BIRMINGHAM 2022 COMMONWEALTH GAMES SUSTAINABILITY REPORT



BIRMINGHAM 2022
commonwealth games

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ABOUT THIS REPORT

This is the sustainability report for the Birmingham 2022 Commonwealth Games Organising Committee, covering the period between December 2017, when the Games was first awarded to Birmingham, and October 2022. This report has been prepared with reference to the GRI Standards 2021 to transparently demonstrate our environmental sustainability operations, actions, challenges and successes.



FOREWORD

Hosting the Commonwealth Games was a once-in-a-generation opportunity for Birmingham. While the action on the track, field and in the arenas was packed into a special and dramatic 11-day period, our ambition was for the Games to have a positive impact on the city and surrounding region for years to come.

We knew that to achieve our vision we had to make sustainability a priority that permeated throughout the organisation. So early on, we established our seven-pillar Sustainability Pledge that outlined three environmental issues we wanted to address as an Organising Committee: climate change, waste and conservation.

Within this report, we explain why we arrived at those strategic priorities, how we set objectives for each one and what actions we took, detailing our challenges and learnings along the way.

Our overriding ambition was to be the most sustainable Commonwealth Games to date, leaving a Carbon Neutral Legacy – a substantial undertaking considering the shorter-than-usual planning phase we had to work with.

We recognised immediately that climate action sits right at the top of the agenda for our key local stakeholders, Birmingham City Council and West Midlands Combined Authority, and is a concern shared by many of the partners, athletes, spectators and volunteers that helped to make Birmingham 2022 such a unique event. It was therefore crucial that our approach to managing our carbon footprint was credible and transparent.

In that respect, colleagues across our organisation's functional areas can be proud of a real team effort. Thanks to their ingenuity, flexibility and commitment, and with the support of our partners we were able to limit the environmental impact of the Games through innovative approaches to energy, transport, logistics and waste, in particular.

The short planning period, punctuated by COVID-19 lockdowns, meant that we had to be adaptable as we saw some of our sustainability ambitions limited by circumstances beyond our control. In hindsight, we also agree that there are things we could have done differently. Throughout the report, we have tried to articulate our shortcomings as well as our wins to help future Organising Committees and sports event hosts.

Our ambition meant that, on occasions, initiatives that we tried were more complex or expensive than business as usual – often both. But we maintained a firm belief that it was our responsibility to do what we could within our parameters and take calculated risks with the aim of contributing to a better future.

We pass on this report in the same way we pass on the Queen's Baton: with the hope that the next custodians will take it and try to improve upon our efforts, for the good of sport and our planet.

Ian Reid, Chief Executive,
Birmingham 2022 Commonwealth
Games Organising Committee



SUSTAINABILITY HIGHLIGHTS

1st Commonwealth Games to strive to create a **Carbon Neutral Legacy**

2022 acre Commonwealth Legacy Forest being planted to sequester our residual emissions

Majority of venues used for Games **existing**, with only two capital build projects

Mains power used to **reduce generator use**

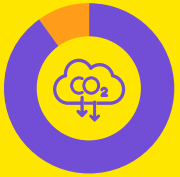
650,000 public transport journey were taken

28,000 riders used free bike hire scheme, cycling **49,000** miles



42% of Games car fleet were low-emission vehicles

100m x 14m **solar array** installed at Victoria Park



HVO fuel in generators resulted in up to **90% fewer** emissions

72 Tiny Forests planted across the region

2,000 people involved in planting days

22 miles of canals were cleared

20,000 plastic bags saved by double-packing uniforms

480,000 single-use plastic bottles avoided through use of 41 Water Refill Stations

16,000 sporting items donated to community groups

2 Carbon Literacy **courses developed**

29 athletes supported through climate education sessions



72% of wayfinding signs to be reused

£250,000 of sustainability community projects funded by Severn Trent

2 vehicles donated as mobile share shacks

61 charities received items recovered from the Games

ISO 20121 certified

OUR SUSTAINABILITY PLEDGE

We wanted the Birmingham 2022 Commonwealth Games to have a significant, positive outcome for the city, its people and local communities. Our overarching sustainability goal was to host the first Commonwealth Games with a Carbon Neutral Legacy, setting the benchmark for future Games and driving long-term sustainable behaviour change.

As an Organising Committee we wanted to be bold and ambitious whilst acknowledging the parameters we had to work in and the challenges we would likely face.

To guide our journey, we produced our Sustainability Pledge that shaped our decisions and provided a guiding principle.

Our Sustainability Pledge had seven key pillars:

1. Accessibility
2. Equality, diversity and inclusion (EDI)
3. Job creation and social value
4. Human rights
5. Carbon and air quality
6. Circular economy principles to minimise waste
7. Conservation



"To bring people together, improve health and wellbeing, be a catalyst for change, help the region grow and succeed and put Birmingham firmly on the map."

That was our overarching mission statement when we drafted our Sustainability Pledge. Preparing to host a world-class sporting event was just one part of the picture for us. We wanted to show true leadership in sustainability, from the way we operated and delivered the Games, to how we engaged with everyone involved – throughout our local communities and the Commonwealth.

We wanted to take a considered approach to our sustainability goals, and our seven pillars were informed by internationally recognised standards, such as ISO 20121, the UNFCCC Sports for Climate Action Framework and Leaders in Diversity, as well as support from our key partners, including the Commonwealth Games Federation, UK Government Department of Digital, Culture, Media and Sport, Birmingham City Council and West Midlands Combined Authority.



DEFINING OUR ENVIRONMENTAL SCOPE

Within this Birmingham 2022 Sustainability Report, we've focused on the objectives, strategies, achievements and lessons learned related to the latter three pillars. Separate reports have been produced to showcase our work around the four social pillars.

Through an assessment of our operations, sustainability at previous Games and current best practices, as well as dialogue with our stakeholders, we outlined a number of objectives under each of these environmental pillars:

Carbon and air quality

- Create a Carbon Neutral Legacy for the Games
- Reduce our carbon footprint and impact on air quality where possible
- Offset the carbon emissions that cannot be reduced through a new Commonwealth Legacy Forest
- Educate to help drive behaviour change and more sustainable sports events

Circular economy principles to minimise waste

- Plan for the end of the Games so that assets can be reused or repurposed and hire rather than buy equipment where possible
- Dramatically reduce the use of single-use plastic
- Zero waste to landfill ambition

Conservation

- Preserve and protect biodiversity around venues
- Plant 72 Tiny Forests around the region through our partnership with Severn Trent
- Clear 22 miles of canals through our United by Birmingham 2022 partner Canal & River Trust
- Create a 2022 acre Commonwealth Legacy Forest

Global sporting events of the magnitude of the Commonwealth Games inevitably have an impact on the environment. Through our strategy and ongoing efforts, we wanted to take responsibility for that impact.

- Our carbon baselining work highlighted that our main impacts came from travel, energy, waste and emissions related to the goods we procured
- From a circular economy perspective, major sporting events like ours are commonly associated with considerable amounts of waste generated through unwanted equipment and overlay and spectator food and beverage packaging
- When it came to conservation, we were keen to make sure that Games activities did not disrupt the natural environment and we wanted to seek out opportunities to enhance biodiversity in the region where possible

Across these three areas we had an underlying focus on behaviour change and education to create a sustainability legacy.



OUR BOUNDARIES OF CONTROL

To help us determine the boundary of our approach, we categorised activities into three areas: those under direct control of the Organising Committee (OC), those under the direct influence of the OC and those where the OC had indirect influence.

DIRECT CONTROL

The OC has direct responsibility for this delivery area

DIRECT INFLUENCE

The OC has limited input into the delivery area, but ultimate responsibility falls on an outside partner or stakeholder

OUTSIDE OC CONTROL

The issue falls outside of the OC's remit, although it may influence the Games and we may need to be reactive to situations that arise due to it

When analysing over 70 functional areas within the OC we discovered that opportunities to further our sustainability objectives could be found most clearly in the following areas:

Procurement	Sponsors and suppliers	Energy and water
Games Family transport	Catering, cleaning and waste	Village and venue management
Logistics	Office management	Accommodation management
	Legacy	

Through contacts within our functional areas, we also had direct influence through the following partners and supplier networks:

- Spectator and workforce transport (Transport for West Midlands)
- Security and policing (West Midlands Police)
- Games merchandising (Commonwealth Games Federation Partnerships)



ENGAGING WITH OUR STAKEHOLDERS

To achieve our vision we needed to understand what it looked like in practice through the eyes of our key stakeholders.

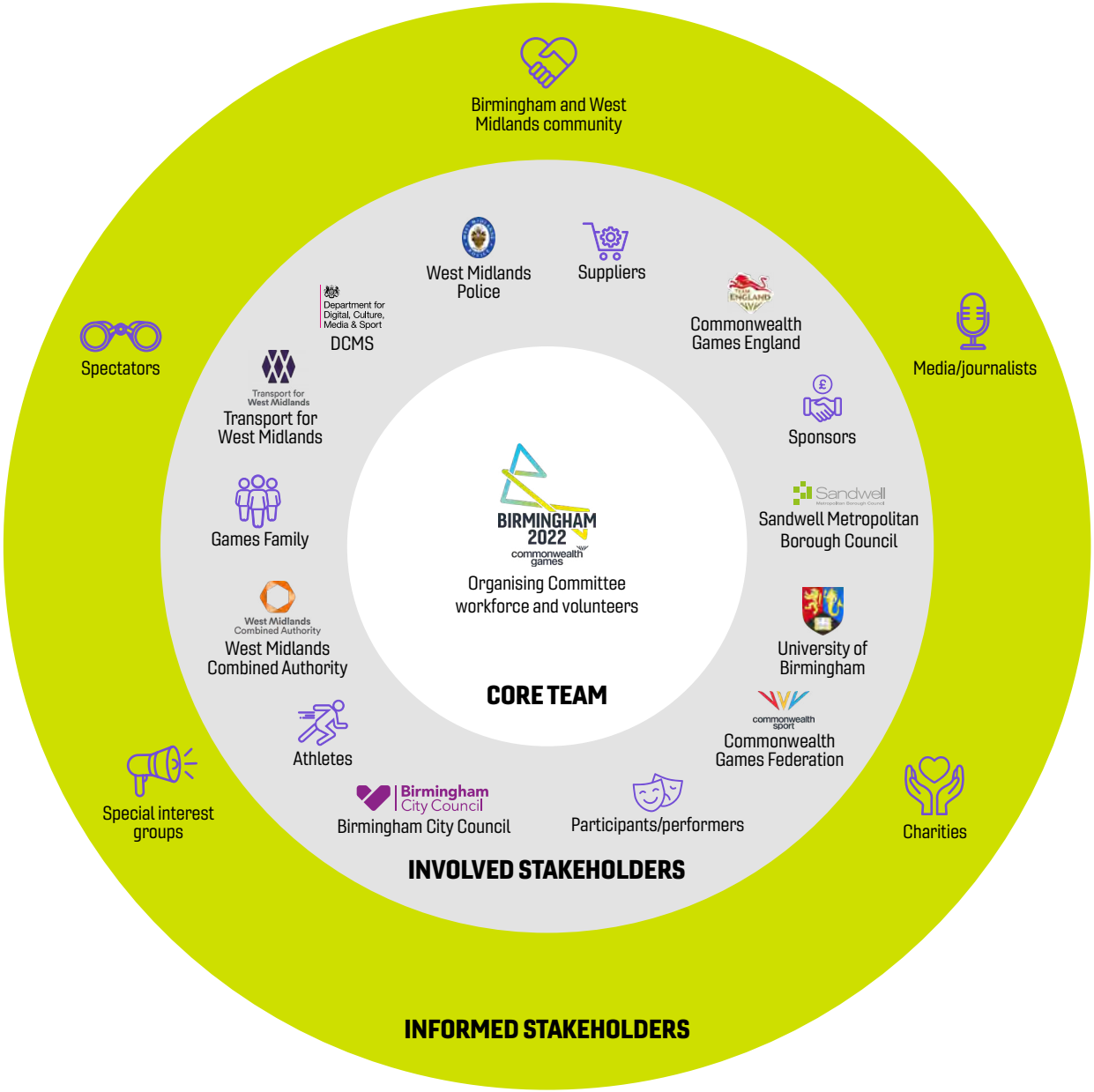
Drawing on expertise in the local area and from the Commonwealth Games Federation Partnerships, we kicked off an extensive stakeholder engagement process while our bid for the Games was being finalised, and continued with this approach alongside our partners all the way up to delivery.

Our stakeholder engagement process started with high level discussions with our two main local partners, Birmingham City Council and West Midlands Combined Authority, about how the Games could contribute to their own sustainability targets.

Both local authorities have set net zero targets (Birmingham called a climate emergency in 2019 and set a net zero target for 2030, while West Midlands Combined Authority aims to be net zero by 2041), which reinforced our ambition to make climate action a priority area.

Birmingham City Council also told us that tackling air pollution was a priority. A Birmingham Clean Air Zone policy, which discourages heavy polluting vehicles from travelling through certain areas of the city, and an Air Quality Action Plan have been established to address this.

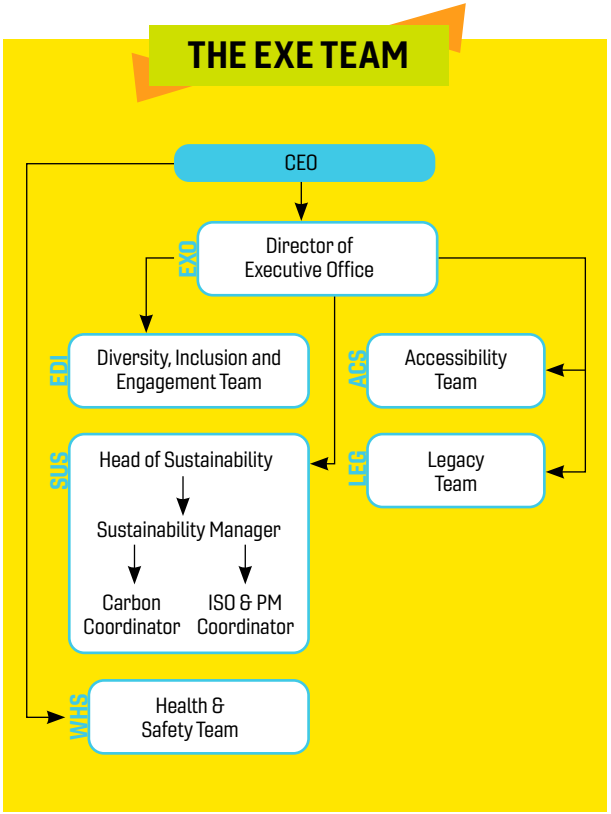
We felt it was important to reflect these goals and commitments in our Sustainability Pledge, which was developed with the support of both local authorities and other key partners, such as the UK Government Department of Digital, Culture, Media and Sport (DCMS), the Commonwealth Games Federation (CGF) and Severn Trent (see page 12). Once the pledge was defined, we worked with the following stakeholders to help us achieve our targets and Key Performance Indicators (KPIs).



GOVERNANCE

A credible sustainability strategy needs endorsement from the top of the organisation, and both the Board of Directors and the Executive Management Team (EXE), including the Chief Executive, had ultimate responsibility for Birmingham 2022's sustainability operations. The latter had strategic oversight of all the activities of the OC and met quarterly to discuss them, including sustainability progress and issues. Sustainability progress and challenges were also presented to the Board and Audit and Risk Committee for feedback on an ongoing basis.

The functional area managing environmental sustainability – including carbon and air quality, circular economy principles to minimise waste and conservation – was the Sustainability Team.



Heads of the different functional areas in the EXE (Sustainability, EDI, Accessibility, Legacy, Health & Safety) reported progress to the Director of the Executive Management Team, who then informed the Board and the Chief Executive.

Additional external Working Groups for partners were set up to facilitate Games legacy projects with environmental objectives. The overarching Sustainability Legacy Working Group was co-chaired by the Organising Committee Head of Sustainability and the Executive Director for Strategy, Integration & Net Zero at the West Midlands Combined Authority as the partner responsible for sustainability legacy.

Three additional Action Groups were created to focus on developing legacy projects in the three key environmental pillars identified. Members included Games partners and wider interest groups, with each group chaired independently. A specific role seconded from the Department for Environment, Food & Rural Affairs (Defra)/Environment Agency into West Midlands Combined Authority focused on facilitating collaboration between partners on sustainability legacy projects.

ALIGNING WITH FRAMEWORKS AND STANDARDS

ISO 20121

Planning for the Games was guided by the ISO 20121 Sustainable Event Management Systems international standard, which helped us make sustainability a central part of preparation through a systematic process. This work around ISO 20121 extended beyond environmental sustainability, incorporating other socio-economic areas of the Executive Office, such as Social Value, Accessibility, Human Rights and Equality, Diversity & Inclusion. The standard is based on a 'plan, do, check, act' approach that puts an emphasis on continual improvement.

Implementing ISO 20121 ensured that we were organised in our approach to sustainability and that our attention was not skewed towards some areas while neglecting others. It helped us to manage risk effectively and reduce our negative environmental impact beyond areas we had initially earmarked as potential issues. Crucially, the standard helped us make sure our governance and decision making around sustainability was appropriate.

To achieve the ISO 20121 standard, our approach to sustainability and the processes we had in place to achieve our objectives were audited and certified by a third party organisation, ERM CVS. We achieved certification in March 2022 and, in particular, were acknowledged for having an organisational structure that facilitated a strong focus on sustainability and clear levels of commitment across roles.

UNFCCC Sports for Climate Action Framework

The OC is also a signatory to the UNFCCC Sports for Climate Action Framework – a set of five principles designed to support the sports sector's transition towards the low-carbon future set out in the Paris Climate Agreement:

1. Undertake systematic action to promote greater environmental responsibility
2. Reduce overall climate impact
3. Educate for climate action
4. Promote sustainable and responsible consumption
5. Advocate for climate action through communication

At COP26 in Glasgow (the host city for the 2014 Commonwealth Games), the UNFCCC expanded the Sports for Climate Action Framework to include its Race to Zero initiative in which signatories commit to reaching net zero by 2040 while reducing their greenhouse gas emissions by 50% by 2030 at the latest.

While long-term pledges do not apply to a one-off event organisation like ours, we still recognise the value of the principles and the need to demonstrate our commitment to credible carbon measurement and reduction through alignment with the Greenhouse Gas Protocol and the International Olympic Committee's Carbon Footprint Methodology.

SETTING AND MONITORING OBJECTIVES

As an OC we had a number of strategic objectives. Sustainability was a key theme that was reviewed regularly, and to keep on top of our progress we split objectives into two categories:

Key Performance Indicators (KPIs)
Objectives that had a specific numerical requirement, such as the measuring the Games carbon footprint.

Wider sustainability objectives
Some of our sustainability work was designed to be observational, experiential and about changing perceptions and behaviours. These objectives could not be measured through the KPI model, but related achievements are evidenced in case studies throughout this report. An example of this was our target to develop education and understanding of sustainability through a Games-wide learning plan, including our Carbon Literacy courses.

All objectives and related progress were reported by the Sustainability Team to the Head of the Executive Team and the Executive Office every two months.

ASSESSING RISKS AND OPPORTUNITIES

Planning and delivering a major sporting event like the Commonwealth Games can pose several environmental risks that need to be identified, analysed and acted upon if necessary. We had two processes for addressing risk within the OC. Strategic issues and risks were regularly logged on our company risk register where they could be viewed and updated by impacted functional areas. The Sustainability Team also hosted regular meetings with colleagues from other functional areas to assess any emerging environmental risks to feed into the process. Opportunities were logged the same way. A central programme management team reviewed and helped to manage these, supported by external consultants with the appropriate expertise when needed.



MANAGING ENVIRONMENTAL RISK AT OUR VENUES

For the 11 days of the Birmingham 2022 Commonwealth Games, we were responsible for all the venues our events took place in. Our Sustainability Team was tasked with cascading messages from our Sustainability Pledge down to those working at the venues to help them mitigate potential environmental issues and ensure that we were good neighbours for the duration of the event.

To do so, we produced Venue Sustainability Management Plans for each of the venues, assessing environmental risks against likelihood and severity and outlining management and mitigation measures to address those risks.

Included within each of the Venue Sustainability Management Plans were guidelines around training, ensuring contractor compliance, legal requirements, assurance, dealing with unforeseen incidents, reporting and generally promoting sustainability.

Particular care needed to be taken around our greenfield sites. At Sutton Park, a protected Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR), we worked with Natural England and Birmingham City Council to mitigate damage at the site. At Cannock Chase, a Special Area of Conservation (SAC) and Area of Outstanding Natural Beauty (AONB), we were supported by Park Rangers and Forestry England to ensure local habitats experienced minimal disturbance.

The Environment Agency guided our approach to environmental risk, helping us to reduce the release of harmful substances to local water sources, for example. After receiving guidance about the harm pouring spoiled milk can cause to water ecosystems, our Sustainability Team took that knowledge and informed colleagues in other functional areas so that they can bring this learning to future events and job roles.

