



## *Nature-based Solutions: A New Urban Planning Process for Implementation*

### *The Glasgow Experience*



## Contents

1 Introduction.....	2
2 Glasgow: A city-wide perspective on open space to guide small-scale interventions.....	4
3 Nature-based Solutions Framework .....	6
A new approach for innovating nature-based solutions in cities .....	6
4 Realising nature-based solutions at a city scale .....	7
Timeline.....	7
5 The Nature-Based Solutions Framework Building Blocks – how Glasgow realised their solution step by step .....	8
5.1 Technical solutions.....	8
5.2 Indicators .....	10
5.3 Governance.....	12
5.4 Financing and business models.....	14
5.5 Nature-based Entrepreneurship (NBE).....	15
5.6 Co-production .....	17
5.7 Reflexive monitoring .....	18

Coordinated by Trinity College Dublin, Connecting Nature is a partnership of 31 organisations co-working with local authorities, communities, industry partners, NGOs and academics. Our partnership will work with 16 European countries, Brazil, China, Korea & the Caucasus (Georgia and Armenia) who are investing in a multi-million euro large scale implementation of nature-based projects in urban settings. We are measuring the impact of these initiatives on climate change adaptation, health and well-being, social cohesion and sustainable economic development in these cities. Innovative actions to foster the start-up and growth of commercial and social enterprises active in producing nature-based solutions and products is an integral part of our work.

Authors: Gillian Dick, Sean Kelly, Laura Mowat, Rania Sampezi - Glasgow City Council (GB)

Contributors: Katharina Hölscher, Marleen Lodder, Daan Sillen, Igno Notermans, Kato Allaert - DRIFT (NL); Siobhan McQuaid - TCD (IR); Adina Dumitru – UDC (ES); Paula Vandergert, Stuart Connop – UEL (GB); Clara Grimes – ICLEI; Isobel Fletcher and Fiona Cooper– Horizon Nua (IR);

Citation: Dick, G. Kelly, S. Mowat, L., Sampezi, R. (2019) Nature-based Solutions: A New Urban Planning Process for Implementation: The Glasgow Experience

More information: [www.connectignnature.eu](http://www.connectignnature.eu)

Cover Photographs Source: Glasgow City Council



Connecting Nature is funded by the Horizon 2020 Framework Programme of the European Union. Grant Agreement No 730222

## 1 Introduction

**Nature-based solutions can directly address urban challenges while providing co-benefits.** Yet, the development and implementation of nature-based solutions has been slow and uneven. It is a complex task, requiring collaborations across different city departments, regional and national governance levels and diverse urban actors. **A collaborative approach to nature-based solutions through co-design and co-creation of ideas** can foster innovation, facilitate cross-sectoral input, support social cohesion and tackle the knowledge deficits that exist around nature-based solutions. **The city of Glasgow has been experimenting with novel processes to innovate nature-based solutions on a large scale** and the city's approach has already had an impact on the design, management and use of its urban areas. Through learning how Glasgow seized opportunities and overcame challenges, other cities can be inspired on their own path towards nature-based development.

### **What are nature-based solutions and how can they benefit cities?**

The European Commission<sup>1</sup> defines nature-based solutions as solutions that are “inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience”.

<sup>1</sup> <https://ec.europa.eu/research/environment/index.cfm?pg=nbs>

Nature-based solutions provide multiple benefits for dealing with urban challenges and making cities greener and more resilient, including the sustainable management and restoration of ecosystems, flood protection, air quality improvement, social cohesion and local business opportunities. Nature-based solutions are quite a new concept and the phrase is not yet widely used. This is changing, however, as the need for interconnected approaches to environmental, social and economic issues is increasingly recognised. Effective examples of nature-based solutions provide co-benefits such as intercepting dust, toxins and noise, sheltering and cooling, capturing carbon and buffering flooding. They can produce energy, manage waste, generate business opportunities, provide spaces for recreation and ultimately lead to more resilient and sustainable urban living.

