to stimulate thought, discussion and action to help deliver lasting and meaningful change to how we plan, build and deliver infrastructure and communities across both Australia and New Zealand. Specifically, it reviews the journey the IOC has taken to increase its focus and attention on driving sustainable outcomes, how these are being considered as part of current planning and Games preparations for Brisbane 2032, and explores a series of priority and opportunity areas (climate positive, embedding resilience and nature-based solutions) put forward by industry to identify best practice case studies and recommendations to support action.

In evaluating the breadth of information and material referenced here, a series of strategic actions are proposed. These are considered the cornerstone essentials for driving change beyond the target of achieving a climate positive Brisbane 2032 to support wide-scale industry uplift.

Legacy

To deliver an enduring and meaningful legacy, planning with the end in mind will be critical. Early action and an integrated and collaborative approach to delivery, form critical success factors for delivering lasting community benefit. Including the consideration of the areas of priority and opportunity identified here within future business case frameworks for major infrastructure would drive lasting and profound change.

Strategy

Good governance, enabled by clear and strategic direction is repeatedly shown to support successful performance and project/business outcomes.[51] Delivering excellence, the creation of legacy, innovation and social inclusion and engagement must be driven from the top down through an inclusive and multi-faceted approach. As part of this, the findings of this paper should be incorporated into a broader strategy for industry and the community to provide a clear picture of what the Olympics and Paralympics can mean to Brisbane, the state and the region more broadly to demonstrate how legacy can continue beyond the Games to change and shape industry.

Collaboration

The need to collaborate and engage is a critical driver in creating and delivering successful strategies. A collaborative approach recognises that 'together we are stronger' and working inclusively and collectively provides opportunities to build networks, forge partnerships and breakdown silos. Cross sector collaboration enables opportunities to streamline approaches to review and change standards, create new policies and adopt new approaches to placemaking and creating communities.

Innovation

To change and challenge the way things have been done before and set a new course for action we need to create and embrace opportunities for innovation across many and varied fronts – energy, climate, environment, resources, materials and procurement, community, skills and workforce etc.

Continuous learning

Given the length of the program, both leading into the development of the Brisbane 2032 Games infrastructure, venues, and precincts, and in creating a model for post-Games success, a commitment to continuous learning and improvement will help inform successful delivery. Central to this should be a commitment to monitor, measure, report and disclose progress to enable appropriate updates and revisions where relevant.

In delivering Brisbane 2032, the true mark of success will not just be a podium finish for the athletes and simply delivering a climate positive Games in line with current aspirations. Success will be determined by being able to watch the closing ceremony while reflecting on and observing what has been achieved and not forgetting how it has been delivered.

With climate action failure cited repeatedly as one of the primary risks challenging our way of life,[52] the infrastructure sector simply cannot afford to snap back to 'regular programming' after the Games is finished. In adopting the recommendations and actions outlined in this report, the infrastructure sector, supported by the IS Council and its progressive members have the opportunity to advance practice and deliver a step change in how infrastructure and communities are delivered to provide a lasting and positive legacy.

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[51] Refer: https://www.forbes.com/sites/forbescoachescouncil/2018/02/12/want-a-successful-business-build-an-effective-strategy/?sh=3b8e3bb69bf0
[52] Source: World Economic Global Risks Report 2022