OUR SUSTAINABILITY JOURNEY

DECEMBER 2017

Birmingham announced to host the XXII Commonwealth Games in 2022

JANUARY 2020

- Birmingham 2022 becomes a signatory member of the UN Sports for Climate Action Framework
- Social Value Charter officially launched

FEBRUARY 2019

Sustainability priorities mapped

DECEMBER 2019

Sustainability commitment signed off for the Games at Executive Management Team and Board level

MAY 2020

Initial carbon baseline calculated

SEPTEMBER 2020

ISO 20121 planning

NOVEMBER 2020

Sustainability Strategy and budget approved

FEBRUARY 2021

Sustainability Working Group first meeting

APRIL 2021

Expansion of Sustainability Team

MAY 2021

Birmingham 2022 Sustainability Pledge published

APRIL 2022

ISO 20121 certification finalised

JULY-AUGUST 2022

GAMES DELIVERY



OCTOBER 2022

Games sustainability evaluation and post-Games sustainability report published

SEPTEMBER 2022

Third party organisation reviews and certifies Birmingham 2022 carbon footprint

START

ONGOING LEGACY

[1] Modelled on the Birmingham 2022 road cycling route

WORKING WITH OUR SUPPLIERS

There were a number of ways we engaged with our suppliers around sustainability. All had to sign up to our Sustainable Sourcing Code, which set out clear guidance around our minimum environmental and social standards.

For example, we asked suppliers to optimise their transportation by reducing fuel consumption, and to measure their carbon footprint. They were also urged to consider switching to less polluting energy, and to measure and minimise greenhouse gases related to their energy provision.

Our Sustainable Sourcing Code also provided guidance on resource preservation (water, printed materials, temporary equipment and precious metals), biodiversity preservation (timbers and forestry products, deforestation and land use), waste management (product and transit packaging and waste duty of care) and pollution prevention (hazardous materials, cleaning materials and wastewater, chemical storage and spill prevention).

Additionally, through our Social Value Charter it was a contractual requirement for suppliers to comply with the Government Supplier Code of Conduct and the Greening Government Commitments.

For our larger suppliers, who had key roles to play in helping us reduce and measure our carbon emission hotspots, we further engaged with them to ensure we were working collaboratively with a sustainability focus through planning and delivery phases.

Several of the suppliers and partners we worked with had their own sustainability operations in place, which helped us achieve our objectives, or developed programmes specific to the Games, for example:

- Aggreko supported our energy-related carbon reduction plans by providing lower carbon options (page 20)
- Sunset+Vine agreed to use the same energy system, driving efficiencies (page 20).
- Kuehne+Nagel optimised its logistical support through a number of policies and the use of lower carbon transport (page 22)
- CSM Live designed, collected and disposed of the branding and signage it produced for us in a way that it would be reused, repurposed or recycled (page 32)





MAXIMISING IMPACT WITH OUR NATURE AND CARBON NEUTRAL PARTNER

Eight million people across the Midlands get their water from Severn Trent. It is a company that is literally plumped into the communities and landscapes that made the Games so unique. Severn Trent's close ties with the region and robust approach to sustainability meant that it was the perfect partner to help us plan and execute our strategic environmental objectives.

As our Nature and Carbon Neutral Partner, Severn Trent's commitment and expertise was fundamental to us achieving our sustainability goals and addressing some complex challenges. We worked together from the outset, strategically assessing how the Games could reduce its environmental impact whilst delivering significant legacy projects that would benefit the local natural environment and the people who live in and around it.

The partnership extended beyond the traditional sport sponsor/Organising Committee relationship: Severn Trent helped us define our strategic sustainability objectives and supported delivery in each of our three environmental pillars. Our Head of Sustainability was seconded to the Organising Committee by Severn Trent to coordinate our plans, and was one of a number of secondments provided by Severn Trent to support wider Sustainability Pledge goals, including social value and EDI.

Delivering a Carbon Neutral Legacy for the Games was our overarching environmental goal. Once we had a view on what our residual carbon footprint would be, we put forward a collaborative plan to help us take responsibility for our unavoidable emissions in a local, long-term and measurable way through our Commonwealth Legacy Forest.

As a monopoly business that doesn't compete for customers, Severn Trent's motivation for partnership wasn't driven by the opportunity for financial upside or market share. However, it saw the Games as an opportunity to build a stronger connection with the community and advance its own environmental objectives.

Severn Trent invested heavily to ensure our sustainability goals stood up to scrutiny. A brand new forestry team was established to secure land and maintain the Commonwealth Legacy Forest and 72 Tiny Forests we planted together throughout the region. It also provided 41 Water Refill Stations across all venues to support our goal to reduce single-use plastic.

In addition to this work, Severn Trent funded £250,000 of community projects which had a specific focus on sustainability initiatives, such as a community growing project, and integrated its collaboration with the Games into an education programme to help children learn about water challenges across the Commonwealth.



"I'm immensely proud of the role that Severn Trent played in helping Birmingham 2022 become the most sustainable games yet. The Games itself shone a huge spotlight on our wonderful region and the communities that make it so special."

Richard Eadie, Head of Sustainability and Corporate Strategy, Severn Trent

...planted **85,200** trees, of **16** native species, across the Commonwealth Legacy Forest and **72** Tiny Forests

...refilled **480,000** water bottles during the Games, supporting refilling and reusing rather than single-use

...reached more than **10.6 million** people via coverage about pre-Games sustainability work

BIRMINGHAM 2022 commonwealth games

OFFICIAL PARTNER

SEVERN TRENT WONDERFUL ON TAP

...encouraged more than **2,000** members of the public to get involved on planting days

...will sequester **201,800 tonnes** of CO2e by planting trees across **2022 acres** of land



CARBON AND AIR QUALITY

WHY IS THIS IMPORTANT TO US?

Creating a Carbon Neutral Legacy was one of the chief sustainability goals of the Birmingham 2022 Commonwealth Games. For us, this meant paying attention to our climate impact in a credible and holistic manner.

From Britain to Bangladesh, South Africa to Samoa, every country across the Commonwealth and beyond is facing its own climate emergency. From the fans watching at home and in the venues, to the staff, volunteers and athletes who made the Games so special, everyone's health, livelihoods and living conditions are being threatened by rising global temperatures.

We understand the devastating and irreversible consequences we're all going to experience if we are not able to limit global warming below 1.5°C, as per the forecasts produced by the Intergovernmental Panel on Climate Change (IPCC).

The consequences of climate change are not being felt equally. People living in inner city areas, like parts of Birmingham where many Games venues are situated, are often disproportionately affected, particularly when it comes to extreme heat and poor air quality. Many of the Commonwealth nations and territories that were represented with distinction by their athletes, support staff and fans in Birmingham are very much on the front line and fighting an existential battle.

As the Organising Committee of the Birmingham 2022 Commonwealth Games, we believe in the importance of using the scale and cultural significance of the event to support the climate goals of the city and wider region, all while demonstrating an understanding and empathy for those visiting us from nations being even more adversely affected by climate change.

Poor air quality is the greatest environmental threat to human health in the UK and in the West Midlands fine particulate matter ($PM_{2.5}$) causes approximately 1,400 premature deaths annually. While local air pollution and climate change are different environmental challenges they share many of the same sources. Our action to reduce carbon emissions through the use of active and public transport will deliver co-benefits to local air quality.

The vulnerability of sport was also something we keenly recognised, with many of the events making up the Birmingham 2022 programme reliant on a healthy and stable natural environment. We believe it is also important to acknowledge that sport contributes to climate change. Energy needed to power events, equipment and products procured for them and spectator travel all generate climate change-accelerating carbon emissions. In light of this context, and as a major global sporting event, it was important that a credible carbon management plan was a strategic priority.

OUR CARBON NEUTRAL LEGACY HAS FOUR MAIN COMPONENTS:

Ensure a **robust approach to measurement** of the Games' carbon footprint

Through our **reduction first** approach, identify emission hotspots and work with functional areas across the Organising Committee to reduce greenhouse gas emissions where we could

Produce a **clear and visible offsetting strategy**, taking responsibility for our unavoidable emissions including the creation of a 2022 acre Commonwealth Legacy Forest

Boost awareness through the development of freely- available **Carbon Literacy toolkits** and a project with the University of Birmingham to understand the impact of the Games on air quality

OUR TARGETS

KPI 1: Deliver a fully accredited and audited Carbon Neutral Legacy through carbon reduction and credible offsetting scheme

KPI 2: Deliver carbon neutral international travel and accommodation for the Queen's Baton Relay

KPI 3: Ensure food waste is minimised and any surplus is distributed to charity and onward production of energy

KPI 4: Work with the supply chain for the car and bus fleet to maximise the use of low emission vehicles that meet Birmingham City Council Clean Air Zone requirements and minimise transport related to CO2

Wider objective 1: Encourage spectators to leave the car at home and use public transport wherever possible

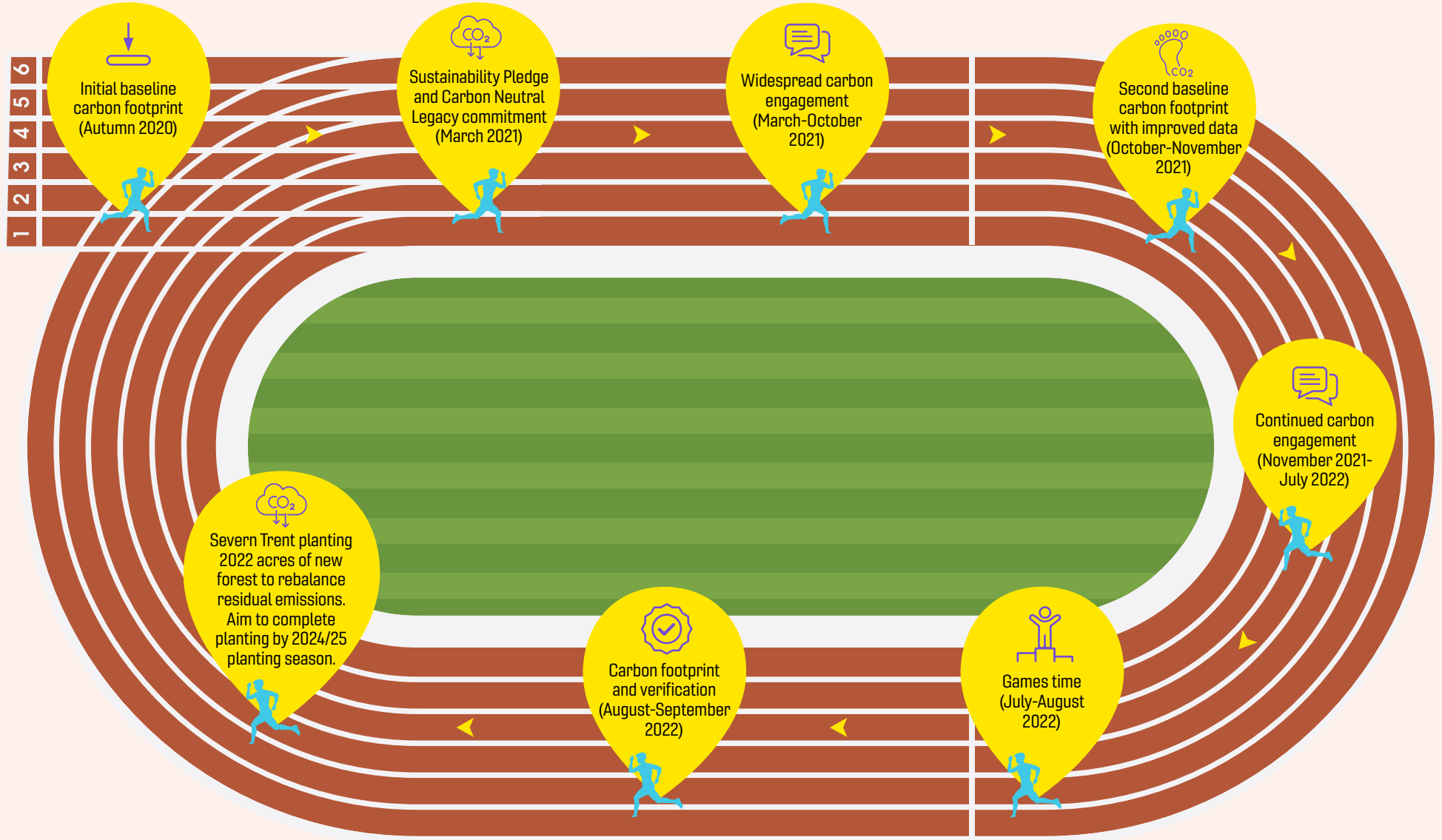
Wider objective 2: Promote the use of alternative modes of transport to passenger vehicles

Wider objective 3: Work with the University of Birmingham and West Midlands Air to develop air quality models to inform the decision-making process of athletes and medical staff

Wider objective 4: Primarily source power from the grid



OUR CARBON MANAGEMENT TIMELINE



OUR CARBON FOOTPRINT METHODOLOGY

In keeping with our ambition to execute a credible carbon management plan, we aligned with best practice standards and methodologies, including the Greenhouse Gas (GHG) Protocol accountancy standard and the International Olympic Committee's (IOC) Carbon Footprint Methodology to define the boundary of, and measure, the Games carbon footprint.

We used a Carbon Footprint Boundary Decision Tree, built from the IOC methodology, to guide our decisions about what we would include in our own carbon footprint.

This process, together with data collected during initial baseline footprint work and the creation of a Carbon Hotspot Materiality Matrix, helped us identify the **'emission hotspots'** we needed to prioritise with our reduction efforts. Three factors in particular informed this:

- Expected carbon impact
- Level of influence we had on delivery as an Organising Committee
- Level of stakeholder interest

We identified the following activities as our **priority emission hotspots**:

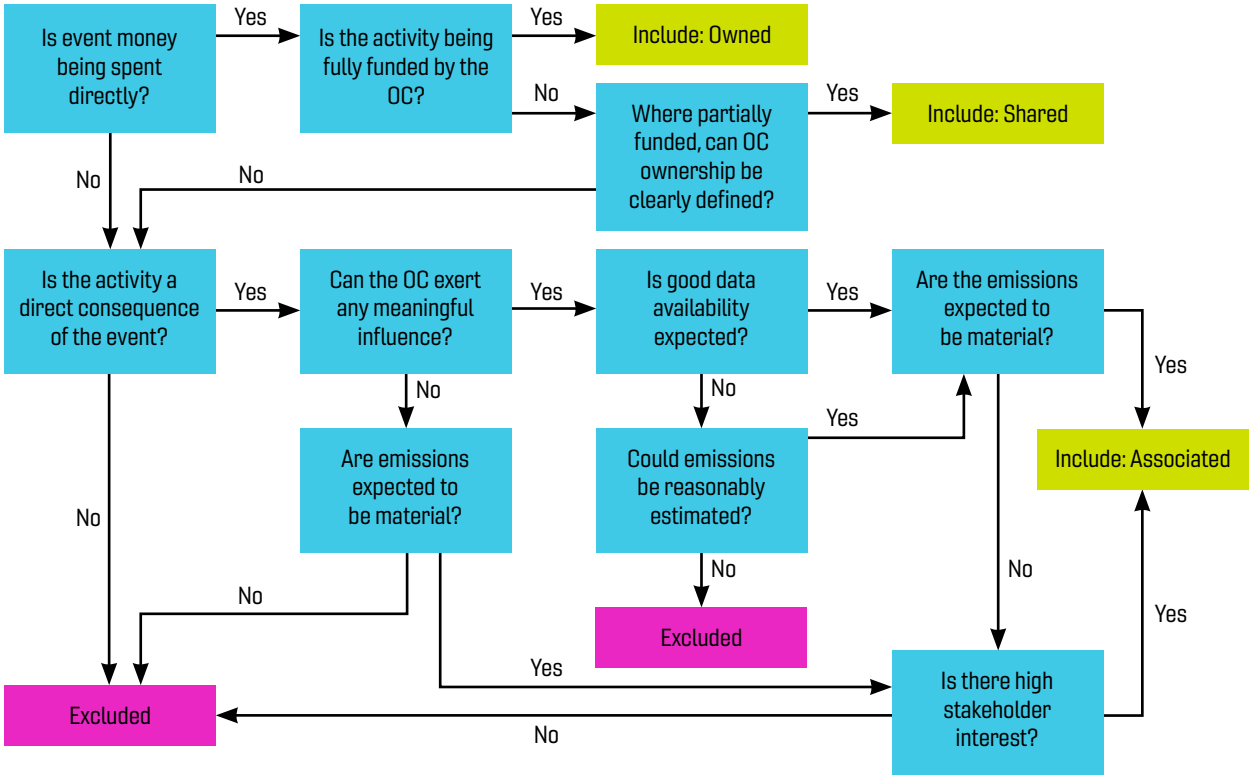
 Spectator travel	 Overlay and temporary structures	 Catering	 Travel of athletes and support teams, media and technical officials	 Energy use

As well as the five priority emission hotspots that we identified, the following activities were included in our carbon footprint calculation:

 Merchandising	 Waste management	 Ceremonies	 Public transport to venues	 Logistics
 Branding and signage	 Transport services to venues for Games Family	 Uniforms	 Live sites	 Queen's Baton Relay
 Games office headquarters	 Accommodation provided by the OC	 Electronic equipment and IT services	 Sports equipment	 Security
 Cultural programme	 Spectator accommodation	 Proportion of permanent infrastructure	 Other financial spend	



CARBON FOOTPRINT BOUNDARY DECISION TREE



WHAT WE DID NOT INCLUDE, AND WHY

Activities under the direct funding and control of the Commonwealth Games Federation's sponsors, non-accredited media and non-ticketed spectators were not included in our carbon footprint calculation.

We acknowledge that Alexander Stadium and Sandwell Aquatics Centre are flagship venues for the Games. We have therefore, in the final footprint, included a proportion of embodied carbon impact relating to the refurbishment of Alexander Stadium and construction on Sandwell Aquatics Centre. However, we have not included the full lifecycle emissions of these two capital projects due to the clear legacy element of these projects.

The refurbishment of the Alexander Stadium was part of a £500 million regeneration plan for the Perry Barr area of Birmingham. Birmingham City Council was responsible for the project and funded it alongside The Greater Birmingham and Solihull Local Enterprise Partnership and West Midlands Combined Authority. After the Games the stadium is due to become the home of Birmingham City University's Sport Science faculty and the Birchfield Harriers athletics team.

Sandwell County Council has full ownership of the design, planning, build and legacy of the Sandwell Aquatics Centre. Funding bodies for the project include central UK Government, Sandwell County Council, Black Country Local Enterprise Partnership, Sport England and the Sandwell Leisure Trust.

OUR REDUCTION-FIRST APPROACH

Our strategy was to find opportunities for carbon reduction within each of our functional areas, particularly around our emission hotspots, with the ambition of creating a practical, collaborative and impactful reduction approach around all of our key activities.

We embedded carbon management across the Organising Committee and with external suppliers and partners in three main ways:

1. POLICIES AND STRATEGIES

Numerous OC policy and strategy documents across different areas incorporated the consideration of carbon management, including but not limited to:

- The OC Sustainability Pledge
- Social Value Charter
- Sustainable Sourcing Code
- Games Transport Plan (responsibility of WMCA/TfWM)

These policies and strategies were crucial tools for us in communicating early and clearly the importance of measuring and managing our carbon impact with our major suppliers.

2. ENGAGEMENT PROCESSES

To keep the whole Organising Committee and key stakeholders engaged in our carbon management strategy, we:

- Identified important stakeholders and provided them with relevant information
- Understood important moments in time
- Streamlined data collection and management
- Maintained internal and external communications

3. CLEAR MESSAGING

Transparent messaging around our carbon management approach was critical, not least because the high profile nature of the Games made us open to scrutiny and the significant reputational risk we would face if there was uncertainty about our approach.

Part way through the planning stage we moved away from defining the Games as carbon neutral and began to refer to our Carbon Neutral Legacy to be clear and transparent about our approach to carbon management. We wanted to tell a more complex story about how we are reducing and rebalancing our residual carbon footprint through our Commonwealth Legacy Forest, being transparent about the length of time this would take. However, we recognise that it would have been more effective if we had positioned our Carbon Neutral Legacy from the start of the process.

More than anything, it was important that everyone involved understood how they could play their part supporting our carbon management plan, with clear calls to action. Information about our carbon management plan was also freely available on the Carbon Neutral Legacy pages of the Birmingham 2022 website, with further information within the frequently asked questions (FAQ) section.

OUR DEFINITIONS

For clarity and transparency, we define key terms in the following way.

Carbon footprint: This relates to the total direct and indirect greenhouse gas emissions caused by the Games, within the Games' carbon footprint boundary. Our carbon footprint is measured in carbon dioxide equivalents (CO_2e).

Carbon Neutral Legacy: How we're taking steps to reduce the carbon footprint of the Games as a priority, as well as having a robust and credible offsetting strategy to balance out our final unavoidable emissions. Instead of purchasing offsets from the Voluntary Carbon Market to balance out our residual footprint, we decided to plant and maintain a Commonwealth Legacy Forest that would sequester 201,800 tonnes of CO_2e over a 35 year period.



FINDING OPPORTUNITIES FOR CARBON REDUCTION

We developed strategies within each of our emission hotspot functional areas to eliminate and reduce carbon emissions as much as we could. While none of our functional areas were given hard targets due to the challenge of not having a comparable baseline (a Commonwealth Games in Birmingham has never been done before and Games in other locations cannot be compared like for like), all were expected to invest in reduction initiatives and find innovative ways to deliver their part of the Games in line with the OC's reduction-first approach.