## What can cities learn from the new planning processes in Glasgow?

**New data and mapping tools support strategic choices and translation of strategies into local contexts by revealing new opportunities.** Innovative and participatory interactive mapping provides multiple data flows for identifying and assessing open space in Glasgow. The Business Model Canvas tool helps to define and better communicate the different types of values of nature-based solutions as well as to identify financing opportunities

**Developing strategic partnerships for collaboration helps to access diverse data sources and funding streams.** Data, finances and responsibilities are dispersed across multiple city departments. Streamlining these requires breaking open siloes and employing innovative “guerrilla-techniques”, for example by placing posters in a space where people often pass by (e.g. near coffee machines).

**Making the local government a facilitator of bottom-up action on nature-based solutions requires stakeholder mapping and ‘community engagers’.** There are already a lot of bottom-up initiatives going on in Glasgow that can be strategically supported through an overarching strategy. This requires mapping what is already there and relationship-building with local communities for coordinated action on the ground.

**Telling a convincing story about nature-based solutions is critical to mobilise political and societal support.** Nature-based solutions is an emerging concept, and requires a clear definition as well as communication of aims and benefits. A communication strategy has to address different target audiences – from politicians, colleagues within the city department to entrepreneurs, local communities and citizens – to raise awareness about the opportunities

**Linking nature-based solutions to overarching city goals creates institutional support and new financing opportunities.** Demonstrating how nature-based solutions can contribute to wider objectives of the council including health, wellbeing and climate adaption helps to get support from strategic partners who champion nature-based solutions in a way that embeds them in policies that will support the transformation of the city.

## 2 Glasgow: A city-wide perspective on open space to guide small-scale interventions

The Scottish city of Glasgow (United Kingdom, population around 590.000) is a vibrant, exciting city with a unique character. Its grand historic areas and buildings and growing collection of striking contemporary architecture make a substantial contribution to the city's sense of place. The city's current identity is significantly shaped by the way physical regeneration has sought to respond to periods of industrial and urban growth and decline. The challenge is still to ensure everybody in Glasgow has access to and connects with high quality open space as a way to ensure that Glasgow is well-equipped to deal with the challenges of the 21<sup>st</sup> century and to enhance the city's attractiveness as a place in which to live and invest.

### **Why are nature-based solutions beneficial for Glasgow?**

Glasgow is a city where 50% of the population live within 500 metres of vacant derelict land. Dereliction makes them feel unhealthy, makes them feel sad and can add to depression and isolation. Delivering nature-based solutions to enhance and increase open space in Glasgow can deliver multiple benefits for society, the economy and the environment. In this way, open spaces can offer opportunities for creating places for strong community cohesion, ecosystem services, healthy life, and access to jobs, education and culture, while responding to climate change including heavy rainfalls, heat waves and floods. For example, the Clyde is a tidal river: that means open spaces around it need to be designed in a multifunctional way. It is possible to create an open space that is used as a football pitch that capture flood runoff during periods of intense rainfall.

### **What are the aims and benefits of open space in Glasgow?**

Experience has shown that efforts to address the city's physical legacy and improve the environment have been successful where they have sought to address, not only appearance and context, but also anticipate the full range of benefits and opportunities that new development can generate in how people interact with and benefit from their environment. Good quality, well-linked open spaces can help provide a range of benefits. They allow individuals to interact with the natural environment and provide habitats for wildlife. They can also be important in defining the character and identity of settlements. Connecting them in a green network can provide enhanced benefits for people, the environment and biodiversity.

### **Planning nature-based solutions on city-scale: the Open Space Strategy**

Glasgow's approach to developing scaled-up nature-based solutions is underpinned by its Open Space Strategy. Based on a wealth of data and spatial analysis, the Open Space Strategy sets out an approach to coordinate the various open space responsibilities to ensure well-managed, well-located and well-connected open spaces that operate as part of a wider green network, helping to deliver:

- Greater awareness of the value of open space and of individual open spaces throughout Glasgow, informing their protection and management;
- A strategic rationale for the future use and management of the city's open spaces, providing guidance on priorities for investment in open space, opportunities for using other open spaces less intensively; and an informed basis on which to make decisions about open space disposal, where an open space may be of little value;
- A basis for closer partnerships with other organisations that have an interest – e.g. With the NHS in how open spaces improve health;
- A framework for cross-departmental engagement and the co-ordination of spending plans to help secure best value; and

- A stronger basis for securing additional funding to help maximise open space benefits by promoting the value of open space and its benefits.