ENERGY

Trying to land on an energy strategy that is sustainable, viable and suitable for a two week event is quite a challenging task, and we opted for a three-pronged approach:

- Utilising every potential grid supply available at all venues, often to full capacity, to reduce our reliance on diesel generators
- Using battery storage systems supplied by Aggreko (see 'vegetable oil and volunteers') across several venues, including Alexander Stadium, to use energy more efficiently. Having this storage system in place meant that we could run generators for a couple of hours per day to charge the batteries – which powered everything during low-demand periods – instead of running at least one generator for 24 hours per day. This helped us save a lot of fuel compared to a traditional reliance on generators. This worked well during lower-load periods and further hybridisation would have reduced fuel consumption and carbon emissions even further, however, this would require further investment
- Where generators were necessary – used for critical elements of the Games like results timing and storage – we used hydrotreated vegetable oil (HVO), a renewable resource that generates around up to 90% fewer carbon emissions than fossil fuel diesel. The CO2e saving of using HVO against normal diesel was around 1,614 tonnes, the equivalent to taking more than 300 diesel cars off the road for a year

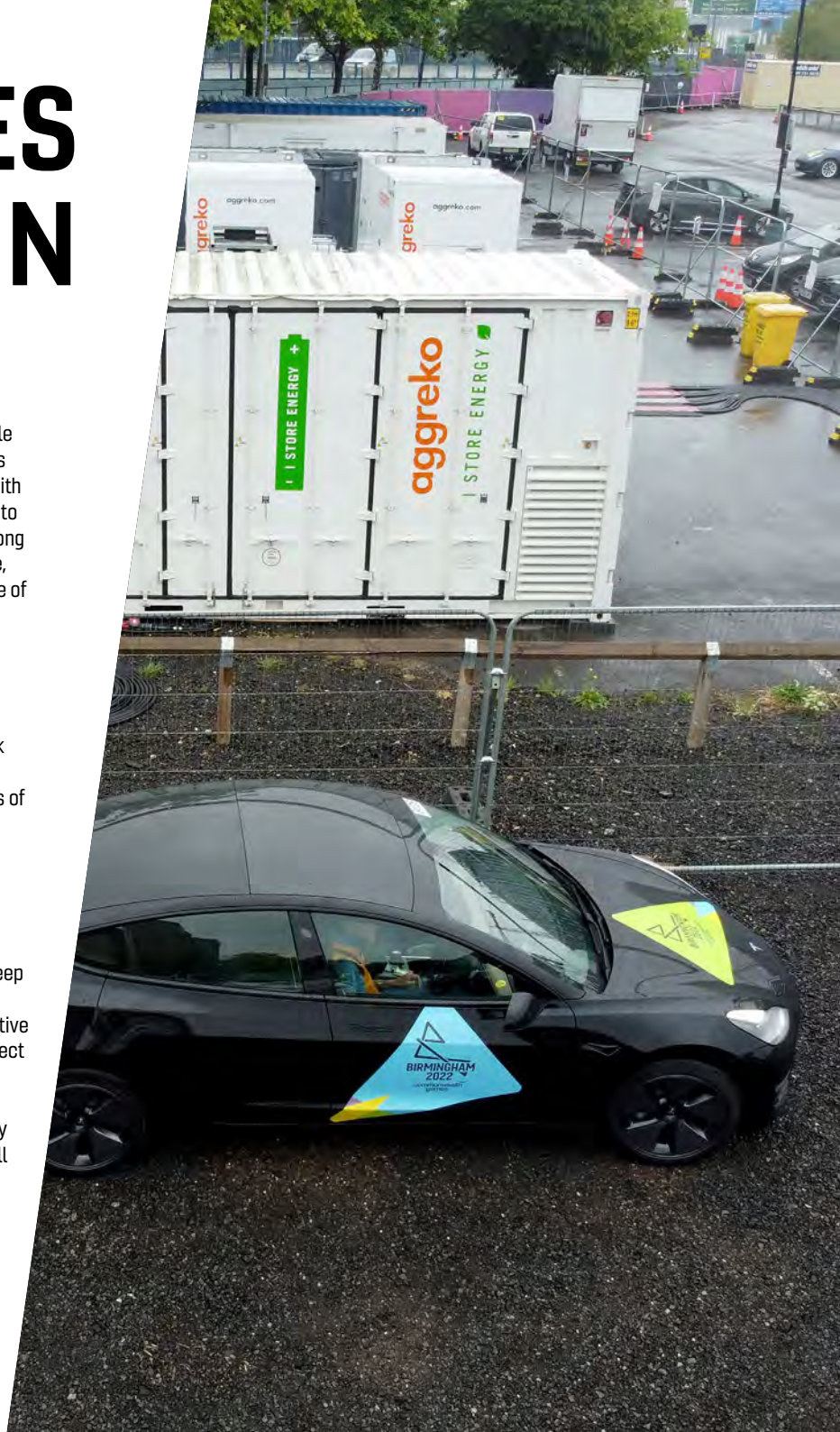
Although a lack of real estate and high cost limited the renewable energy infrastructure we could incorporate for the short Games period, we were able to augment our battery storage solution with 140kW of solar generation at Victoria Park, where we were able to place two parallel arrays that were approximately 100 metres long and 14 metres wide. This powered around one-third of the venue, with the rest being produced at optimal efficiency due to the use of battery storage to hybridise the generation.

Our approach to broadcast energy was a first for the Commonwealth Games, with production company Sunset+Vine (see 'challenging the norm') moving away from the traditional method of using a separate energy system and agreeing to work on the same load-on-demand system, reducing the number of generators and amount of fuel use while maximising efficiencies of the hired distribution kit.

Challenges and the future opportunities

Budgetary constraints caused by unexpected further energy requirements threatened to curtail our investments, but our Sustainability Team was able to allocate some of its budget to keep plans in place. The creation of a ring-fenced 'Innovation Fund', to invest in new sustainable products or purchase existing alternative technology, might be worth considering at future events to protect funding for sustainability projects.

Future OCs can build on our approach to energy through two key strategies. Firstly, they could specify that power contractors will pay per kWh generated, not pay for hardware and fuel. Coupled with sustainability metrics, such as the required percentage of energy derived from renewable sources, it will force energy suppliers to innovate. We also recommend that future OCs assemble a technically strong internal energy team that would be willing to accept and cope with a level of risk around energy supply in return for progress around sustainability.



VEGETABLE OIL AND VOLUNTEERS

Our Official Modular Energy Solutions Supporter Aggreko helped support our Carbon Neutral Legacy by providing more sustainable temporary energy for all 15 venues, Athletes Villages and the fleet depot centre to power our electric vehicles. Battery hybrids, solar panels and Stage V generators that run on hydrotreated vegetable oil (HVO) were supplied to provide greater efficiency and fewer emissions than traditional diesel generators.

We reinforced our relationship with Aggreko by offering several of its employees opportunities to volunteer for the Games in services, hospitality, mascot services, accreditation and anti-doping roles. "This is a once in a lifetime chance to come together for a fantastic event," said Scott Wright, a Customer Services Representative who took the role of Anti-doping Chaperone.

Additionally, Aggreko delivered six careers events to 300 schoolchildren in Birmingham, education sessions on what renewable energy is and workshops asking students to create a renewable home that cut carbon emissions and demonstrated self-sustainment.





HOST BROADCASTER: CHALLENGING THE NORM

As well as opting to broadcast the Games through the same energy system as us, Sunset+Vine incorporated several other policies to support our Carbon Neutral Legacy. A 'no-fly' policy for the pre-production phase meant that camera coverage had to be planned remotely. During Games time, that evolved into an 'only necessary flights' rule that saw Sunset+Vine reduce its air travel by 90% compared with the previous edition of the Games.

Travel-related emissions were reduced further through several key initiatives: 15% of the Host Broadcast team was recruited from the West Midlands, while Sunset+Vine encouraged public transport use by creating appropriate schedules and notifying people when cheap tickets were available. Securing accommodation close by so that crew could walk or cycle supported a 'feet first' policy.

Additionally, Sunset+Vine created a beef-free menu that prioritised vegetables and sourced second-hand furniture for the International Broadcast Centre.

"From the outset, we drew inspiration from the Birmingham 2022 Organising Committee's Social Values Charter, which detailed the core values that would underpin this edition of the Games and shape future editions," said Ruth Hayman, Host Broadcast Chief Operating Officer. "We were left in no doubt that we needed to challenge ourselves to create a strategy that would deliver a positive environmental and socio-economic legacy for the region."

PUBLIC AND ACTIVE TRANSPORT

As part of our pre-Games carbon footprint modelling process we anticipated that over 50% of our carbon footprint would come from spectator travel. We therefore made a significant effort to target reducing this as much as possible by moving people away from individual car journeys and towards using public transport and active travel by making it as seamless and cost-effective as possible, all while contending with a series of nationwide rail strikes. The responsibility and provision of services was through our partner, Transport for West Midlands (TfWM) .

Our ambition to be a public transport Games saw spectators reaching venues via bus, train and metro, with 54%[2] taking advantage of having the cost of their public transport included in the price of their ticket, with this cost being absorbed by the OC. In a city like Birmingham, where using the car is the traditional method of travel, we used our partnership with TfWM to demonstrate the benefits of using public transport to instigate behaviour change. A post-Games spectator survey, which generated 23,486 responses, found that 4 in 5 spectators rated their travel experience as 'good' or 'very good'.

A journey planner was also provided to help both spectators and workforce map out their trips ahead of their visit, and to make alterations in real-time if there was unexpected congestion or delays. The 45% of spectators who used the planner were also informed of the carbon impact of each journey to help them make a decision. The inclusion of carbon data in future journey planners will be considered by TfWM and the contractor involved in developing the Games planner.

Once public transport passengers alighted they were directed towards designated walking routes between their stop and Games venues. Encouraging active travel, these routes were developed to offer safe passage on foot, scooter or bicycle.

For those enjoying their journey to an event on two wheels, there was dedicated secure cycle parking at every venue, and more than 7,500 cycle parking sessions were delivered. And for those not able to bring their own bicycle, West Midlands Cycle Hire allowed everyone in Birmingham access to two free 30-minute journeys per day. More than 28,000 bikes were hired during the Commonwealth Games.





45%
of spectators used the journey planner app

54%[2]
of spectators used their tickets for public transport

28,191
bicycle journeys were recorded during the Commonwealth Games

4,000
cyclists had never tried West Midlands Cycle Hire before

WEST MIDLANDS CYCLE HIRE[3]

With riders covering
49,000
miles in 12 days (1,000 miles short of riding around the world twice)

Riders cycled for more than
12,000
hour

[2] This data comes from the post-Games spectator survey, n= 23,256

[3] Data refers to West Midlands Cycle Hire only

GAMES SPECIFIC TRANSPORT

Almost half (42%) of our entire car fleet were low-emission vehicles (electric, hydrogen, plug-in hybrid or mild hybrid). As well as opting for a significant number of low-emission vehicles, we also used a fleet that was considerably smaller than the fleet used during the previous Games in Gold Coast 2018, with a 40% reduction in vehicles.

Despite global shortages in EV production and the need to use multiple suppliers to meet our requirements, we were able to secure 343 low-emission vehicles, including 10 hydrogen cars. Compared with a traditional combustion engine fleet of the same size, these vehicles helped us reduce 240 tonnes of CO2e, not to mention the public health benefits related to using cars that were all Birmingham Clean Air Zone compliant.

Charging the fleet presented another significant challenge as we needed to secure a site that had an electrical supply large enough to charge more than 250 electric vehicles simultaneously and that also had an adequate number of parking spaces in close proximity to the central Games operational centre. After conducting thorough research, we came to the conclusion that a temporary facility at Aston University was the best option as it ticked two of the three boxes (a large enough space that was in close proximity), but the site was not right for a long-term or permanent EV charging infrastructure.

As the electrical infrastructure in the area was not sufficient to meet demand, we deployed Aggreko's Stage V generators (see 'vegetable oil and volunteers') to charge the vehicles through 125 temporary dual connector 7kW charging stations loaned to us by National Grid, our Official Electric Vehicle Charging Provider. Nine of those charging stations were earmarked to remain at Aston following the Games, while 15 additional charging ports installed in our Brindley Place headquarters will stay permanently after the Organising Committee disbands.

More than 600 buses were contracted to operate services for athletes, technical officials, Games Family, media, spectators and workforce. All buses were Euro VI emission standard and the fleet was composed of different vehicle sizes to best meet demand, improving fuel efficiency and reducing environmental impacts.

CAR FLEET TOTALS

Electric vehicle	Hydrogen	Plug-in hybrid	Mild hybrid	Petrol	Diesel	TOTAL
252	10	40	41	197	275	815



LOWER CARBON LOGISTICS

By using renewable energy, biodiesel and electric vehicles, as well as recycling waste, our Official Event Logistics Provider helped us avoid 27 tonnes CO2e – the equivalent of carbon sequestered by 1,350 trees over the course of a year. Kuehne+Nagel's Commonwealth Games logistics hub in Tyseley was powered by 100% renewable energy, verified by Renewable Energy Guarantees Origin (REGO).

Medals won by victorious athletes were delivered using electric vans. Arrivals and departures (AAD) and athletic equipment distribution (AED) were completed using Hydrotreated Vegetable Oil (HVO), while AAD drivers based themselves centrally to minimise mileage.

Of the 21 tonnes of waste generated at the Tyseley logistics hub, 1.5 tonnes was recycled, saving 0.7 tonnes CO2e. The remaining 19.5 tonnes of general waste generated around nine tonnes CO2e, with 75% coming during August (mid- or post-Games).

In addition, 80% of Kuehne+Nagel's 88-strong agency support team travelled by bus to reach Games sites. A further 20% commuted by car, generating 42.7 tonnes CO2e. Its core team travelled an estimated 60,000 miles between March and August 2022, using 6,700 litres of fuel, responsible for 16.4 tonnes CO2e.

FURTHER EMISSION REDUCTIONS



Games Villages made use of existing accommodation facilities, meaning construction was not necessary – moving away from the original plan to build a new facility

Hire over buy mentality, a dissolution strategy which ensured charities benefited and a zero waste to landfill approach through waste to energy

Number of team members travelling for the Queen's Baton Relay was reduced, cutting the number of flights taken



95% of the Games venues were existing facilities, minimising the need for permanent construction works



40% of non-spectator (athletes, tech officials and workforce) food and beverage provision was vegetarian or vegan

Reducing supply chain-related emissions by setting clear guidance around transportation and energy within our Sustainable Sourcing Code



Athletes and technical officials in accommodation at the NEC walked to their venues as their primary mode of transport

Athletes in accommodation at the University of Birmingham and University of Warwick were able to walk to many of their training venues (squash, hockey, athletics, gymnastics, rugby, judo and wrestling)

Delivering uniforms straight to staff and volunteer homes instead of asking everyone to collect from Birmingham, saving **13,000** journeys into central Birmingham



OUR CARBON FOOTPRINT

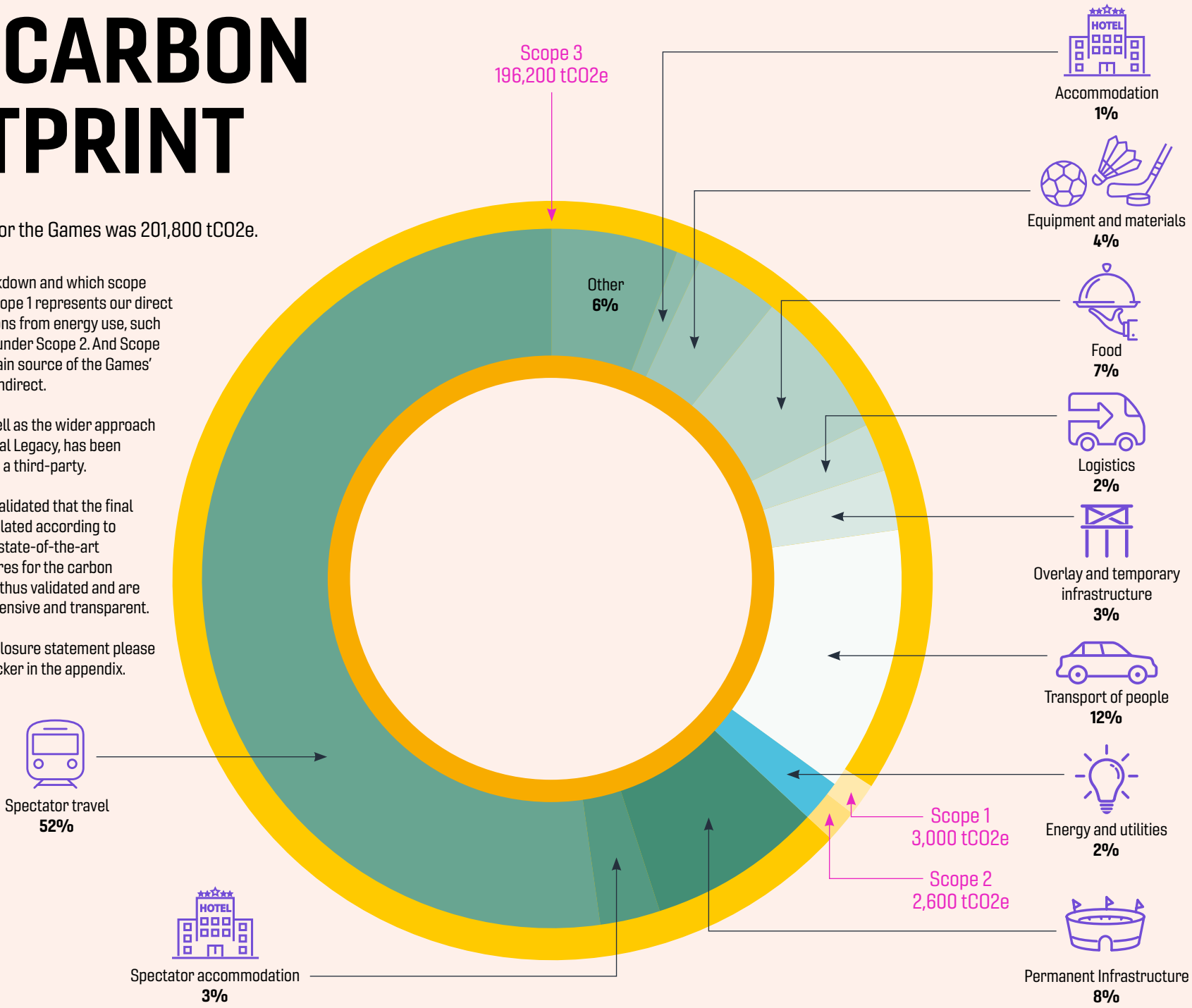
The carbon footprint for the Games was 201,800 tCO2e.

The below shows the breakdown and which scope each category falls into. Scope 1 represents our direct emissions. Indirect emissions from energy use, such as bought electricity, falls under Scope 2. And Scope 3 emissions – by far the main source of the Games' carbon emissions – were indirect.

The carbon footprint, as well as the wider approach to creating a Carbon Neutral Legacy, has been independently reviewed by a third-party.

After this review, Quantis validated that the final carbon footprint was calculated according to the highest standards and state-of-the-art methodology. The final figures for the carbon footprint of the Games are thus validated and are coherent, robust, comprehensive and transparent.

For the full third-party disclosure statement please refer to the credibility checker in the appendix.



BALANCING OUR FOOTPRINT THROUGH A 2022 ACRE LEGACY FOREST

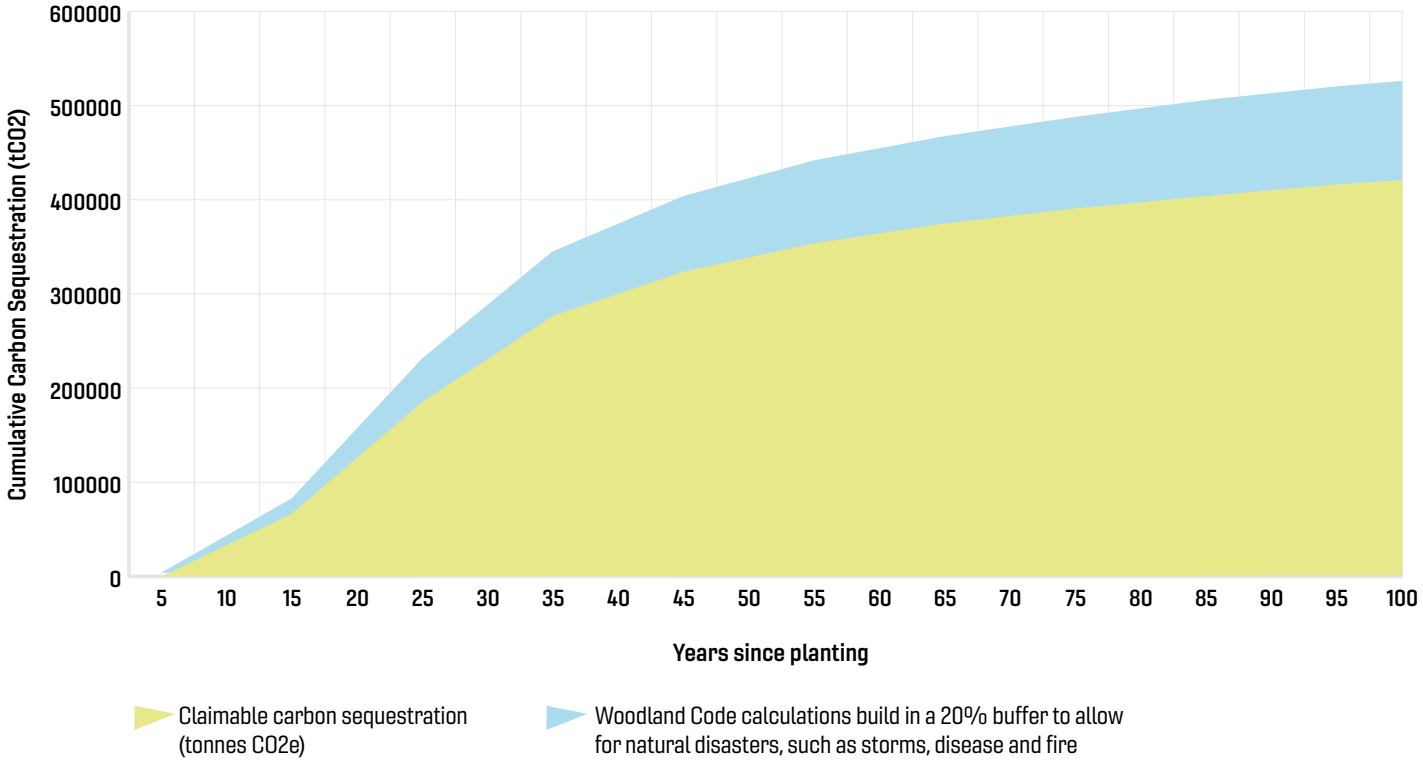
As a major global sporting event we immediately understood that no matter how robust our carbon reduction plan was, there would still be emissions that we could not avoid. We wanted to be intentional about how we addressed that. Rather than taking the traditional route of balancing out the majority of those emissions by purchasing carbon credits from the Voluntary Carbon Market, we decided to invest in a local, well-governed and more long-term approach to offsetting.

Our Nature and Carbon Neutral Partner, Severn Trent, committed to planting, maintaining and managing a series of **Commonwealth Legacy Forests.**

More precisely, the native trees that are being planted on 2022 acres of land across Birmingham, the West and East Midlands and beyond, will **sequester our 201,800 tonne CO2e footprint** over an approximate 35-year timeframe. Severn Trent made sure we are planting the right trees in the right places by mapping against future climate models, local character areas, soil types and existing adjacent woodland.

We opted for this approach due to the number of additional benefits, including improvements to local biodiversity, probable flood prevention, air quality improvements, temperature regulation and community engagement. Recognising the challenges around offsetting as a principle, we worked hard to make sure what we were doing was credible, demonstrated a transparent and sincere approach and had a regional focus. Our approach was independently reviewed by Quantis, carbon experts that helped the International Olympic Committee produce its carbon footprinting guidance.

MODEL OF HOW THE FOREST WILL SEQUESTER CARBON OVER TIME IN ACCORDANCE WITH THE UK WOODLAND CARBON CODE[4]



[4] The graph shows an model of predicted carbon sequestration using the UK Woodland Code calculator and includes various assumptions regarding planting. Exact figures will be verified for each area of land planted.

Ensuring the forest's long-term credibility
Severn Trent are committed to maintaining the forest for the lifespan of the project to ensure carbon sequestering targets are met.

A further layer of governance will be added to the work through audits conducted by Organic Farmers & Growers or the Soil Association and Scottish Forestry through its Woodland Carbon Credit process, which will verify the carbon sequestration of the forest.

The Legacy Forest meets the criteria to be recognised as a high-quality offsetting project by the GHG Management Institute:

Permanence – Severn Trent will be the long-term custodian and will have responsibility for the forest for 35 years. Land agreements also ensure that once woodland, it must remain woodland indefinitely.

Additionality – Through the UK Woodland Carbon Code validation and verification process, a number of technical additionality tests have to be passed.

Avoidance of overestimations – A scientifically sound and consistent measurement was used in line with the UK Woodland Carbon Code.

Exclusive claim – Carbon credits will be retired exclusively in the name of Birmingham 2022 Organising Committee

Avoidance of social and environmental harm – Environmental impact assessments have to be undertaken and passed.

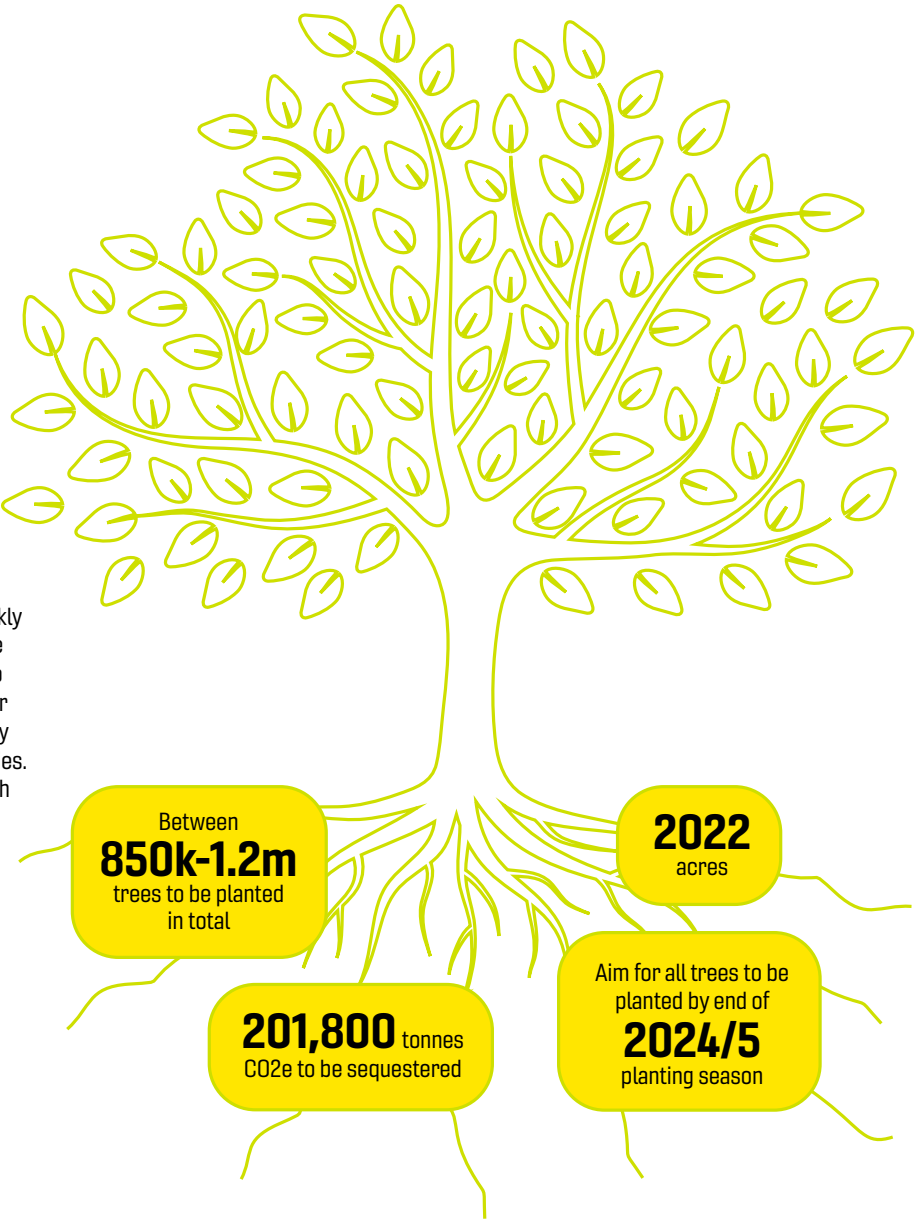
Net zero alignment – The Commonwealth Legacy Forest is a nature-based solution approach, and the associated carbon credits will therefore be classed as a carbon sequestration, rather than avoidance.

Alignment to the values of Birmingham 2022 – The Legacy Forest will maintain strong regional links and provide a tangible legacy for the region



2022 acres
Determination to produce a truly impactful offsetting strategy in the form of the Commonwealth Legacy Forest can be illustrated by the significant challenges Severn Trent has overcome – and continue to face – to achieve our goal. Initially conceptualised as one 2022 acre piece of land, it quickly became apparent that we would have to plant 30-50 separate forests in a zoning strategy across the Midlands region due to challenges securing appropriate pieces of land. Land is harder to come by and becoming more expensive as organisations try to acquire it to satisfy their own carbon sequestering strategies. Fortunately, Severn Trent's commitment to the Commonwealth Legacy Forest has not wavered.

Most sites are between 20 and 60 acres, with the larger sites between 100 and 200 acres. In the first planting season, four Commonwealth legacy forests were planted. Severn Trent are committed to securing the land, and the aim is to plant all the trees by the end of the 2024/5 planting season.



MOVING FORWARD WITH OUR CARBON NEUTRAL LEGACY

One of our Carbon Neutral Legacy principles was to raise awareness and share knowledge of the environmental issues facing us through the prism of the Games. Two of our key projects in this area are facilitating Carbon Literacy education throughout the West Midlands and sports industry and, supported by the University of Birmingham, understanding how major sporting events impact the air quality of the host city – and vice versa.

Accelerating Carbon Literacy through the West Midlands and sport

More than 40,000 people across the UK are 'Carbon Literate' or, in the words of The Carbon Literacy Project, have "an awareness of the carbon dioxide costs and impacts on everyday activities, and the ability and motivation to reduce emissions, on an individual, community and organisational basis."

As one of the legacy projects developed in partnership with the West Midlands Combined Authority, up to 3,000 people across the region will be able to acquire the same formal certification at no personal cost. These individuals will then have the knowledge and confidence to inform people in their own circles of influence, including friends, family and colleagues.

In the immediate aftermath of the Games, the four module Carbon Literacy course was launched and offered to Games volunteers and all residents of community groups across the West Midlands. The course is made up of three self-paced interactive e-learning modules followed by a live online workshop session led by a student from one of the local universities. The training will sit on a legacy platform for Games volunteers which will provide a digital matching service linking volunteers and curated volunteering opportunities in the region. This will be run by the United by 2022 Legacy Charity.

Those who complete the course and make pledges to reduce their carbon footprints will earn Carbon Literacy certification accredited by The Carbon Literacy Project. Students teaching the final segment of the course have been trained and will receive a digital badge of recognition demonstrating that they have supported Birmingham 2022 and the West Midlands Combined Authority in delivering Carbon Literacy courses. West Midlands Combined Authority will retain long-term ownership and management of this course to ensure its content remains relevant as time passes, aligning with its own climate action objectives. Alongside the West Midlands Combined Authority and the Organising Committee, the Department for Business, Energy and Industrial Strategy also provided funding to support this training.

Our Sustainability Coordinator has also developed a Carbon Literacy course for those working within the sports sector with a sharp focus on the impact climate change is having on all sports. A pilot was launched in June 2022 and a shareable Toolkit will be launched via The Carbon Literacy Project in the coming months.

'What's your number?' campaign

Our 'What's your number?' campaign was developed to demonstrate the importance of individual action when it comes to addressing climate change, so in partnership with Giki we provided an online platform to help people to understand where their own carbon emissions come from (through a 150-step carbon calculation process) and what steps they can take to reduce them. We initially promoted the campaign to employees, driving engagement internally, before sharing with our volunteers when they joined us. We also trialled this platform with a group of athletes and made it widely available to all our spectators.



"I was excited to see the creation of a sports-specific Carbon Literacy course. The pilot session clearly highlighted the carbon impacts of our sector and the actions that we can all take to reduce emissions on an individual, community and organisational basis. The potential of this course to empower people to make a positive change is huge."

Sustainability Advisor, UK Sport

"The Carbon Literacy course is really insightful, eye-opening and a good reminder of the problems we are facing. It is also thought provoking and forward thinking in the factors we should be considering and changing now (e.g. handling hot weather, preparing for extremes). I found it really engaging."

Senior Research Manager, Sport England

EXAMINING AIR QUALITY AT MAJOR SPORTING EVENTS

In 2019, approximately 1,400 deaths in the West Midlands were attributed to particulate pollution – the biggest environmental impact on mortality in the region. Poor air quality is a significant risk to human health, and we wanted to explore how hosting a major sporting event impacts local air quality – and how local air quality can impact a sporting event.

In a first for the Commonwealth Games, and together with the University of Birmingham through its WM-Air air quality improvement programme, we set out to capture the daily state of play air quality-wise and to share this information with medical teams and athletes to help with their preparations.

Air quality was measured through instruments at a permanent site close to an Athletes Village and hockey venue, an array of air quality measurement devices at the Alexander Stadium and stationary devices at the Alexander Stadium and Edgbaston Cricket Ground.



The Air Quality Index (AQI) for Birmingham and the West Midlands was "low" throughout the Games period indicating low levels of pollutants. Measurements at Alexander Stadium showed locally elevated fine particulate (PM2.5) concentrations, most likely as a result of cooking and the use of fireworks. Despite these local increases in pollutant concentrations an assessment of the causal impact of the Games on air quality at two background sites in Birmingham showed the Games had little causal impact on background PM2.5 or nitrogen dioxide (NO2) concentrations in the city. This indicates that, despite local increases in pollutant concentrations, Games-related activities did not meaningfully impact background concentrations across the wider city during the Games period.

As well as the real-time data provided to medical teams and athletes, the University of Birmingham will compile a wider report showcasing trends and variables that impacted air quality throughout the Games so that future Commonwealth Games OCs and sports event organisers in general can glean some insights to make athletes, staff volunteers and spectators safer. For further information see https://wm-air.org.uk/b2022/

Data was also collected through the Queen's Baton as it went on its 269-day journey across all the nations and territories of the Commonwealth. Designed to infuse art, technology and science, the Baton was fitted with atmospheric sensors with laser technology to analyse environmental conditions wherever it found itself in the world.

Technology for the Baton was developed by BOM (Birmingham Open Media), while its design was conceived by West Midlands-based studios Raymont-Osman Product Design, Kajul and MAOKWO with the support of artist Laura Nyahuye.



"Atmospheric data captured during the Baton's global journey will be highly valuable in starting important conversations around air quality across the Commonwealth. The data collected will be particularly relevant to our ongoing research partnerships in East Africa and India, where we're investigating the impact of air quality on citizens."

Professor Francis Pope, University of Birmingham



CIRCULAR ECONOMY PRINCIPLES

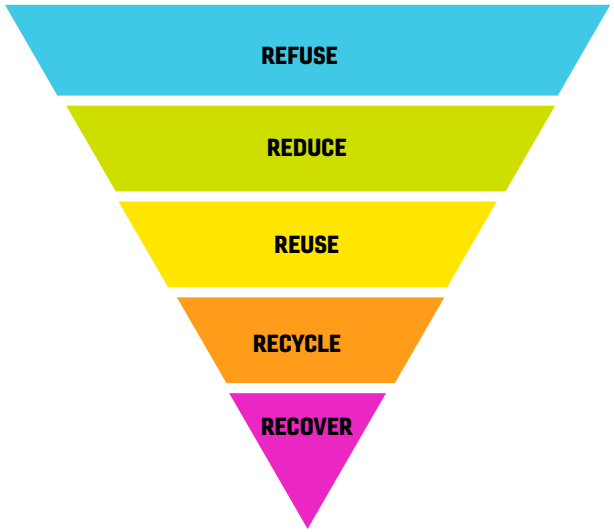
WHY IS THIS IMPORTANT TO US?

'Take, make, dispose' is a linear model of production and consumption that has drastically depleted our natural resources and created unsustainable amounts of waste. Through this approach, products are manufactured without consideration for their end-of-life and consumers are encouraged to purchase the latest models – often manufactured with new materials – to replace faulty, old or unfashionable items.

The circular economy is helping us move away from this end-to-end model by designing waste out of the system and keeping products and materials in use. Our target was that no waste from the Games would go to landfill for final disposal. We focused on this by incorporating circular economy principles into our procurement, dissolution and waste strategies.

Generating large amounts of waste also creates knock-on effects for other environmental issues. When discarded items are sent to landfill or the incinerator greenhouse gas emissions are produced, accelerating climate change. If waste is disposed of incorrectly it often ends up in the natural environment, harming delicate ecosystems.

OUR HIERARCHY OF WASTE



We wanted the Games to showcase how we can all be conscious consumers and deal with waste responsibly. As an OC, we felt this was even more important because of the significant amounts of waste typically produced at major sporting events, particularly equipment, food and beverage containers, textiles and overlay and branding.

TO MAKE THE GAMES AS CIRCULAR AS POSSIBLE, WE USED THE WASTE HIERARCHY TO INFORM OUR FIVE MAIN COMPONENTS:

Prevent waste by **using existing facilities**

Reduce single-use plastic by installing free water bottle refill points

Hiring equipment rather than buying where possible

Ensuring assets used during the Games – including sports equipment, signage, furniture and fittings – were **repurposed, reused and recycled** where possible

Achieving **zero waste to landfill** by turning non-recyclable waste into energy

OUR TARGETS

KPI 1: 90% of pro audio visual equipment to be hired

KPI 2: Provision of free water bars offering drinking water available at every Games venue to mitigate the purchase of single-use plastic bottles

KPI 3: Zero waste to landfill objective

KPI 4: Develop a dissolution strategy to identify beneficiaries to receive Games consumables and therefore avoid landfill

Wider objective 1: Policy to hire all equipment except where not feasible

Wider objective 2: Use and upgrade existing building infrastructure where possible

Wider objective 3: Delivery model changes to drive efficiencies

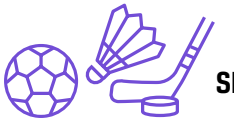


REFUSE, REDUCE AND REUSE



We decided that hiring the majority of our assets and returning them to suppliers post-Games was a more sustainable approach than buying everything new, including 100% of our audio visual equipment. Through our functional areas responsible for venues and villages, we conducted an inventory to make sure the furniture, fixtures and fitting we were either hiring or buying were not going to be duplicated, and created a plan to move items to different venues when needed.

In the instances that we did purchase products instead of hiring them, we followed a dissolution process to make sure all assets found a new home and continued to have a life beyond the Games. In practice, we created an asset register to log all of the products we procured and mapped out different exit routes depending on what the items were:



SPORTS EQUIPMENT

More than £1.5 million (16,000 items) of sporting equipment was donated to local community organisations, including charities, schools and colleges, with the support of Sport England. Organisations interested in the kit – which included judo mats, boxing gloves, T20 cricket gear, basketballs and netballs – were encouraged to express their interest and apply. Following an assessment process the equipment was distributed all over the West Midlands (including Birmingham, Black Country, Coventry, Solihull and Warwickshire, Hereford and Worcestershire, Shropshire and Staffordshire) in the weeks following the Games.



FURNITURE

Specialist events dissolution company Event Cycle helped us collect and donate desks, chairs, filing cabinets and other pieces of office furniture to local community groups. Altogether, 2081 pieces of office furniture, furniture and white goods were placed with social enterprises and charities, with one charity taking 39 flip-top tables to help provide regular hot meals to people in need.

Whiteboards, tables, chairs, white goods, shelves, radios and floor mats were distributed to 35 charities, community groups and social enterprises across the Midlands, including 5UP CIC, a socially-focused gym that helps children and young people who are excluded from mainstream education, and Saheli Hub, a small charity that helps women in inner city Birmingham become more physically active.

RGS, our furniture, fixtures and equipment provider, donated £404,175 worth of good to four local charities – CT Transports, Help Harry Help Others, Let's Feed Brum and Father Hudson's Care – after two years of detailed and targeted planning.



VILLAGE ITEMS

As well as encouraging athletes and their support teams to bring only what they needed, we also set up donation stations at the villages so that unwanted items could be passed on. Event Cycle made sure that all the weird and wonderful items that were abandoned – from fancy dress costumes to astroturf – found a new home.

Astroturf was provided for a new sports zone at Birmingham Youth Sports Academy (BYSA), as well as towels, antibacterial spray and children's playmats. 5UP was also able to add kettles and crockery left at the village to its kitchenettes.

Flags from the villages were donated to brighten up the Balsall Heath Children's Action Team Support play space, which gives young people with disabilities a place to learn and play. Help A Squaddie, an organisation formed to support and rehouse homeless ex-servicemen, received clothing, kettles and toilet brushes, while bibles, Psalm books, deck chairs, toilet brushes and sports equipment were donated to Victory Church in Rugeley.

Around 14,600 laundry bags were collected and donated to charities, 14 of which were full of clothes that were left at the village. Distributing and collecting furniture and village items took Event Cycle around 123 local crew man hours and supported 61 unique charities and three social enterprises in total.