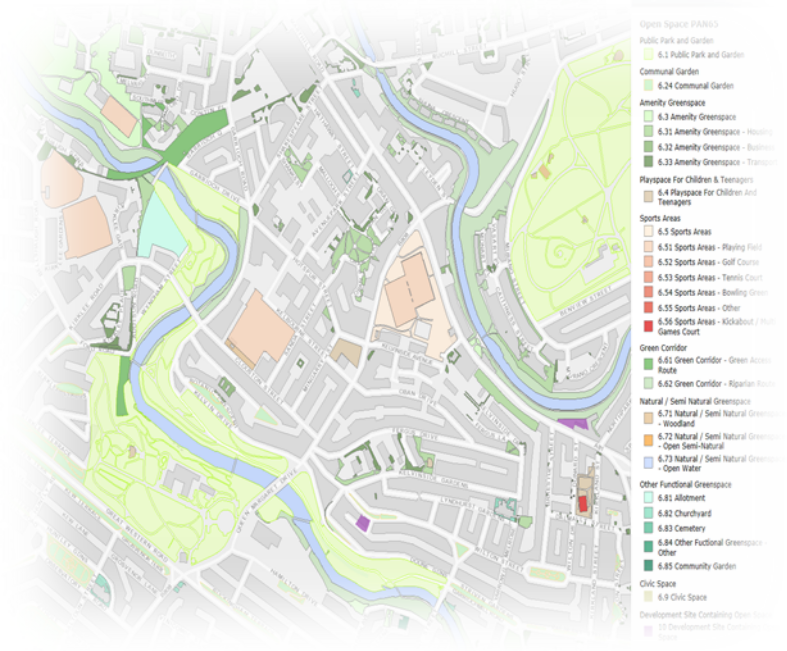


Image 1: The Open Space Strategy Map to identify opportunities for improvements across the city.

### 3 Nature-based Solutions Framework

A new approach for innovating nature-based solutions in cities

**The Nature-based Solutions Framework is a new urban planning process for facilitating the multiple innovations needed for nature-based solutions in cities.** The aim of the framework is to enable technological innovations in the design of ecologically sound solutions, but also governance innovations to collaboratively design and learn about solutions that address local needs, new relationships between different urban actors and market innovation for novel financing opportunities. **The Nature-based Solutions Framework consists of seven building blocks that provide a 360° picture to support urban planning and policy practice.** It encompasses the holistic technical design, financing, monitoring and governance steps and processes for the collaborative, multi-functional and fit-to-context design of nature-based solutions in cities.