VEHICLES

Two of our community vehicles were donated to the Active Wellbeing Society to act as mobile 'libraries of things' – or share shacks – which will transport items around the city for temporary free hire. There are already several permanent share shacks, but these will give more people in deprived communities long-term and ongoing access to sports equipment, DIY tools, toys, cleaning and gardening equipment without having to purchase them. There are also plans to develop another permanent share shack in the Perry Barr area post-Games.









UNIFORMS

Excess material left over after the production of the uniforms will be made into sports bibs for local schools and clubs with Birmingham 2022 branding, contributing to the Games legacy.

SIGNAGE

Wooden structures produced by CSM Live (also see 'signing off sustainably') alongside Jericho, a local social charity and United by 2022 partner – including the winner's 'hot seat' for the cycling time trial and the cladding at the entry of the Smithfield venue – were donated to charity for recycling and reuse. Around 31,634m² of graphics used for the cycling road races were donated to several not-for-profits and community associations.

IT EQUIPMENT

High resale items, such as purchased IT equipment, were sold to generate revenue to be distributed back to Games funders.



SIGNING OFF SUSTAINABLY

Disposing of signage and overlay responsibly is a complex task for organisers of major sports events. However, working with CSM Live and Project Plan B, a circular textiles solutions company, we were able to transform the nine tonnes of polyester we used for flags, fence scrims, barrier jackets and table skirts into PET pellets, which Project Plan B shaped into polyester yarn to manufacture other products.

To ensure all products produced for the Games of this nature were totally recyclable, they had to be made out of 100% polyester without any additional material, such as metal eyelets that are traditionally found on scrim, for example.

"Restrictions like this mean that you have to be a little more creative, but it doesn't mean you have to go back to basics," Tim Cross, the Partner and Business Managing Director at Project Plan B said. **"It means you can be more creative and people working in the creative industries love that challenge."**

In addition, we worked with CSM Live to produce 78,481 wayfinding signs, 72% of which were donated, reused, repurposed or recycled. The other 28% went to energy recovery. Similarly, 350 items of metal hardware – frames and totems designed to support freestanding signage – will be dismantled, packed and reassembled at the next event. Traditionally, these items are made with wood and used only once. Most of the hardware items used (60%) were rented and will be reused, while 40% were repurposed by Jericho (see 'signage').

CSM Live also created reusable 10 metre and four metre versions of the Commonwealth Games' Celebration Device – the three equilateral triangles that form part of its brand – that will be dismantled, packed and relocated to Victoria for the next Games.

REDUCE





SINGLE-USE PLASTIC

We understood that single-use plastic water bottles would be a key issue for us to address and decided that the Games needed to demonstrate how people could reduce their consumption. Severn Trent provided 41 'Water Refill Stations' across Birmingham 2022 Commonwealth Games venues, which gave spectators, volunteers and staff the opportunity to fill up reusable bottles free of charge, as often as needed.

While traditionally members of the workforce would be given a bottle of water with their meals, reusable bottles were provided as part of our reward and recognition initiative to encourage the use of the stations.

Water flowed from 248 taps, filling up at least 480,000 bottles over the course of the Games. More than half (56%)[5] of spectators used the stations. Water bar volunteers carried water efficiency messages and tips to help people get into good habits and highlighted the importance of nature. Providing free refill stations also provided a key role in making the Games accessible and affordable for everyone.

However, reducing single-use plastic was one of the areas we found most challenging. On the performance side we were obliged to supply sealed plastic water bottles to athletes to ensure the integrity of their water supply to guard against doping. The bottles supplied by our partners Coca-Cola and Lucozade were produced using recycled material and were also recyclable after use.

Ahead of the Games our catering team analysed the environmental impact and feasibility of introducing reusable cups for beverages versus single-use plastic cups. Multiple aspects were considered, including the number of times a cup would be reused, water use, space requirements and transportation.

The number of venues, short Games period and our 14 caterers coming on board very close to Games delivery created a complex situation and, although our catering partners were briefed that single-use plastic reduction was a key area of focus through our Sustainable Sourcing Code and 'Flavours of the Commonwealth' guide, ultimately spectators were served with single-use plastic cups during the event.

This potentially created a negative perception of the environmental credentials of the Games and our approach to influencing the behaviours of spectators, especially when it came to waste. We did, however, provide reusable cups within venues that had existing capacity, such as Edgbaston and the Coventry Arena.

Indeed, achieving consistency for many of our sustainability objectives was made more challenging by the fact that our planning time was shorter than for most Games and that we had to work with a number of venues and different contractors.



MERCHANDISE

Ten different licensing partners produced just under 950,000 units of product featuring Birmingham 2022 branding, including pin badges, plush toys and apparel. Our master licensee, Cube International, was responsible for around 800,000 units and helped us design and deliver a more sustainable merchandising offer. One of our primary objectives was to limit the amount of single-use plastic used to wrap and package items, so working with a local manufacturer in the West Midlands, Cube was able to package all 187,000 units of plush – as well as a good proportion of apparel – in aquapack, a polymer that dissolves in water. Any product where this was not possible was packaged in 100% biodegradable wrapping.

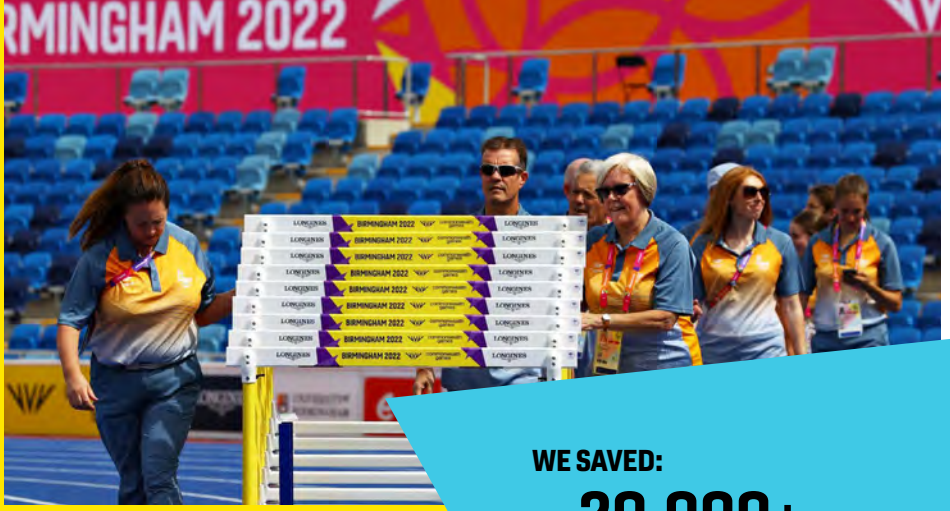
Our plush mascot toys were filled with 100% post-consumer recycled polyester, which was certified by an independent audit. Cotton tags were used instead of plastic kimbles to attach tags to all products. A decision was taken to not offer temporary tattoos, ponchos or balloons in the range to reduce single-use plastic further. All single-use shopping bags were made from FSC certified and sustainably sourced paper and 100% recyclable.

Cube reduced the carbon footprint of our pop-up merchandising offer by 80% compared with traditional methods by providing its Continest product – a shipping container with solar panels and electric and data connections already installed. Four Continest units can be transported at a time, saving fuel-related carbon emissions.

Some sports equipment, ceremony props and non competition assets such as mascot statues that were not so easily repurposed, were collected following use, authenticated, and auctioned for personal ownership.



[5] This data is from the post-Games spectator survey, n=23,256



WE SAVED:

20,000+
packaging bags on workforce and technical officials uniforms

15,700
plastic bags on both water bottles and uniform bags

5,000
small pieces from packaging

2,000
plastic hangers

50%
policy helped us reduce plastic consumption by c. 50%

UNIFORMS

All Organising Committee staff, technical officials and volunteers were provided a uniform, accounting for 157,500 units in total. We knew that if we could even make incremental changes that they would have a significant positive impact.

We approached waste reduction from two angles: the production of the uniforms and how they were packaged and transported.

In terms of the former, we made it compulsory for everyone eligible for a uniform to take a sizing questionnaire to generate highly accurate measures to help us avoid using excess material. This resulted in us ordering less in the first place, with 14% overage on any 'sized' line item – significantly less than done previously but still a sensible contingency. We also used single fibres where possible to help with garment recycling after the Games.

When it came to packaging and transportation, double folding and packaging two uniforms per bag helped us save more than 20,000 plastic bags. We also had a policy not to use plastic hangers or small pieces of plastic such as clips and collar stays. Bags and reusable water bottles were also given out to the workforce, officials and volunteers without plastic packaging.

Rather than asking volunteers to make the journey into Birmingham to collect their uniforms we delivered directly to their door, which has never been done before at any prior multisports Games, taking thousands of trips off the road network.

FOOD WASTE

Around 1.3 billion tonnes – or one-third of the food produced for human consumption globally – is wasted every year. Within the parameters of our obligations as the OC of a major sporting event, we attempted to do things a little differently to cut food waste as much as possible.

Aside from the food we offered spectators, our catering provision fell into three broad groups:

- Athletes and teams
- Volunteers, workforce and Games Family
- Spectators

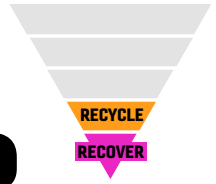
Research and previous experience told us that there were areas to make food waste savings across these groups. Traditionally, sports event staff and volunteers are offered a 'bagged meal' with a number of complementary items, but often people will not consume the entire contents of the bag. So we decided to move to a pick and pack service to counter this.

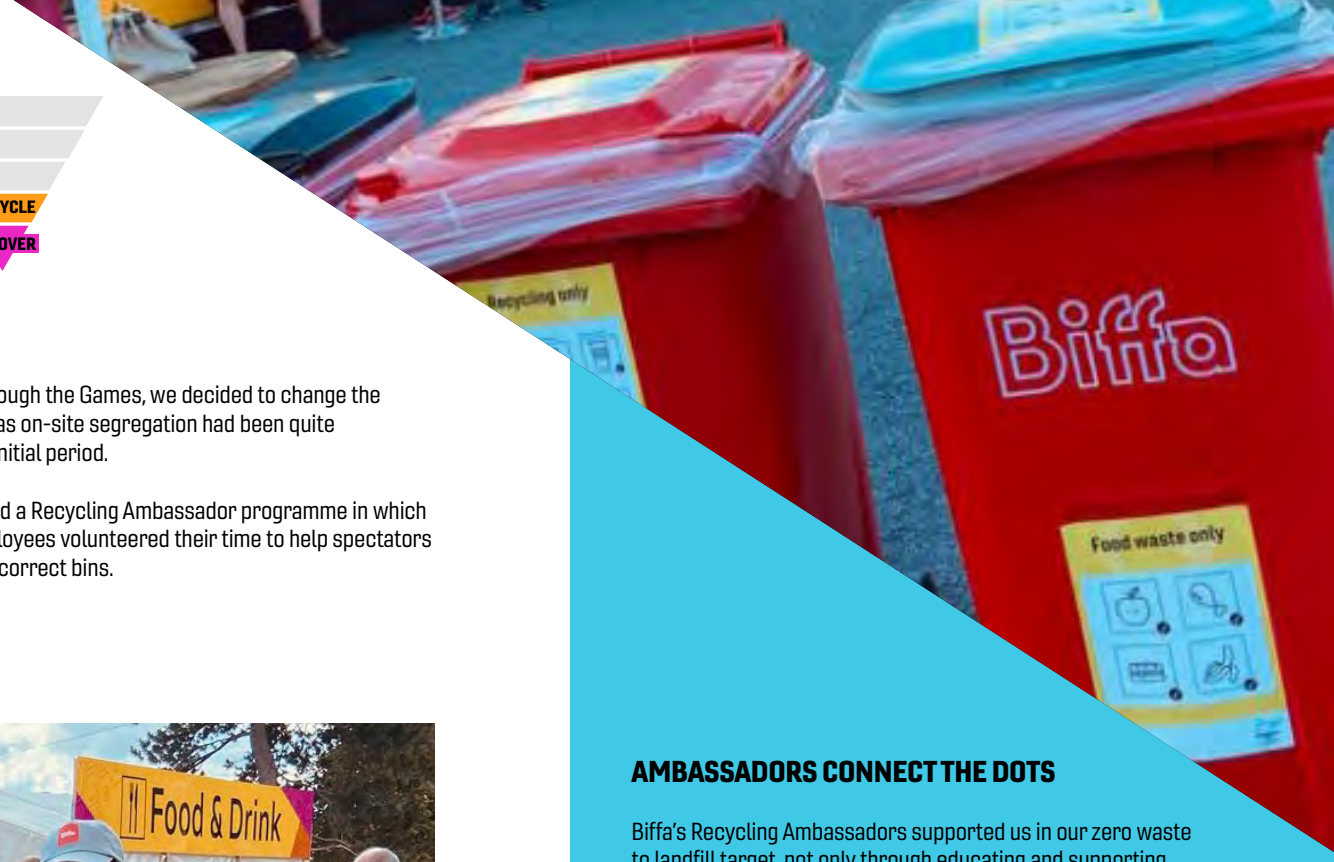
For the athletes, we tried to manage food waste by offering the same menu at lunch and dinner. For Games Family, individually prepared small bowls and plates replaced traditional big buffets displays.

Due to the high security and accreditation requirements at venues we had challenges around donating surplus food during Games time. However, we did work closely with charities as venues closed down to ensure excess food was distributed to those in need locally.

Another challenge we faced when it came to spectator waste was disposing of the food packaging we provided. While we requested that all caterers provide compostable packaging and utensils, our waste provider (which was appointed after the caterers) had no way to process those items within the region. To ensure we remained a zero waste to landfill event, we placed all biodegradable and compostable packaging in with general waste so they could go towards energy generation rather than landfill.

RECYCLE AND RECOVER





Our zero waste to landfill ambition was supported by our Official Waste Management and Recycling Provider, Biffa, and a handful of other incumbent waste management providers at different Games venues. We set the expectation that there would be three main waste streams – general waste, dry-mix recycling and food – and made spectator education a key part of our segregation strategy.

A bin sticker and recycling guide was produced by Biffa, demonstrating which waste should go where, with designated bins for food waste only, recycling only, glass only and general waste.

Part of the way through the Games, we decided to change the colour of each bin as on-site segregation had been quite a challenge in the initial period.

We also established a Recycling Ambassador programme in which over 100 Biffa employees volunteered their time to help spectators place waste in the correct bins.



AMBASSADORS CONNECT THE DOTS

Biffa's Recycling Ambassadors supported us in our zero waste to landfill target, not only through educating and supporting spectators, but also making real-time decisions about how best to place and man bins around Games venues. Ambassadors fed into the overall waste strategy by observing what was working well, what was not, and making adjustments accordingly.

Education and support extended to back-of-house staff, such as caterers, so that they were using the correct bins to simplify the segregation process. While good labelling and signage was important, engaging with people on a human level, having fun and telling them why we were approaching waste management this way made the message more compelling.

"It is always a challenge to make sure spectators are doing the right thing with waste, but the business really came together to get behind the waste ambassador programme," said Dan Shepppard, Biffa's Regional General Manager. **"A massive priority for us is engaging our people and the Games brought the whole company together. Everyone wanted to be a Recycling Ambassador."**

BIFFA HELPED US MANAGE OUR WASTE IN FOUR STAGES

1. Sort

Bins were emptied and transported to local depots before being sorted manually to ensure quality control. Some venues had waste sorting teams established on site. Electric refuse collection vehicles (RCV) were deployed for the first time at Alexander Stadium and returned to a transfer station in Tipton.

2. Process

Materials were separated by type into three areas – general waste, dry-mix recycling and food – before being transported to specialist facilities. Some venues had additional segregation of glass.



3. Transform

'Waste-to-energy' technology saw food waste being transformed into clean energy via an anaerobic digestion process, non-recyclable waste turned into low-carbon energy and recyclable plastic reshaped into raw pellets.

4. Achieve

As well as reducing pollution, our zero waste to landfill target helped us save a further 232 tonnes of CO2e that would have been emitted if the waste went direct to landfill.

OUR WASTE BROKEN DOWN [6]

TOTAL (TONNES)	771
Waste to energy	57%
Recycling	34%
Anaerobic digestion	9%
	100%

[6] Includes data from Biffa and Veoila and excludes the Coventry Arena/Stadium, Edgbaston and University of Warwick where actual data was not available

CONSERVATION



WHY IS THIS IMPORTANT TO US?

A key component of our sustainability strategy was a commitment to conserve the natural environment close to host venues and enhance biodiversity around Birmingham, the West Midlands and beyond for future generations. We ensured that we limited our impact on the region's ecosystems of canals, rivers and green spaces through environmental impact assessments (EIA) as well as management and mitigation measures.

A rich variety of tree and plant species can protect us against threats like disease and climate change and, as far as human enrichment is concerned, numerous studies have found that living in an area with green space and experiencing nature has a number of positive mental health consequences.

Improvements to cognitive function, stress relief, increased levels of physical activity, lower mortality and chronic disease, improved self-esteem, decreased depression and anxiety, lower blood pressure and improved immune function can all be correlated with spending time outside among trees and plants.

Communities with more green spaces report a higher sense of connectivity, increased cohesion and lower crime rates while removing health disparities between populations.

Birmingham and its surrounding regions have a rich natural environment, including ancient woodlands, agricultural and archaeological remains and significant nationally- and internationally-protected heathland. More than 500,000 species of plant and animal life can be found in the area according to EcoRecord, the ecological database for Birmingham and the Black Country.

We wanted the Birmingham 2022 Commonwealth Games to play its part through the correct management of natural areas, preserving these habitats and promoting their benefits. We want communities to spend time in their local natural environment so that they can enjoy them and contribute to preserving them for years to come.

OUR CONSERVATION WORK CAN BE BROKEN DOWN INTO FIVE MAIN AREAS:

Working with venue contractors to ensure negative environmental impacts **were reduced and avoided**

Clearing 22 miles of Birmingham's canals through the United by 2022 partnership with the Canal & Rivers Trust

Planting 72 Tiny Forests through our partnership with Severn Trent

Making conservation and sustainability part of the Games' **regional and international education** programmes

The planting of a **2022 acre Commonwealth Legacy Forest**

OUR TARGETS

KPI 1: Monitor biodiversity net gain on the two new Games infrastructure projects, Sandwell Aquatics Centre and Alexander Stadium

KPI 2: 22 miles of canals to be cleared through the United by 2022 partnership with Canal and River Trust

KPI 3: Plant 72 Tiny Forests in urban areas around the West Midlands in partnership with Severn Trent

KPI 4: Work alongside West Midlands Combined Authority to support its 'Virtual Forest', logging all trees planted as part of the Games programme and promoting its use

Wider objective 1: Develop education and understanding of sustainability through Games-wide learning and engagement programmes throughout the region for the benefit of children and young people



SUPPORTING NATURE AROUND OUR VENUES

We worked with the main contractors of the new Sandwell Aquatics Centre and Alexander Stadium developments – as well as our established venues and greenfield sites – to maintain and protect local biodiversity. This proved to be quite challenging for two reasons: firstly, it was a challenge to embed these improvements and move beyond the perception of being a 'nice-to-have'. It was also difficult for us to achieve consistency across venues that we did not own. However, suppliers' commitment to social value as part of their contract helped to facilitate biodiversity projects at a number of venues:



ALEXANDER STADIUM

Alexander Stadium was refurbished ahead of the Games as part of a wider Birmingham City Council redevelopment plan. The main contractors planted two wildflower meadows – one at the accessibility ramp at the stadium's East Stand and the second near the Transport Mall and BMX track – increasing plant pollination by providing a home for a variety of invertebrates and flowering plant species. Planters were installed and bird boxes were put in trees along the canal. Post-Games, the venue will be handed back to Birmingham City Council, who will lead a reinstatement programme that includes the extensive greening of wild meadows and providing outdoor furniture for people to enjoy green spaces.



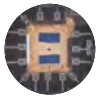
SANDWELL AQUATIC CENTRE

In the local Smethwick Hall Park 101 trees were planted, offsetting 500 tonnes of CO2e and receiving a Carbon Footprint Certificate. The build project for the centre is set to achieve a biodiversity net gain of around 12% based on mitigations (avoiding the need to reduce plant life) and enhancements (adding more plant life) by Summer 2023.



CANNOCK CHASE

Because of its status as a Special Area of Conservation (SAC) and an Area of Outstanding Natural Beauty (AONB), the Cannock Chase venue team maintained a close relationship with Park Rangers and Forestry England to ensure the event delivery minimised vegetation clearance and other potential environmental impacts. Contractors used low-level lighting to avoid interfering with wildlife sleep cycles and spectators were encouraged to protect habitats and species through a public awareness and education initiative. Additional signage was installed to separate walking routes from the habitats for the 10,000 free-to-view spectators.



SMITHFIELD MARKET AND FESTIVAL SITE

Following the conclusion of the Games, trees that were cultivated in planters at the site were 'adopted' by the National Trust and replanted at schools, community spaces and public gardens.



SUTTON PARK

Careful liaison with Natural England and Birmingham City Council ensured that build and event activities left no permanent change to the site's environment. Sutton Park is protected as a Site of Special Scientific Interest (SSSI) and a National Nature Reserve (NNR). A Cattle Management Plan separated the animals from the competition area and water quality was monitored by the City Council and triathlon sports bodies to ensure athletes avoided health risks. A surfacing mesh was also installed to promote drainage and protect grass.