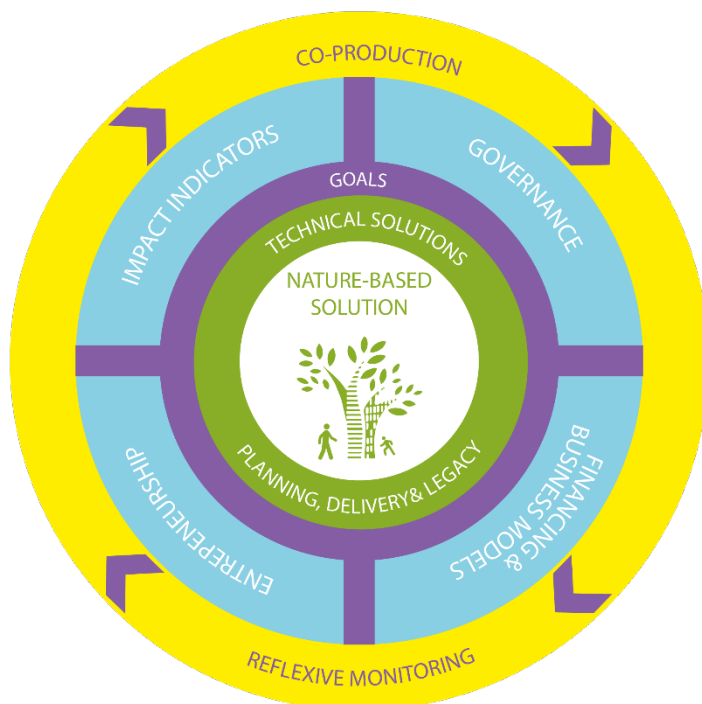


Image 2: Nature-Based Solutions Framework

#### 4 Realising nature-based solutions at a city scale

The Open Space Strategy is due to be officially adopted in autumn 2019 after a period of extensive consultation and analysis. The Planning (Scotland) Bill passed on 20th June 2019 made the preparation and publication of an Open Space Strategy a statutory duty of a Planning Authority. This will make the Open Space Strategy a legally binding document in relation to spatial planning decisions and the asset management decisions that the Council will make.

The strategy's preparation built on in-depth Local Context Analyses that show how to translate the strategic goals into operational projects within 15 areas of the city, with the aim that local communities will be embedded in developing projects at this scale. As such, the strategy formulation involved close collaboration with diverse stakeholders within the city, and will guide the implementation of nature-based solutions in specific open spaces across the city.

Developing and connecting the Open Space Strategy with nature-based solutions took some time, and roughly went through three phases in the past decade:

##### Timeline

<b>2010-2019</b>	<b>Setting the scene for an Open Space Strategy</b>
	<ul style="list-style-type: none"><li>- The first steps to discuss an open space strategy are taken in 2010-2012</li><li>- This included a first draft of the open space strategy and consultation rounds in which additional needs were identified.</li></ul>
<b>2012-2017</b>	<b>Focus on multifunctional space</b>
	<ul style="list-style-type: none"><li>- During 2012-2017 the focus was on a multifunctional open space.</li><li>- A methodology for assessing multifunctional open spaces was developed, as well as the City Development Plan.</li></ul>
<b>2017-2019</b>	<b>Open Space Strategy linked to Connecting Nature</b>
	<ul style="list-style-type: none"><li>- In 2017-2019 nature-based solutions are linked to the Open Space Strategy, and a final draft of the Open Space Strategy was formulated.</li><li>- Pilot projects started that focus on nature-based solutions and simultaneously work on the strategic objectives of the Open Space Strategy.</li></ul>



## 5 The Nature-Based Solutions Framework Building Blocks – how Glasgow realised their solution step by step

### 5.1 Technical solutions

#### *What is the nature-based solution design?*

*The technical design of a nature-based solution needs to ensure that the desired outcomes are achieved and sustained in the long-term, and that trade-offs are avoided where possible. This includes both the practical construction aspects in relation to questions such as: ‘what kind? where? how big? what plants? what additional infrastructure is needed?’, and the broader contextualisation in relation to the character and needs of the locality, region, and landscape into which it is being introduced.*

#### **How does the Open Space Strategy relate to open space development at the city scale in Glasgow?**

The Open Space Strategy is a strategic approach at the scale of Glasgow city as a whole. The main aim of the strategy is to define how much open space citizens living within the inner urban area or the outer core should have, and to identify and assess opportunities and qualities of existing open spaces. To guide development of open spaces, open space standards were formulated. These standards are underpinned by three elements: (1) a Quality Standard – a benchmark against which quality can be measured in terms of usability and multi-functionality; (2) a Quantity Standard – an amount of space per house unit or head of population; and (3) an Accessibility Standard – distance thresholds for particular types of open space. In this way, the Open Space Strategy aims to support the development of high quality accessible open spaces. Furthermore, by identifying open space priorities and opportunities the strategy will inform future strategic land use decisions in the next City Development Plan.