RECONNECTING WITH OUR CANAL

One of our key conservation projects we developed through our United by 2022 legacy charity involved clearing 22 miles of canals in Birmingham with the support of the Canal & River Trust.

Along the route, Canal & River Trust thinned out a section of trees that had previously blocked the view between the canal and the Alexander Stadium. Hedges and boundary fences that maintained visibility were laid in their place, creating a landscape that showcases the symbolic connection between the sporting and sustainability legacies of the Games.

With canals acting as key routes to many of the venues, the work made a huge difference not only to the local communities but also the thousands of visitors who travelled along them.

The Canal & River Trust's work centres on revitalising Birmingham's canal, which has been in decline since its Industrial Revolution heyday. It is now a place of wellbeing, with the Trust working hard to make it a clean, safe and enjoyable place to be.

A large part of that involves removing rubbish that has been disposed of in the canal's water or surrounding bank. Shopping trolleys, motorcycles and other large items were retrieved from the canal by the Trust and its volunteers, while plastic that had been collected was recycled and turned into a sculpture (see main image).

As well as removing rubbish from the area, we worked together to plant gardens, wildflowers and managed vegetation. Water quality improvements and canal bank protection that resulted from this work have positively impacted wildlife, with a boom in butterflies, flying insects and otters.

The creation of gardens and the placing of benches along the canal has given local people the opportunity to enjoy the natural environment closer to home. Volunteers who contributed to the project reported a renewed sense of joy, wellbeing and community cohesion.

Our work caught the imagination beyond the city boundary. Walsall Against Single-Use Plastic (WASUP) lent us a hand when clearing, while the Canal & River Trust received two grants to support this work: one from the National Lottery Heritage Fund and another from the UK Government Department for Environment, Food & Rural Affairs (Defra) as part of its Green Recovery Challenge.

"We've used the Games as a trigger to showcase the region's wonderful canal network and create opportunities for people to volunteer for us, enabling them to take local ownership and pride in their canal and realise the wider health benefits it brings.

The funding that we've received from the National Lottery and Defra was all about the environmental enhancement of Commonwealth Games venue locations, and the Games bid helped us secure that money. We were doing a lot of this work anyway, but Birmingham 2022 has really given us the opportunity to raise its profile, increase community involvement and take the Games across the region through our projects."

Ian Lane, Head of Operational Projects – West Midlands, Canal & River Trust

UNITED BY 2022

The legacy charity for the Birmingham 2022 Commonwealth Games was established so that projects like the canal clearing initiative did not stop once the Games left town. The charity was created to reach the most socially-excluded and disadvantaged communities by supporting projects that:

- Are community led, enabling their ideas to be actioned while solving challenges on their doorstep
- Keep the 'Games for Everyone' vision alive while promoting fairness and social inclusion
- Ensure venues and other Games assets are turned into well-loved community spaces after the Games



BRINGING NATURE TO URBAN COMMUNITIES

Planting 72 tennis-court-sized forests in Birmingham and other urban areas around the Midlands gave thousands of people in the region the chance to connect with nature during fun and community-focused planting days, and will give thousands more the opportunity to spend time in the natural environment on a regular basis as the forests begin to thrive.

The plots – all named after flora or fauna from each of the 72 Commonwealth member states and territories – contain 600 native trees each that were planted by our Nature and Carbon Neutral partner, Severn Trent, and volunteers between January and April 2022. They were supported by our charity partner Earthwatch Europe, which is leading the Tiny Forests movement in the UK.

As urban areas continue to face increasing environmental pressure from heat stress, flooding and biodiversity loss, Tiny Forests provide natural habitats that can mitigate climate change and provide areas where people enjoy nature, even where space is at a premium.

Four layers, including main tree species, subspecies, shrubs and ground-covering herbs, were planted one foot apart in a randomised pattern to cultivate a dense micro-ecosystem that will be an oasis for plants, insects, birds and small mammals. During the early planting period, when trees are between 20-60cm tall, they compete for space, light and water, which encourages up to 10-times faster growth than traditional afforestation techniques, meaning they should double in size within three years.

Each plot was filled with local soil, with enough mulch spread across the 72 Tiny Forests to fill seven double-decker buses. Native Midlands seeds for the trees were propagated, germinated and grown into trees in Scotland before being returned south to be planted in the Tiny Forests. Seating for 650 people was installed across the sites, with benches, fences and information signs (with a QR code linking to Earthwatch's Tiny Forests information portal).

Planting days galvanised communities, with many people attending multiple events including one family that planted more than 1,000 trees. Regular upkeep of the Tiny Forests is the responsibility of volunteer 'Tree Keepers' – 2-4 per site – while Severn Trent looks after more significant maintenance projects. With the support of Severn Trent and Earthwatch, Tree Keepers monitor:

- Biodiversity slabs placed below the mulch that can be lifted to see what's growing underneath
- Flood risk and water interception by observing soil hardness both inside and next to the forest
- Air quality and temperature regulation in the shade under trees (this will become more prevalent when trees grow taller)

At the time of this report's publication, our Tiny Forests were responsible for almost half of all similar sized forests in the UK (149), but they are rapidly growing in popularity as the UK Government aims to plant 30,000 hectares of trees per year. Research partnerships between Severn Trent, Earthwatch and local universities will paint a more detailed picture of Tiny Forests' environmental and social benefits over time.





WHAT IS A TINY FOREST?

A dense and fast-growing native woodland, ideal for creating an oasis for plants, insects, birds, small mammals and people in an urban environment. Developed by Dr. Akira Miyawaki in the 1970s, the tree planting technique used for Tiny Forests encourages accelerated forest development.

Tiny Forests are great for:

- Providing green space for people in urban environments
- Giving local communities an opportunity to come together
- Creating nature-rich habitats to support urban wildlife
- Providing carbon capture and flood management support
- Supporting outdoor learning
- Contributing to scientific research projects

There are generally four main layers to a Tiny Forest: tree layer, sub-tree layer, shrub layer and herb layer (see left).



BEYOND OUR KEY PILLARS



EMBEDDING THE ENVIRONMENT INTO THE FABRIC OF THE GAMES

Hosting the Commonwealth Games was a once in lifetime opportunity to create a lasting and positive legacy, and despite having a shorter than usual timeframe to prepare for the event, we wanted environmental sustainability to be a thread that tied together every aspect of Birmingham 2022. Beyond our core objectives around mitigating the environmental impact of the Games and driving sustainable innovation where we could, environmental protection could be seen in most of our activities, from the Queen's Baton Relay to our festivals programme.

DRIVING ENVIRONMENTAL AWARENESS THROUGH EDUCATION

Climate change is among the priority concerns for the younger generation, with high-profile Gen Z activists leading the charge and putting pressure on governments and organisations to adopt more sustainable policies. We wanted to support the learning of younger people in our region so that they are better informed about the risks related to climate change and other environmental issues, and how they can make a positive difference.

Alongside Planet Earth Games Trust, we developed a Birmingham 2022 School Games Sustainability Challenge to gamify climate action and make it fun for young people in schools right across England. Those taking part were encouraged to choose three out of five options (transport, energy, waste, food and conservation) where they wanted to make an impact. In the three areas chosen, participants were encouraged to find out about Birmingham 2022's policies and behaviours they could adopt for their own sporting events.

As part of the wider Games Education Programme, Birmingham 2022 Youth Programme 'Bring the Power', children and young people in schools and youth centres across the West Midlands had the opportunity to learn about the different environmental challenges faced by countries across the Commonwealth. This was delivered through educational resources and in-person workshop delivery, centred around play, physical and creative activity.

Our partners, Severn Trent and Aggreko, supported our environmental education programme. The former hosted school assemblies focused on water issues around the Commonwealth and developed a plastic competition, while the latter produced workshops around renewable energy. Through our United by Birmingham 2022 community projects, a book titled 'World Against Single-Use Plastic' that explains the life cycle of a plastic bottle was produced and distributed to schoolchildren.

YOUTH SOCIAL ACTION DRIVING THEIR OWN ENVIRONMENTAL PROJECTS

Gen22's 'Ideas Made Real' campaign, which has delivered over 30,000 hours of youth social action as part of the legacy of the Games, has also empowered young people 16-24 to drive their own environmental projects in the heart of their own communities across the region. From tree planting and education projects in areas of deprivation, to community gardens and shared spaces in youth mental health facilities and also supporting those with SEND (Special Educational Needs and Disability) to learn new skills outdoors, Ideas Made Real has captured young people's imagination and supported them with funding of up to £10,000 to turn their ideas into reality.

PLANET-FRIENDLY GIFTS FOR ATHLETES

Through support from the Arts Council and National Lottery Heritage Fund, we were able to present athletes with heartfelt gifts that had minimal impact on the environment. Produced by Craftspace, the 4,600 gifts were hand made with upcycled locally-sourced materials from metal washers, that were wrapped, stitched and knotted with yarn by local volunteers. The yarns, that were chosen from Scrapstore, were chosen to reflect the flags of the Commonwealth's nations and territories.

SPECTATOR ENGAGEMENT[7]

4 in 5
rated their travel experience as 'good' or 'very good'

56%
of spectators used Water Refill Stations

62%
of spectators said that sustainability was a consideration when planning travel

[7] This data is from the post-Games Spectator Survey n=23,486



QUEEN'S BATON RELAY PROMOTES ENVIRONMENTAL PROJECTS

Over the course of 294 days, the Queen's Baton (the symbol of the Commonwealth Games), travelled to all 72 nations and territories represented at Birmingham 2022, covering 90,000 miles. It was the perfect opportunity to understand and showcase some of the environmental issues facing these places and how they are being addressed.



AFRICA

As it journeyed through Africa, the Baton visited the Banjul Beach Coconut Project in The Gambia, which helps to preserve and protect coastline by planting hundreds of coconut trees, tree planting activities in Kenya and Uganda and activities in Rwanda's Nyandungu Urban Wetland Ecotourism Park, designed to conserve local biodiversity and restore on-land aquatic habitats. In Mauritius the Baton spent much of its time travelling around the island on an electric bus or the nation's metro system to reduce the environmental impact of its journey.

ASIA

A hop across the Indian Ocean to the Maldives saw the Baton land in a beach clean-up project and conservation initiative led by environmental advocate and Batonbearer Hashim Aboobakur.

Vinisha Umashankar, a 14-year-old-student from Tamil Nadu, was chosen as one of the Indian Batonbearers by the University of Birmingham after she captured their imagination with a solar powered ironing cart that she designed to reduce the need for coal. Her adventure with the Baton followed a speaking engagement at the COP26 Climate Summit in Glasgow, where she was invited by Prince William, Duke of Cambridge.

As the Baton made its way through Asia and down to Oceania it passed through Singapore's high-tech sustainable airport, a university round table in Malaysia that focused on the impact of sustainable engineering and Brunei Darussalam's Taman Mahkota Jubli Emas eco-park.

OCEANIA

Coral planting was on the agenda in Fiji as part of the OZONE global conservation initiative, followed by tree planting in the Sigatoka Sand Dunes National Park. In Kiribati and Tuvalu, the Baton journeyed around coastlines where mangroves had been planted to support local conservation and climate mitigation efforts. At the halfway point of the Queen's Baton Relay, children from Niue spoke about their passion to save the Pacific region from the impacts of climate change.

CARIBBEAN

In Belize and Guyana, conservation of mangroves, coral and rainforest was part of the programme. Through the Caribbean, the Baton moved across a conservation site for blue iguanas (Cayman Islands), a protected coral area called the Nylon Pool (Trinidad & Tobago), the ecologically-focused Bregado Educational Centre (British Virgin Islands) and the SKELEC Solar Farm (St Kitts & Nevis). In St Lucia, Batonbearer Johanan Dujon showcased his company, Algas Organics, which is the Caribbean's first idigenous agriculture biotech firm that converts invasive plants into organic products.

CANADA AND THE UK

Air quality research produced by McMaster University was presented during the Canadian leg of the tour, while in Scotland Batonbearers were taken to tree nurseries and given the chance to plant more trees. In the final nation, England, the Baton visited a wind turbine training facility in Blyth, Northumberland, where practical training is available to support the offshore energy sector. This first for the UK wind industry will see wind technicians of the future take their first steps into the industry at this unique location.

GIVING ATHLETES A PLATFORM FOR CLIMATE ACTION

Overcoming adversity is part of an elite athlete's job description. But Cheyenne Rova must have thought everything was against her when unseasonal tropical cyclones forced the cancellation of Olympic trials in her home nation of Fiji, not once but twice, and persistent flooding prevented her from training at her one and only local pool.

Those setbacks did not stop the swimmer from qualifying for Birmingham 2022 – her third Commonwealth Games – where she used her opportunity at the Games to highlight the worsening impact of climate change on her country and the surrounding Pacific island nations.

Recognising the increasing concern within the athlete community on climate change and other environmental issues, we teamed up with Athletes of the World, a movement established by Hannah Mills, the most successful female sailor in Olympic history, and Melissa Wilson, former Team GB rower, to inspire athlete education, engagement and action during the Games.

Rova was one of 29 athletes taking part in two climate education sessions hosted by Athletes of the World and AimHi Earth that explained the science behind climate change and how it is likely to impact sport going forward.

The athletes – who represented nine sports, including athletics, beach volleyball, cricket, cycling, hockey, lawn bowls, rugby 7s, swimming and weightlifting – were then invited to take part in a pilot using an app developed by Giki to map their own carbon footprints and take meaningful steps to reduce it.

Over the two weeks of the project, the participating athletes adopted a number of carbon-minimising behaviours, including the reduction of meat consumption, composting food waste and taking shorter showers.

"I found that really helpful because it meant I could literally map my own personal carbon footprint, which is something I haven't been able to do previously," said Fiona Burnet, who represented Team Scotland in field hockey at the Games. **"As athletes we have a fairly big carbon footprint related to travel, but it felt really quite empowering to know that there are other things we could do to reduce our impact."**

As well as making everyday changes, athletes were encouraged to use the Games as a high-profile platform to advocate for climate action. Taking inspiration from her team's tradition of wearing temporary Scotland tattoos during tournaments, Burnet suggested that athletes at the Games could increase awareness around climate change by sporting the Athletes of the World logo on equipment, such as hockey sticks, or their body through temporary tattoos.

Rova, who wore the tattoo during her events and shared them with her Fiji teammates, also got the opportunity to discuss her region's climate change challenges via a BBC interview alongside fellow swimmer, Tilka Paljk, who is from Zambia.

"I had the chance to explain that we're on the frontline of the crisis and I also learned about the issues they are facing in Zambia, which is different to Fiji," said Rova. **"Tilka spoke about how emissions were affecting wildlife in her part of the world and it's interesting to see that we're all being impacted by climate changes in different ways. This was my first experience of a major competition where climate change and environment was really being talked about. Young people listen to athletes, so when you get a lot of us together at a major Games, advocating for a big issue and learning together, that is really powerful."**

Burnet and rugby 7s player Jamie Farndale were named as Team Scotland's 'sustainability captains' and wore specially commissioned armbands to showcase the importance of nature. Crucially for Farndale, the opportunity to interact with his teammates on environmental issues during a major event means that he is no longer the "lone voice" advocating.

"Teammates who weren't really interested before are now not accepting it if a tournament hasn't been organised with sustainability in mind," Farndale explained. **"It's difficult being the only voice but as a team it's really powerful. Melissa spoke so well during our education session about athletes needing to take responsibility that a few of my teammates left feeling genuinely inspired."**


Fiona Burnet, Hockey, Scotland


Cheyenne Rova, Swimming, Fiji



Jamie Farndale, Rugby 7's, Scotland

REFLECTIONS FROM THE SUSTAINABILITY TEAM

As the Sustainability Team tasked with overseeing and implementing the OC's environmental sustainability ambitions, we're proud of our achievements and the work we did. At times it was a leap of faith as we endeavoured to raise the bar without always having all the immediate answers on how to deliver it. We achieved more than we thought possible given the constraints of the Games but our ambition is that other sporting events learn from and build upon our lessons. So while this report was produced in part to demonstrate what went well, we also believe it is important to pass on the baton of future opportunities to whatever events come next.

1. PLACING SUSTAINABILITY AT THE HEART OF THE OVERALL STRATEGY AND APPROACH

Birmingham was awarded the Games with four-and-a-half years to plan compared with the customary six-and-a-half years which created a sense of pace and urgency to identify our strategic targets and sustainability ambitions quickly. We set a strong early goal to be the most sustainable Commonwealth Games yet and, with 500 days to go, published our Sustainability Pledge putting forward the idea that Birmingham 2022 would be the first Commonwealth Games to create a Carbon Neutral Legacy. Our leadership team, including the Board of Directors and Executive Management, gave us their wholehearted backing and support.

However, sustainability ambitions cannot operate in a silo to the deliverability of the Games overall. Whilst this support and our Pledge gave us a terrific mandate to create real positive environmental impact, functional areas were all at very different stages in terms of developing their own approaches, creating challenges around alignment of objectives and the sequencing of activity. For example, our Sustainable Sourcing Code was finalised after some early procurement decisions were already made, which limited its impact.

Going forward, having a clear sustainability approach and team in place in advance of other strategies would benefit the overall delivery. This would enable approaches to be co-built, budgets aligned and stakeholders bought in from out-set in their role and contribution. Future OC's also need to be prepared to take risks in innovation if they want to make a tangible change.

2. CHALLENGE THE SUPPLY CHAIN TO DELIVER AT SCALE AND BRING MORE INNOVATION

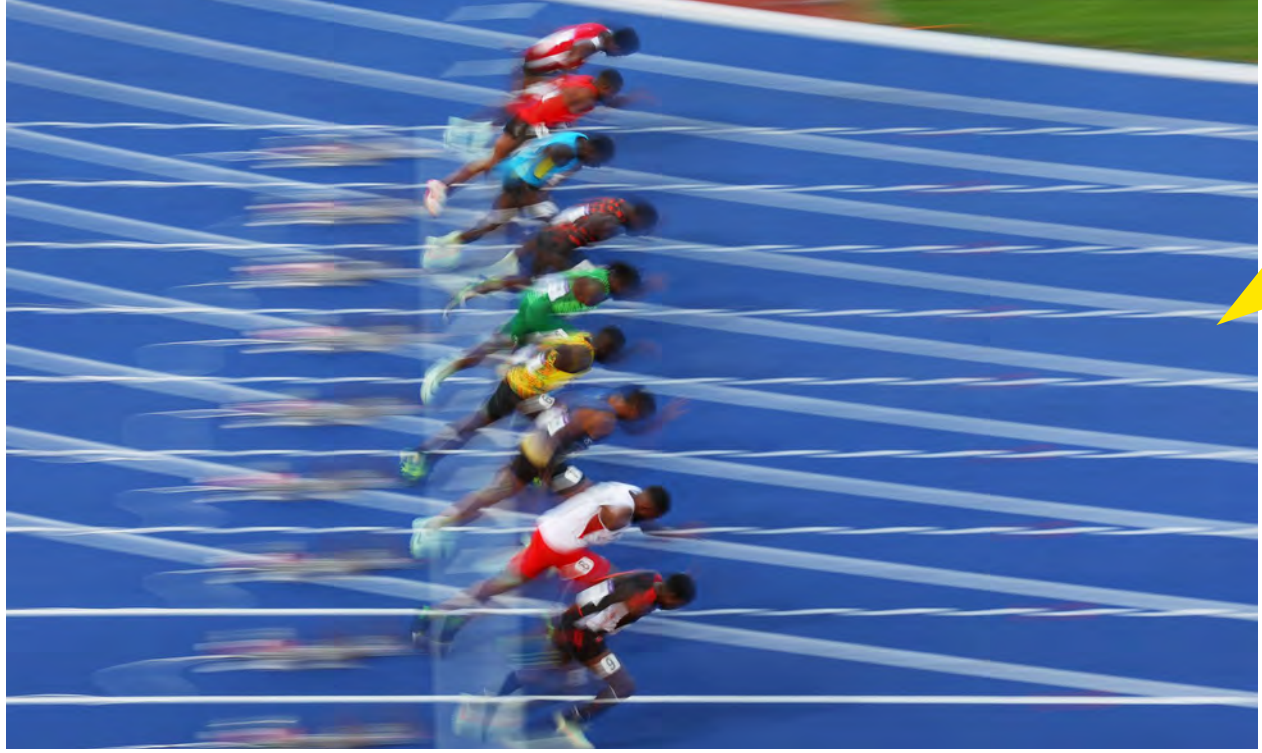
Our bold ambition to be the first Commonwealth Games to create a Carbon Neutral Legacy is something we are proud of. We have some strong reduction examples across our footprint from promoting public transport, to the fact that 42% of our fleet were low emission vehicles and our 'grid-first approach' massively reduced our reliance on generators.

We could have gone further with greater availability of low emissions vehicles and improved charging infrastructure. If sporting events signal a higher level of ambition around sustainability it will give the supply chain greater confidence to invest in more sustainable solutions rather than settling for the status quo. Further hybridisation of temporary energy is a perfect example.