#### **What are the multiple benefits of open space in Glasgow that are delivered through the Open Space Strategy?**

*Open spaces can deliver multiple benefits on environmental, economic, social and health. This means that when developing or regenerating open spaces, it is important to keep different priorities in mind. The quality of Glasgow’s open spaces, and their ability to deliver a range of benefits for the city’s people, is a key determinant of Glaswegians’ quality of life.*

*Good quality open spaces, as part of a wider, integrated green network, can help deliver:*

A **HEALTHIER** Glasgow by providing opportunities to play, engage in formal sports, walk cycle and grow food, meet and engage with others in the local community, tackle air and water quality issues, engage with the natural world.

A more **LIVEABLE** Glasgow by increasing its attractiveness as a place in which to live, work, study and invest

A more **RESILIENT** Glasgow in relation to the threats, and potential opportunities, arising from climate change and other external factors such as reducing budgets.

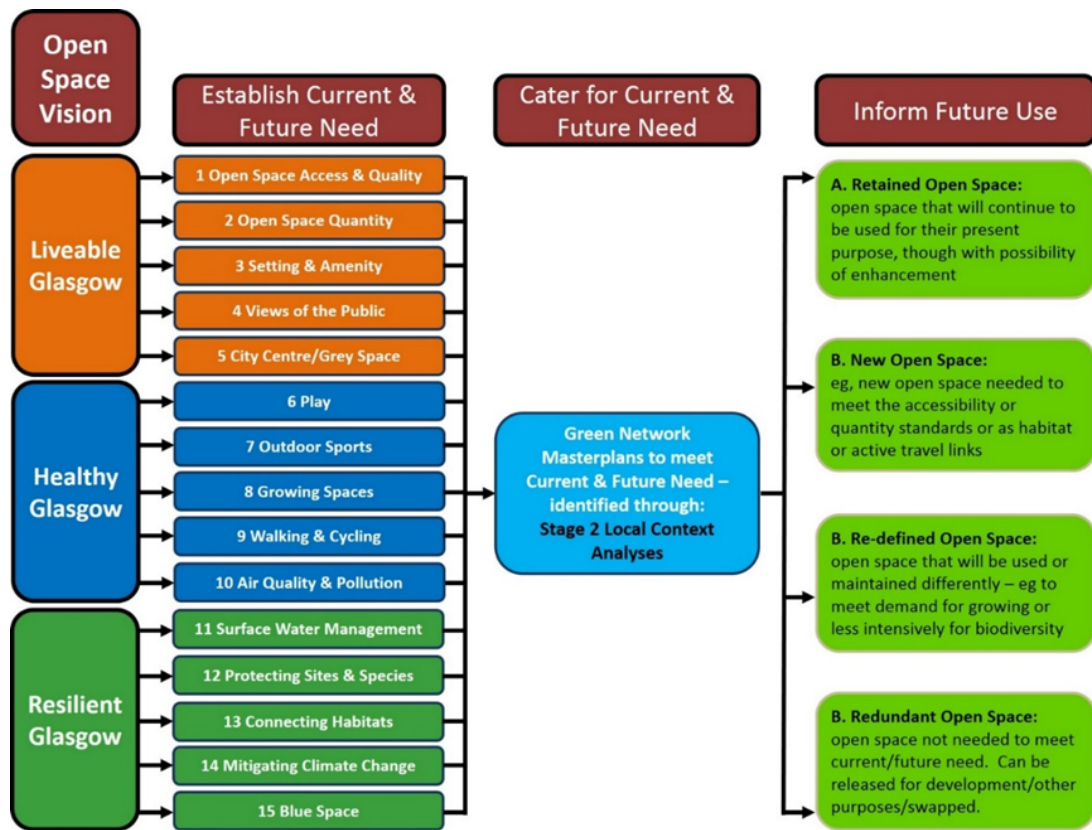


Image 3: Open Space Strategy vision and aims.

**How was the data generated to underpin the Open Space Strategy and its translation into operational projects for good quality open space?**

The Open Space Strategy builds on a wealth of data and spatial analysis to identify (opportunities for) open space in Glasgow and assess the quality of open space. A Geographic Information System (GIS) database allowed to quantify how much open space there is in Glasgow and what is the quality of that space. Local Context Analyses were undertaken to show how to translate the strategic goals into

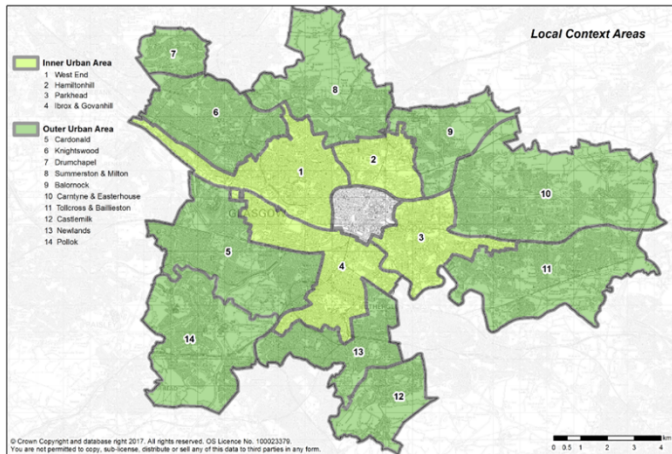


Image 4: Identification of key open spaces in 15 local areas in Glasgow

operational projects within 15 areas of the city, with the aim that local communities will be embedded in developing projects at this scale. In these analyses, the open space mapping – in terms of quality, quantity and accessibility – was complemented with information and data on flooding, housing, and economic land. This served to show whether open space is in the right place, whether it needs to be improved if it is in the right place, or whether something else can be done when it is in the wrong place. It also addressed questions such as whether open

space can be used for flood alleviation, heat reduction in the inner city, air quality management or other issues. This shows how the strategy and data can be used to develop nature-based solutions to improve open space in Glasgow.

### **How to ensure that local needs are accounted for when assessing and planning for open space across the city?**

A one-size-fits-all approach does not fit well with smaller spaces. This requires an in-depth look at individual spaces and local contexts in relation to those spaces. This has revealed that some spaces that seemed to be of bad quality are actually good. It also requires collaboration with local communities through co-production and by using place standards as an additional tool to add information about which parts of the city have no access to any good quality open space. Overall, assessing open space is about asking different questions: Is it in the right place? If so, can it be made multifunctional? If it's in the wrong place, can it be swapped with some of the vacant derelict land that might be more accessible to those communities that are deficient in open space? Or can we look at doing different things that will make it more accessible?

#### 5.2 Indicators

##### *Assessing the baseline and the transformation achieved*

*Nature-based solutions have the potential to simultaneously provide social, environmental and economic benefits. However, the evidence for their multiple benefits is rather scarce and highly fragmented, and more robust frameworks for the monitoring and assessment of their impacts are needed to guide urban policy-making. The development of a robust impact evaluation framework for nature-based solutions entails the choice of appropriate indicators to capture impacts across multiple categories, and robust, flexible and cost-effective methods for their monitoring and evaluation. Choosing and/or developing robust indicators to assess impacts of nature-based solutions allows cities to assess the strengths and weaknesses of specific interventions in achieving strategic city goals and provide an essential tool to make adaptations in real time, thus increasing their performance. Robust indicators also support cities in building the case for investments in nature-based solutions, by providing evidence regarding the types of impacts they are able to deliver. Finally, evaluation is necessary for a change in mainstream ways of planning for urban resilience and regeneration, still dominated by silo-thinking and the understanding of ecological, social and economic objectives as separate.*

### **Why use indicators to monitor the impact of open space?**

Assessing the impacts of the nature-based solutions on open spaces in Glasgow through the use of indicators can evaluate the effectiveness of the interventions' contribution to Glasgow's strategic city goals and provide the means to adapt design and implementation features in real time, thus improving their performance. The gathering of evidence over time can inform the decision-making and choices when designing and implementing interventions for urban regeneration and resilience, as well as building the case for investments in nature-based solutions. It helps to convince investors that nature-based solutions can deliver on the multiple objectives and interests their stakeholders have. Finally, the evaluation process helps to innovate how to plan for urban resilience and regeneration by presenting ecological, social and economic objectives in an integrative way and linking it to the different departments that can benefit from the intervention(s) in Glasgow.