3. CREATE THE BUSINESS CASE FOR SUSTAINABILITY

Signalling a strategic intent for sustainability will only be successful if it is integrated into the commercial approach of an event also. Inevitably events can become budget constrained and





trade-offs and compromises need to be made to deliver an overall successful outcome. In the case of Birmingham 2022, energy requirements shifted late in the planning process which put sustainable options at risk due budget constraints. Owing to the importance of the initiative, compromises were made elsewhere to accommodate sustainable energy solutions but at the expense of other initiatives.

Being clear on the business cases for solutions and ensuring they are adequately integrated into the upfront budgeting process would help to avoid difficult choices closer to event time. Equally, the argument needs to be made that sustainable practices can drive cost-out rather than cost-in. Reducing waste, being more efficient with water and energy, repurposing and reusing assets and incentivising green travel can all help to reduce the operating costs or allow for re-investment elsewhere.

Ring-fenced funding or department incentives to support future carbon reduction initiatives could also support this approach.

Although COVID delays had an impact in terms of the amount of time we had to work with some of our suppliers, examples where we were able to work together to think differently were fruitful, for example, driving down the amount of packaging across uniforms and merchandise. Incremental changes add up, and the earlier these discussions can happen, the more scope there is for creativity.

4. IDENTIFY PURPOSEFUL PARTNERSHIPS

Our partnership with Severn Trent wasn't a traditional sport sponsor/Organising Committee relationship – with Severn Trent's unique tie to the region – its investment in biodiversity improvements drove a fantastic level of community engagement through planting days, its education programmes helped to extend our reach and the provision of water refill stations helped to nudge sustainable behaviours amongst spectators.

Acknowledging the complexity of offsetting, we felt that the development of a Commonwealth Legacy Forest was a credible way we could take responsibility for our residual emissions – investing in a local and properly managed project. Planting 2022 acres of new forest is no small feat, and land availability has certainly been a key challenge with the landscape around tree planting evolving quickly with numerous grants now available and land becoming increasingly valuable since the commitment. Delivering on such a bold ambition was never going to be easy, and Severn Trent has been a fantastic partner, collaborating and innovating through the numerous challenges and providing the additional resources needed in order to deliver on this considered approach to offsetting, leaving a true legacy for the region.

Lots of other partners and sponsors contributed to our sustainability journey, and there is certainly a greater opportunity with these partnerships to really drive innovative solutions to the sustainability challenges facing the events industry, whether that's through showcasing the best of technology, driving behaviour change or finding opportunities within aligned visions.

5. USE YOUR PLATFORM TO EDUCATE AND ENGAGE

Using the Games as an opportunity to engage and educate was really important to us – and we are really pleased to publish our freely available Carbon Literacy training courses we have created. We also had some great sessions with athletes who are passionate about advocating for climate action, through education sessions, a behaviour change trial and through advocacy at the Games time in the form of interviews. Athletes have such a powerful voice in this space and with the right support and platform they could be such a powerful force for future events.

However, on reflection, we didn't take full advantage of the captive audience we had with our spectators, with much of our education invisible to many. There is a vast opportunity to capture spectators attention, to educate about sustainable behaviours, influence and incentivise behaviours through activations and empower and inspire them around climate action.

We are proud of the progress we have made, but acknowledge there is much more to be done, and hope that this report and our lessons are of value to others and can be used as a springboard for future events to both learn from and build on.


APPENDIX
BIRMINGHAM
2022

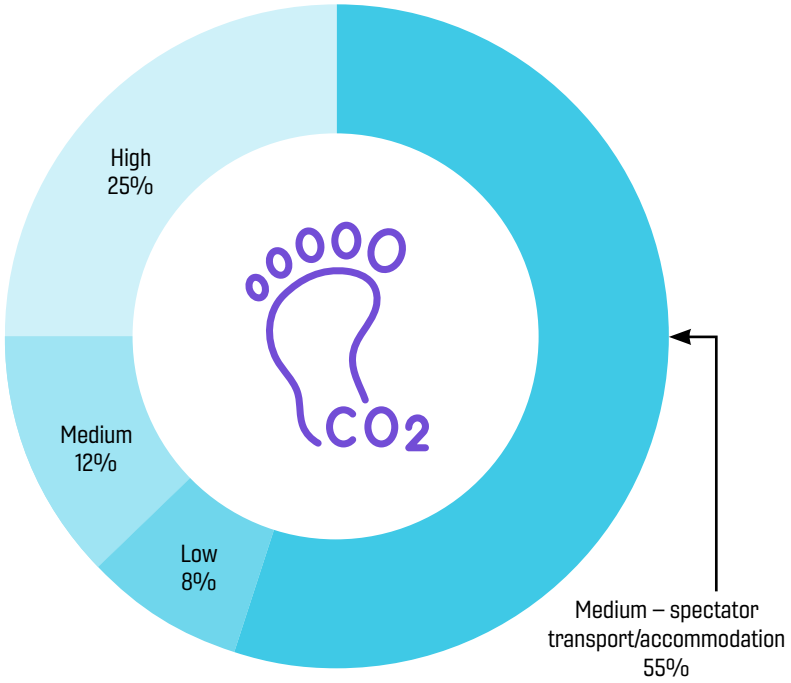
CARBON FOOTPRINT DATA QUALITY

The best data available, in the time constraints of reporting, has been used to calculate the final carbon footprint of the Games. Table 1 and Figure 1 provide an overview of data quality per category and across the whole footprint, respectively.

CATEGORY	OVERALL DATA QUALITY
Preparation & Operations	
Ceremonies	High
Overlay & Temporary Infrastructure	Medium
Energy	High
Water	Medium
Transport Services to Venues	High
Games Family Travel	High
Logistics	High
Licensing & Merchandise	High
Look of the Games	High
Electronic Equipment & IT Services	High
Sports Equipment	Low
Uniforms	High
Catering	Medium
Accommodation	High
Waste Management	High
Live Sites	Low
Office Management	High
City Events (Culture Programme)	Medium
Finance - Overhead Costs	Low
Security	High
Queen's Baton Relay	High
Permanent Infrastructure	Medium
Spectator Transport	
Spectator Travel (Home-City)	Medium
Spectator Accommodation	Medium
Spectator Travel (City-Venues)	Medium

KEY:
High = All activity data, which is based on actual data and/or robust assumptions.
Medium = Over 50% based on activity data, where activity data-based on actual data or reasonable assumptions and estimates.
Low = 100% financial data or, where mix of where activity data is also used there is some uncertainty.

FINAL FOOTPRINT – tCO2e



Principal emission factor databases used for the final carbon footprint:

- DEFRA Emissions Factors 2022
- International Olympic Committee Olympic Games Methodology
- Ecoinvent 3.8
- Base Carbone Ademe
- EU Input-Poutput database or financial data
- Other footprinting tools

BIRMINGHAM 2022'S AMBITION TO CREATE A CARBON NEUTRAL LEGACY – CREDIBILITY CHECKER

Purpose of credibility checker: This credibility checker provides a summary of progress against each of the key elements of Birmingham 2022s carbon management strategy. Quantis, who are acting as Birmingham 2022s third party verification partner, have created this summary credibility checker following an in-depth review of Birmingham 2022 key documentation. This acts as an external summary of a full report.

Quantis

Statement from Quantis: The footprint calculation of the games has been conducted by the internal sustainability team of B2022, with the help of external consultants. As an independent third-party, Quantis has thoroughly reviewed and verified all relevant documentation concerning the Carbon Neutral Legacy objectives of the Games. This includes the Carbon Management Plan, the GHG accounting methodology, the reference footprints and final footprint as well as the Carbon Offsetting Strategy. The offsetting strategy was reviewed against the key criteria of the Carbon Credit Quality Initiative. After this review, Quantis validated that the final carbon footprint was calculated according to the highest standards and state-of-the- art methodology. The final figures for the carbon footprint of the Games are thus validated and are coherent, robust, comprehensive and transparent. Quantis is not liable for the actual implementation of the Carbon Management strategy and the long-term achievements of B2022's climate goals. Quantis has only been involved in the verification process.

KEY:

- Implemented/validated
- In progress and on track
- In progress but to be reinforced
- Off track

PROGRAMME ELEMENT	UPDATED CREDIBILITY STATUS	JUNE 2022 STATUS	SEPTEMBER 2022 STATUS
Carbon Management Plan	✓	**Carbon management plan:** Overall, the Organising Committee's (OC) Carbon Management Plan follows the big principles and criteria of a credible climate strategy. The carbon management plan includes all relevant and necessary information and approach described is in line with best practice. The OC's carbon management plan to be published on the website.	
	✓	**Reduce first strategy:** As is best practice, the OC is taking and encouraging a reduction-first approach in delivery of the Games. The following approach to emissions management is correctly 1. Eliminate 2. Reduce 3. Substitute 4. Offset	In the weeks leading up to the Games and post-Games, the reduction stories have been implemented. The development of a Carbon Reduction Log allows to track the implementation status of the actions and the "owners" of each actions. Whenever possible the reduction potential has been modelled.
	👍	**Carbon Neutral Legacy:** The updated phrasing of the long-term objectives of the Games regarding leaving a carbon neutral legacy instead of being "carbon neutral" is strong and robust. The use of the term "legacy" showcases that the emissions of the Games will be offset and compensated in the long term and that the event will not be carbon neutral as soon as it ends. Wording on the Pledge has been updated to offer better clarity and a note on why the document has been updated has been added to the Pledge and an updated version of the Pledge added to the B2022 website.	Ensure language used to communicate approach continues to refer to carbon neutral legacy and describe approach. Share guidance with partners on how to accurately communicate approach. Pledge updated to offer better clarity with a note explaining update in language used.
GHG Accounting Methodology and scope	✓	**Overall methodology:** The OC has aligned to established methodology set out by the International Olympic Committee (IOC) Carbon Footprint Methodology and the best practice accountancy standard of the Greenhouse Gas (GHG) Protocol. Quantis recommends largely the use of these two methodological standards as they are recognised as "best-practice" worldwide in the different sectors.	Final footprint is aligned on methodology
	✓	**Scope and boundaries definition:** The OC has developed a decision tree to decide if emissions are allocated to the Games' OC, its stakeholders, its activities or if these emissions are unrelated to the Games. The decision tree is built on the IOC guidance. Quantis validates this approach as it ensures transparency, coherence and is built on best practice.	To ensure transparency of approach decision tree is included within Carbon management plan.

GHG Accounting Methodology and scope		**Actual scope and boundaries:** Within the review of the first and second reference footprint, Quantis can say with confidence that the boundaries of the carbon footprint have been determined using the decision tree and that no material emissions have been left out of scope. The rationale for non-included categories is clearly presented and transparent. The decision process is clear and transparent and is thoroughly followed by the OC.	
		**Permanent infrastructures:** According to the decision tree, key infrastructure projects have been left, in part, out of the scope of the reference footprints. A separate document explaining the rationale for the exclusion of these major project has been developed by the OC and this is also communicated in the carbon management plan, and on the website. Following recommendations from Quantis, the OC will include an apportioned amount of the embodied carbon of these infrastructures in the final footprint. All temporary infrastructure and overlay are within scope and included in the footprint.	Embodied carbon impacts or the capital projects of Sandwell Aquatics Centre and Alexander Stadium has been included within the final carbon footprint, based on the data available and relevance to the Games.
Initial Baseline Footprint		**First reference footprint:** Crucial first step of the process, it gave a first estimate of the total footprint of the Games and has been used as a basis for the development of the Carbon Neutral Legacy strategy and offsetting scheme. More importantly, it is crucial to use this first reference footprint as a learning step for better data capture and collection and, most importantly, to focus the data collection efforts to material sources of emissions.	
Second Reference Footprint		**Second reference footprint:** Quantis has verified and validated this second reference carbon footprint. Even though some points of improvements are highlighted (primarily related to data quality that will come with actual data and refining assumptions within the spectator travel model), we strongly believe that this second reference footprint can be used with confidence to build and refine the Carbon Management Plan and the Carbon Neutral Legacy strategy of the Games.	
		**Scope and boundaries:** As mentioned in the 'scopes and boundary definition' criteria above, Quantis validates this approach as it ensures transparency, coherence and is built on best practice. Quantis recommends that categories of business travel, employee commuting and media travel should be implemented in the post-event assessment of the event.	Recommended categories have been fully added to the final footprint
		**Emission factors:** The emission factors selected cover all GHG emissions and not only CO2. This is a crucial point as some other gasses might be important contributors.	Recommended improvements have been implemented in the final footprint
		**Data quality and buffer:** The OC has accounted for a buffer of 30% for the footprint results in its Carbon Neutral Legacy strategy. Based on the high variability of some of the pre-event data and its availability only after the event for some of the categories this buffer has been kept as part of the second reference footprint. A clear plan has also been highlighted to improve the data confidence between the first, second and final footprints. This data improvement strategy covers all material categories and highlights the potential of improvement for each of them. This strategy should allow to move from a relatively low confidence in the initial baseline footprint to mostly medium to high data quality in the final footprint.	Missing categories and data improvements have been included in the final footprint review. The Games is a large-scale and complex event, with many component parts and activities. In order to try and ensure the carbon footprint was as comprehensive as possible, for the second reference and final footprints, an extra 'financial' category was also added into the carbon footprint boundary. This additional category included spend across programmes which are unlikely to have been captured across the other footprint categories. For example, activities such as media and advertising, learning programme, training and development, specialist support/advisory and consultancy services among many other things. Using financial data, as this was the most practical form of data here, the intention was to 'mop up' and provide a safeguard for impact that may have otherwise been missed.

Final Footprint	 	N/A	**Final carbon footprint:** As an independent third-party, Quantis has thoroughly reviewed and verified all relevant documentation concerning the Carbon Neutral Legacy objectives of the Games. This includes the Carbon Management Plan, the GHG accounting methodology, the reference footprints and final footprint as well as the Carbon Offsetting Strategy. After this review, Quantis validates that the final carbon footprint has been calculated according to the highest standards and state-of-the-art methodology. The final figures for the carbon footprint of the Games are thus validated, coherent, robust and transparent. Quantis is not liable for the actual implementation of the Carbon Management strategy and the long-term achievements of B2022's climate goals.
Carbon Reduction Initiatives		**Carbon materiality matrix:** The approach taken by the OC to prioritise emission hotspots using their materiality matrix is supported by Quantis. The matrix is based on the following key criteria: expected carbon impact, level of OC influence on delivery, level of stakeholder interest. It was noted, one valuation another parameter "Awareness-raising potential" could also have been included in the prioritisation of actions.	
		**Carbon reduction stories:** Quantis has reviewed the various carbon reduction stories implemented by the Games and validates the approach. Due to the timeframe and the proximity to the Games, no new actions have been suggested. Furthermore, all material categories of the footprint are mainly covered by the existing reduction actions. The use of a tracker and "owners" of the reduction stories has also been implemented by the OC according to best-practice.	In the weeks leading up to the Games and post-Games, the reduction stories have been implemented. The development of a Carbon Reduction Log allows to track the implementation status of the actions and the "owners" of each actions. Whenever possible the reduction potential has been modelled.
Carbon Offsetting Strategy (Commonwealth Forest)		**Overall approach:** Once again the "reduce first, compensate later" strategy that is recommended as best practice has been implemented for its event. Quantis validates this approach from the OC and supports the use of carbon compensation projects to offset the unavoidable emissions, given these offsetting projects follow all required criteria.	Final footprint numbers fall within the 240'000 tCO2e capture potential of the Commonwelaht Forest. Consequently, no need for external carbon credtis through the VCM.
		**Commonwealth Forest:** The development of an internal and local project of natural carbon removal project through the planting of trees and the storage of carbon in biomass has been chosen. This approach, favoured by Quantis, allows the OC to be much less reliant on the use of carbon credits from the Voluntary Carbon Credits market, which usually lack of transparency, permanency and sometimes lack additionality. Quantis encourages companies to work directly with project developers (instead of intermediaries) to design projects that are meaningful for the environment globally and locally, in line with their operations, and guaranteeing highest quality.	
		**Carbon capture potential:** The UK Woodland Carbon Code has been used to estimate the amount of forest needed to offset the residual emissions of the Games. The UK Woodland Carbon Code is internationally recognised for high standards of sustainable forest management and carbon management and is endorsed by ICROA (The International Carbon Reduction and Offset Alliance), the global umbrella body for carbon reduction and offset providers in the voluntary market.	
		**Long-term governance:** Because of its nature as a one-time event and the OC dissolving at the end of the year, the Carbon Neutral Legacy governance is absolutely critical to ensure that projects are carried out properly over the next decades and survives the dissolution of the OC. The forest process already has robust governance in accordance with the UK Woodland Code. To ensure robust legacy governance Quantis recommends, there is also a role for an independent overseer, who will review on an annual basis the progress of the project by asking Severn Trent for a written status report and validate the report.	The OC is finalising the long-term governance from a legal point of view. Key partners have been identified and scope of oversight has been agreed.

Carbon Offsetting Strategy (Commonwealth Forest)		**Key criteria:** Different institutions have developed a set of criteria to ensure the quality of a carbon credit. Quality in this sense refers to the confidence that a project/method/standard delivers a carbon credit: the real avoidance of a GHG emission or the permanent removal of CO2 from the atmosphere. To ensure the highest credibility for the offsetting strategy and the Commonwealth Forest, Quantis recommends that at least the "required" criteria are met and implement by the OC and its partner, as well as incorporating as much as possible all "further" criteria. Required criteria includes: Real (no leakage), additional, permanent, quantifiable/verifiable and unique allocation. Further criteria includes: Potential for co-benefits, scalability, effective.	
Carbon Offsetting Strategy (Commonwealth Forest)		**Credit retirement:** For the retirement of the credits, after assessing different options, Quantis agrees that Severn Trent retiring the credits on behalf of the OC/Games final footprint is the best solution moving forward.	Severn Trent will retire credits on behalf of the OC as they are validated.
		**Permanence:** Permanent nature of carbon credits is stipulated by UK Woodland Code and reiterated by Severn Trent landowners' agreements, stipulating that all forestry planted need to remain permanently. Severn Trent landowner agreement commit Severn Trent to 35-year maintenance, after which this becomes landowners' responsibility. Due to the short-term life of the OC and to truly ensure the permanency of the offsets, Quantis recommends to also appoint a third-party that will act as an oversight of the Carbon Neutral Legacy of the Games and ensure Severn Trent are held accountable for the completion of the project.	Third-party overseer to be formalised as per "long-term governance" criteria.
		**Additionality:** Additionality: In the case of the Games, The forest is born solely out of the Games and the relationship between Severn Trent and the OC. Furthermore, as a new project, the additionality of the carbon credits will be ensured. It is important however to verify and control that the credits are not used for another purpose (criteria of uniqueness). Through the verification with the UK Woodland Carbon Code, numerous additionality tests will need to be passed on a regular basis (cycles of 5 to 10 years).	
		**Real, no leakage:** Severn Trent has implemented a verification strategy that will be upheld by the UK Woodland Carbon Code. Each site will undergo the UK Woodland Carbon Code Registration and Validation & Verification stages throughout the lifetime of the woodland. Verification audits will be undertaken at set intervals (every five or 10 years) to ensure the trees are sequestering as much carbon as initially calculated, and to ensure the woodlands are in good healthy condition and are being managed in line with best practice.	
		**Buffer:** A second buffer, covering for forest-related risks is key and recommended. Indeed, it avoids that the amount of carbon credits stored by the Forest are underestimated and therefore does not allow for full compensation of all remaining emissions. This buffer has been accounted for and is implemented in the accounting of the carbon storage potential of the Forest by Severn Trent, following the UK Woodland Carbon Code calculation methodologies and guidelines.	
Website		Main website pages on sustainability have been reviewed by Quantis. Specific recommendations have been made to include further clarity in wording and add more detailed information on the FAQ.	Continue to keep website up to date, when necessary, with key information and detail regarding the carbon management approach.
Overall approach to creating a carbon neutral legacy		**Overall approach for the Commonwealth Forest:** Quantis validates the approach chosen by the OC for their Carbon Neutral Legacy, given it strictly follows the aforementioned criteria and that a strong long-term governance is implemented to ensure liability and completion of the project over the next 35 years.	Continue to ensure we meet the objectives we have set out in a credible and transparent manner.

GRI CONTENT TABLE

This report has been produced with reference to GRI Standards 2021. Our disclosures can be found in this table:

DISCLOSURE NUMBER	DISCLOSURE TITLE	DISCLOSURES	REFERENCE
102-01	Name of the organization	a. Name of the organization.	Birmingham Organising Committee for the 2022 Commonwealth Games Ltd
102-02	Activities, brands, products, and services	a. A description of the organization's activities. b. Primary brands, products, and services, including an explanation of any products or services that are banned in certain markets.	Operation of sports facilities
102-03	Location of headquarters	a. Location of the organization's headquarters.	One Brindley Place, Brindley Place, Birmingham, England, B1 2JB
102-04	Location of operations	a. Number of countries where the organization operates, and the names of countries where it has significant operations and/or that are relevant to the topics covered in the report.	1 - United Kingdom
102-05	Ownership and legal form	a. Nature of ownership and legal form.	Private company limited by guarantee without share capital
102-06	Markets served	a. Report on the markets served, including: i. geographic locations where products and services are offered; ii. sectors served; iii. types of customers and beneficiaries.	UK public sector
102-07	Scale of the organization	a. Scale of the organization, including: i. total number of employees; ii. total number of operations; iii. net sales (private sector) or net revenues (public sector); iv. total capitalization (private sector) broken down into debt and equity; v. quantity of products or services provided.	Annual Report 2022 (i, ii, iii,), (iv and v N/A)
102-08	Information on employees and other workers	a. Total number of employees by employment contract (permanent and temporary), by gender. b. Total number of employees by employment contract (permanent and temporary), by region. c. Total number of employees by employment type (full-time and part-time), by gender. d. Whether a significant portion of the organization's activities are performed by workers who are not employees. If applicable, a description of the nature and scale of work performed by workers who are not employees. e. Any significant variations in the numbers reported in Disclosures 102-8-a, 102-8-b, and 102-8-c (such as seasonal variations in the tourism or agricultural industries). f. An explanation of how the data have been compiled, including any assumptions made.	EDI section on website (a and b) https:/www.birmingham2022.com/corporate/governance/freedom-of-information-publication-scheme/equality-diversity-and-inclusion/workforce-data, ,c. N/A, d. N/A e. Annual report 2022

102-09	Supply chain	a. A description of the organization's supply chain, including its main elements as they relate to the organization's activities, primary brands, products, and services.	The supply chain consists of UK and overseas suppliers of both goods and services relating to delivery of the sporting event.
102-12	External initiatives	a. A list of externally-developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes, or which it endorses.	ISO 20121, UN Sustainable Development Goals, UNFCCC Sports for Climate Action Framework. Social- The Prince's Responsible Business Network Race at Work Charter Signatory, Disability Confident Employer, Include Me West Midlands, Deaf Friendly Standard Gold certification, Mental Health Charter, Tech Talent Charter, Leaders in Diversity Award, Armed Forces Covenant – Silver Award
102-14	Statement from senior decision-maker	a. A statement from the most senior decision-maker of the organization (such as CEO, chair, or equivalent senior position) about the relevance of sustainability to the organization and its strategy for addressing sustainability.	p.2
102-15	Key impacts, risks, and opportunities	a. A description of key impacts, risks, and opportunities.	Throughout the report
102-16	Values, principles, standards, and norms of behavior	a. A description of the organization's values, principles, standards, and norms of behaviour.	Bimringham 2022 Commonwealth Games Our Legacy https:**/**resources.cwg-qbr.pulselive.com/qbr-commonwealth-games/document/2022/07/12/a37f0633-361d-49b1-9cca-d25043dccff8/Birmingham-2022_Our_Legacy.pdf
102-17	Mechanisms for advice and concerns about ethics	a. A description of internal and external mechanisms for: i. seeking advice about ethical and lawful behaviour, and organizational integrity; ii. reporting concerns about unethical or unlawful behaviour, and organizational integrity.	Whistleblowing Policy on Birm 22 webiste: https:**/**resources.cwg-qbr.pulselive.com/qbr-commonwealth-games/document/2022/02/14/4d7150f1-715f-4834-a72f-c18be1015604/LGL.001-B2022-Whistleblowing-Policy-v2.1-August-2020.pdf
102-18	Governance structure	a. Governance structure of the organization, including committees of the highest governance body. b. Committees responsible for decision-making on economic, environmental, and social topics.	p.8
102-19	Delegating authority	a. Process for delegating authority for economic, environmental, and social topics from the highest governance body to senior executives and other employees.	p.8-9
102-20	Executive-level responsibility for economic, environmental, and social topics	a. Whether the organization has appointed an executive-level position or positions with responsibility for economic, environmental, and social topics. b. Whether post holders report directly to the highest governance body.	p.8-9
102-21	Consulting stakeholders on economic, environmental, and social topics	a. Processes for consultation between stakeholders and the highest governance body on economic, environmental, and social topics. b. If consultation is delegated, describe to whom it is delegated and how the resulting feedback is provided to the highest governance body.	p.7
102-22	Composition of the highest governance body and its committees	a. Composition of the highest governance body and its committees by: i. executive or non-executive; ii. independence; iii. tenure on the governance body; iv. number of each individual's other significant positions/commitments, and the nature of the commitments; v. gender; vi. membership of under-represented social groups; vii. competencies relating to economic, environmental, and social topics; viii. stakeholder representation.	p.8-9 and Annual Report 2022

102-23	Chair of the highest governance body	a. Whether the chair of the highest governance body is also an executive officer in the organization. b. If the chair is also an executive officer, describe his or her function within the organization's management and the reasons for this arrangement.	p.8
102-24	Nominating and selecting the highest governance body	a. Nomination and selection processes for the highest governance body and its committees. b. Criteria used for nominating and selecting governance body members, including whether and how: i. stakeholders (including shareholders) are involved; ii. diversity is considered; iii. independence is considered; iv. expertise and experience relating to economic, environmental, and social topics are considered.	p.8 and Annual Report 2022
102-25	Conflicts of interest	a. Processes for the highest governance body to ensure conflicts of interest are avoided and managed. b. Whether conflicts of interest are disclosed to stakeholders, including, as a minimum: i. Cross-board membership; ii. Cross-shareholding with suppliers and other stakeholders; iii. Existence of controlling shareholder; iv. Related party disclosures.	Birmingham 22 Website - Board governance. https://www.birmingham2022.com/corporate/who-we-are/board-of-directors
102-26	Role of highest governance body in setting purpose, values, and strategy	a. Highest governance body's and senior executives' roles in the development, approval, and updating of the organization's purpose, value or mission statements, strategies, policies, and goals related to economic, environmental, and social topics.	p.8
102-27	Collective knowledge of highest governance body	a. Measures taken to develop and enhance the highest governance body's collective knowledge of economic, environmental, and social topics.	p.8-9
102-28	Evaluating the highest governance body's performance	a. Processes for evaluating the highest governance body's performance with respect to governance of economic, environmental, and social topics. b. Whether such evaluation is independent or not, and its frequency. c. Whether such evaluation is a self-assessment. d. Actions taken in response to evaluation of the highest governance body's performance with respect to governance of economic, environmental, and social topics, including, as a minimum, changes in membership and organizational practice.	Birmingham 22 Website. Board governance https://www.birmingham2022.com/corporate/who-we-are/board-of-directors. Audit and Risk Committee Board effectiveness evaluation: https://www.birmingham2022.com/corporate/governance/arac-meetings
102-29	Identifying and managing economic, environmental, and social impacts	a. Highest governance body's role in identifying and managing economic, environmental, and social topics and their impacts, risks, and opportunities – including its role in the implementation of due diligence processes. b. Whether stakeholder consultation is used to support the highest governance body's identification and management of economic, environmental, and social topics and their impacts, risks, and opportunities.	Throughout the report

102-30	Effectiveness of risk management processes	a. Highest governance body's role in reviewing the effectiveness of the organization's risk management processes for economic, environmental, and social topics.	p.9
102-31	Review of economic, environmental, and social topics	a. Frequency of the highest governance body's review of economic, environmental, and social topics and their impacts, risks, and opportunities.	p.8-9
102-32	Highest governance body's role in sustainability reporting	a. The highest committee or position that formally reviews and approves the organization's sustainability report and ensures that all material topics are covered.	p.8-9
102-33	Communicating critical concerns	a. Process for communicating critical concerns to the highest governance body.	p.9
102-34	Nature and total number of critical concerns	a. Total number and nature of critical concerns that were communicated to the highest governance body. b. Mechanism(s) used to address and resolve critical concerns.	Annual report 2022
102-35	Remuneration policies	a. Remuneration policies for the highest governance body and senior executives for the following types of remuneration: i. Fixed and variable pay, including performance-based pay, equity-based pay, bonuses, and deferred or vested shares; ii. Sign-on bonuses or recruitment incentive payments; iii. Termination payments; iv. Clawbacks; v. Retirement benefits, including the difference between benefit schemes and contribution rates for the highest governance body, senior executives, and all other employees. b. How performance criteria in the remuneration policies relate to the highest governance body's and senior executives' objectives for economic, environmental, and social topics.	Annual report 2022
102-36	Process for determining remuneration	a. Process for determining remuneration. b. Whether remuneration consultants are involved in determining remuneration and whether they are independent of management. c. Any other relationships that the remuneration consultants have with the organization.	Remuneration Committee - subset of the Board. https:/www.birmingham2022.com/corporate/governance/policies-and-procedures
102-37	Stakeholders' involvement in remuneration	a. How stakeholders' views are sought and taken into account regarding remuneration. b. If applicable, the results of votes on remuneration policies and proposals.	Remuneration Committee - subset of the Board. https:/www.birmingham2022.com/corporate/governance/policies-and-procedures
102-38	Annual total compensation ratio	a. Ratio of the annual total compensation for the organization's highest-paid individual in each country of significant operations to the median annual total compensation for all employees (excluding the highest-paid individual) in the same country.	Annual report 2022
102-39	Percentage increase in annual total compensation ratio	a. Ratio of the percentage increase in annual total compensation for the organization's highest-paid individual in each country of significant operations to the median percentage increase in annual total compensation for all employees (excluding the highest-paid individual) in the same country.	Annual report 2022
102-40	List of stakeholder groups	a. A list of stakeholder groups engaged by the organization.	p.7
102-42	Identifying and selecting stakeholders	a. The basis for identifying and selecting stakeholders with whom to engage.	p.7

102-43	Approach to stakeholder engagement	a. The organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group, and an indication of whether any of the engagement was undertaken specifically as part of the report preparation process.	p.7
102-44	Key topics and concerns raised	a. Key topics and concerns that have been raised through stakeholder engagement, including: i. how the organization has responded to those key topics and concerns, including through its reporting; ii. the stakeholder groups that raised each of the key topics and concerns.	p.7
102-45	Entities included in the consolidated financial statements	a. A list of all entities included in the organization's consolidated financial statements or equivalent documents. b. Whether any entity included in the organization's consolidated financial statements or equivalent documents is not covered by the report.	Annual report 2022
102-46	Defining report content and topic Boundaries	a. An explanation of the process for defining the report content and the topic Boundaries. b. An explanation of how the organization has implemented the Reporting Principles for defining report content.	p.5-6
102-47	List of material topics	a. A list of the material topics identified in the process for defining report content.	p.5
102-50	Reporting period	a. Reporting period for the information provided.	December 2017-October 2022
102-53	Contact point for questions regarding the report	a. The contact point for questions regarding the report or its contents.	finance@birmimgham2022.com
102-54	Claims of reporting in accordance with the GRI Standards	a. The claim made by the organization, if it has prepared a report in accordance with the GRI Standards, either: i. 'This report has been prepared in accordance with the GRI Standards: Core option'; ii. 'This report has been prepared in accordance with the GRI Standards: Comprehensive option'.	This report has been prepared with reference to GRI Standards
102-55	GRI content index	a. The GRI content index, which specifies each of the GRI Standards used and lists all disclosures included in the report. b. For each disclosure, the index shall include: i. the number of the disclosure (for disclosures covered by the GRI Standards); ii. the page number(s) or URL(s) where the info can be found, within the report or other published material; iii. if applicable/where permitted, the reason(s) for omission when a required disclosure cannot be made.	This table
103-01	Explanation of the material topic and its boundary	a. An explanation of why the topic is material. b. The Boundary for the material topic, which includes a description of: i. where the impacts occur; ii. the organization's involvement with the impacts. For example, whether the organization has caused or contributed to the impacts, or is directly linked to the impacts through its business relationships. c. Any specific limitation regarding the topic Boundary.	p.4-5

103-02	The management approach and its components	a. An explanation of how the organization manages the topic. b. A statement of the purpose of the management approach. c. A description of the following, if the management approach includes that component: i. Policies ii. Commitments iii. Goals and targets iv. Responsibilities v. Resources vi. Grievance mechanisms vii. Specific actions, such as processes, projects, programs and initiatives	p.4-11 and throughout the report
103-03	Evaluation of management approach	For each material topic, the reporting organization shall report the following information: a. An explanation of how the organization evaluates the management approach, including: i. the mechanisms for evaluating the effectiveness of the management approach; ii. the results of the evaluation of the management approach; iii. any related adjustments to the management approach.	Throughout the report
Circular economy			
306-2	Waste by type and disposal method	(a) Total weight of hazardous waste, with a breakdown by the following disposal methods where applicable: (i) Reuse; (ii) Recycling; (iii) Composting; (iv) Recovery, including energy recovery; (v) Incineration (mass burn); (vi) Deep well injection; (vii) Landfill; (viii) On-site storage; and (ix) Other (to be specified by the organization).	No hazardous waste disposed of
		(b) Total weight of non-hazardous waste, with a breakdown by the following disposal methods where applicable: (i) Reuse; (ii) Recycling; (iii) Composting; (iv) Recovery, including energy recovery; (v) Incineration (mass burn); (vi) Deep well injection; (vii) Landfill; (viii) On-site storage; and (ix) Other (to be specified by the organization).	p.36
		(c) How the waste disposal method has been determined: (i) Disposed of directly by the organization, or otherwise directly confirmed; (ii) Information provided by the waste disposal contractor; and (iii) Organizational defaults of the waste disposal contractor.	p.30-36
306-4	Transport of hazardous waste	(a) Total weight for each of the following: (i) Hazardous waste transported; (ii) Hazardous waste imported; (iii) Hazardous waste exported; and (iv) Hazardous waste treated.	No hazardous waste disposed of
		(b) Percentage of hazardous waste shipped internationally.	No hazardous waste disposed of
		(c) Standards, methodologies, and assumptions used.	No hazardous waste disposed of

Carbon			
305-1	Direct (Scope 1) GHG emissions	(a) Gross direct (Scope 1) GHG emissions in metric tons of CO2 equivalent.	p.24
		(b) Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.	All
		(c) Biogenic CO2 emissions in metric tons of CO2 equivalent.	N/A
		(d) Base year for the calculation, if applicable, including: (i) the rationale for choosing it; (ii) emissions in the base year; (iii) the context for any significant changes in emissions that triggered recalculations of base year emissions.	p.16-17
		(e) Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source.	Defra Greenhouse gas reporting: conversion factors 2022
		(f) Consolidation approach for emissions; whether equity share, financial control, or operational control.	p.17
		(g) Standards, methodologies, assumptions, and/or calculation tools used.	p.16-17
305-2	Energy indirect (Scope 2) GHG emissions	(a) Gross location-based energy indirect (Scope 2) GHG emissions in metric tons of CO2 equivalent.	p.24
		(b) If applicable, gross market-based energy indirect (Scope 2) GHG emissions in metric tons of CO2 equivalent.	p.24
		(c) If available, the gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.	All
		(d) Base year for the calculation, if applicable, including: (i) the rationale for choosing it; (ii) emissions in the base year; and (iii) the context for any significant changes in emissions that triggered recalculations of base year emissions.	p.16-17
		(e) Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source.	Defra Greenhouse gas reporting: conversion factors 2022
		(f) Consolidation approach for emissions; whether equity share, financial control, or operational control.	p.17
		(g) Standards, methodologies, assumptions, and/or calculation tools used.	p.16-17
305-3	Other indirect (Scope 3) GHG emissions	(a) Gross other indirect (Scope 3) GHG emissions in metric tons of CO2 equivalent.	p.24
		(b) If applicable, gross market-based energy indirect (Scope 2) GHG emissions in metric tons of CO2 equivalent.	p.24
		(c) If available, the gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.	All
		(d) Base year for the calculation, if applicable, including: (i) the rationale for choosing it; (ii) emissions in the base year; and (iii) the context for any significant changes in emissions that triggered recalculations of base year emissions.	p.16-17
		(e) Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source.	Defra Greenhouse gas reporting: conversion factors 2022
		(f) Consolidation approach for emissions; whether equity share, financial control, or operational control.	p.17
		(g) Standards, methodologies, assumptions, and/or calculation tools used.	p.16-17

305-4	GHG emissions intensity	(a) GHG emissions intensity ratio for the organization.	0.0128
		(b) Organization-specific metric (the denominator) chosen to calculate the ratio.	Per ticket sold
		(c) Types of GHG emissions included in the intensity ratio; whether direct (Scope 1), energy indirect (Scope 2), and/or other indirect (Scope 3).	All
		(d) Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.	All
305-5	Reduction of GHG emissions	(a) GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO2 equivalent.	p.18-22
		(b) Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.	All
		(c) Base year or baseline, including the rationale for choosing it.	p.16-17
		(d) Scopes in which reductions took place; whether direct (Scope 1), energy indirect (Scope 2), and/or other indirect (Scope 3).	All
		(e) Standards, methodologies, assumptions, and/or calculation tools used.	p.16-17
Conservation			
304-2	Significant impacts of activities, products, and services on biodiversity	(a) Nature of significant direct and indirect impacts on biodiversity with reference to one or more of the following: (i) Construction or use of manufacturing plants, mines, and transport infrastructure; (ii) Pollution (introduction of substances that do not naturally occur in the habitat from point and non-point sources); (iii) Introduction of invasive species, pests, and pathogens; (iv) Reduction of species; (v) Habitat conversion; and (vi) Changes in ecological processes outside the natural range of variation (such as salinity or changes in groundwater level).	N/A
		(b) Significant direct and indirect positive and negative impacts with reference to the following: (i) Species affected; (ii) Extent of areas impacted; (iii) Duration of impacts; and (iv) Reversibility or irreversibility of the impacts.	p.38-42
304-3	Habitats protected or restored	(a) Size and location of all habitat areas protected or restored, and whether the success of the restoration measure was or is approved by independent external professionals.	p.39
		(b) Whether partnerships exist with third parties to protect or restore habitat areas distinct from where the organization has overseen and implemented restoration or protection measures.	p.12, 25, 26, 39, 40, 41, 42
		(c) Status of each area based on its condition at the close of the reporting period.	p.39-42
		(d) Standards, methodologies, and assumptions used.	p.38-42

KPI OUTCOMES SUMMARY TABLE

KPIs and wider objectives outcomes are addressed throughout this report, but for clarity and transparency KPI outcomes summarised below.

KPI	OUTCOME
Carbon and Air Quality	
KPI 1: Deliver a fully accredited and audited Carbon Neutral Legacy through carbon reduction and credible offsetting scheme	Final carbon footprint and overall approach to creating a carbon neutral legacy, including reduction case studies and offsetting via Commonwealth Legacy Forest was independantly verified by Quantis - third party verification partner.
KPI 2: Deliver carbon neutral international travel and accommodation for the Queen's Baton Relay	QBR travel and accomodation data has been included within overall Games carbon footprint and offsetting programme.
KPI 3: Ensure food waste is minimised and any surplus is distributed to charity and onward production of energy	Some Games caterers adopted measures to prevent food waste such as Winnow. Although there were challenges with surplus collection during Games time due to acceditation, surplus food collections were made post Games with multiple local charities benefitting. Food waste collected by Biffa was transformed into waste for energy through anaerobic digestion.
KPI 4: Work with the supply chain for the car and bus fleet to maximise the use of low emission vehicles that meet Birmingham City Council Clean Air Zone requirements and minimise transport related to CO2	All OC Games provided transport was compliant with the Clean Air Zone. 42% of Games car fleet were low emission vehicles (Electric, hydrogen, plug in hybrid or mild hybrid).
Circular Economy	
KPI 1: 90% of pro audio visual equipment to be hired	100% pro audio visual equipment was hired.
KPI 2: Provision of free water bars offering drinking water available at every Games venue to mitigate the purchase of single-use plastic bottles	41 water refill stations were provided by Severn Trent. 480,000 refills were recorded. 56% spectators reported to have used the refill stations during the Games (post games spectator survey).
KPI 3: Zero waste to landfill objective	Biffa, who were the Games offical Waste Management and Recycling Provider, managed three main waste streams - general waste, dry-mix recycling and food. Biffa reported zero waste to landfill, with non-recycled waste sent to waste to energy, saving 232 tonnes of CO2e that would have been emitted if the waste went direct to landfill.
KPI 4: Develop a dissolution strategy to identify beneficiaries to receive Games consumables and therefore avoid landfill	Numerous charitable organisations benefitted from the Games dissolution strategy. 16,000 items of sports equipment were donated to community groups. 61 charities benefitted from lost and found from the villages and furntiure from the head quarters. Charities also benefitted from materials from our Look and Wayfinding provider - CSM Live.
Conservation	
KPI 1: Monitor biodiversity net gain on the two new Games infrastructure projects, Sandwell Aquatics Centre and Alexander Stadium	Birmingham City Council due to lead a reinstatement programme at Alexander Stadium that includes extensive greening of wild meadows. Sandwell Aquatics Centre is due to achieve biodiversity net gain of around 12% based on mitigations and enhancements by summer 2023.
KPI 2: 22 miles of canals to be cleared through the United by 2022 partnership with Canal and River Trust	22 miles of canal cleared pre games. Sculpture made from some of waste collected.
KPI 3: Plant 72 Tiny Forests in urban areas around the West Midlands in partnership with Severn Trent	72 Tiny forests planted across West Midlands ahead of the Games. 'Keeper teams' will support Severn Trent with long term monitoring and maintenance.
KPI 4: Work alongside West Midlands Combined Authority to support its 'Virtual Forest', logging all trees planted as part of the Games programme and promoting its use	All trees planted to date by Severn Trent in both Commonwealth Legacy Forests and in 72 Tiny forests have been logged. Future tree planting will also be logged via this virtual forest.



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