### **How will the indicators be used?**

The processes of co-creation, implementation and maintenance of Glasgow will be monitored and evaluated in order to understand and capture those elements that contribute to their success, and build the evidence-base regarding benefits, synergies between these, as well as trade-offs, and thus inform knowledge-based practice in the future.

A first step was to select indicators for different impact categories – health and wellbeing, social cohesion, environmental, economic. It was important to identify indicators that are already used as well as indicators that could be used for evaluating the impact on the objectives of open space. Based on this information, the first preliminary set of most important indicators were selected. After the final selection of indicators is made, existing data gathering methods were defined and possible data gaps where new data collection would be needed were identified.

### **Specifying indicators and impacts across scales and for different target groups**

The uniqueness and geographical-coverage of the exemplar, the Open Space Strategy, means that it is not easy to identify what indicators are relevant. The impact of implementing the Open Space Strategy should be felt at all city levels – macro, meso and micro. This means that the indicators need to allow measurement of the impact of the enhancements at each open space site both at neighbourhood and street level, as well as at the city as a whole. As the Open Space Strategy aims to improve open space across the city, there is no specific social group that will exclusively benefit from its implementation. The strategy aims to improve the health, well-being and social cohesion of communities in all areas of the city.

Overall, the list of indicators has been useful at producing a generic template-like list of topics that may be relevant to nature-based solutions projects, and therefore allows for a more organised data-gathering exercise.

### **How will the data be collected to monitor and evaluate the indicators?**

Collaboration with colleagues within Glasgow City Council and other organisations has been essential to identifying the right data sources; The National Health Service (“NHS”) Greater Glasgow and Clyde is a critical source of social and health data, which are collected for nine areas across Glasgow. Internal departments within Glasgow City Council are instrumental in identifying economic data, such as numbers and locations of businesses, or biological species data after liaising with the Biological Records Centre.

For some indicators, however, it has been difficult to find relevant data sources across organisations; These refer mainly to qualitative topics such as ‘Community Empowerment’, ‘Environmental Education Opportunities’ and ‘Social Desirability’, which are generally non-quantifiable and results are usually available at a very local scale. This is also related to misunderstandings around the wording of some indicators, whereby definitions did not always match the terminology used by Glasgow City Council; in such cases, it has become evident that continuous contact with the academics is essential to cross-reference terminology and reach a consensus.

Finding data sources has also been complicated by the fact that it has not always been clear which organisations would be collecting the relevant data; Following these difficulties, it has now been agreed that our partner academic institutions will provide support in identifying relevant organisations. They have also offered to provide us with templates for data sharing agreements, to be sent along with data requests, in order to avoid confidentiality concerns. Thus, it is expected that the data collection process will be ongoing, whereby both the indicators and the associated data, will be continuously reviewed.

Data are often either available at a city-wide scale or for specific geographical communities in Glasgow. Therefore, depending on the location of future nature-based solutions projects, some of the gathered data may be irrelevant due to its scale.

### **How can the impacts of open spaces be monitored?**

As nature-based solutions projects emerge, the project-specific data requirements will be reviewed and data collection processes will be put in place to monitor the progress of these projects in delivering socio-economic, health-related and environmental benefits to the community. This is only possible if baseline data are available for the specific area; if that's not the case, then the requirement for baseline data will be reviewed and any required data collection campaigns will be undertaken prior to starting work on the project.

## 5.3 Governance

### *Creating conditions for collaboration and coordination for multifunctional nature-based solutions*

*Because of the multifunctional benefits that can be achieved from nature-based solutions, their delivery is often aligned with broader social, political and business priorities and goals of a city and of city-regions. This requires cross-sectoral, multi-scale and inclusive approaches in terms of who is best placed to ensure development, delivery and ongoing sustainability of the nature-based solution and thus the creation of new conditions for how effective coordination and collaboration can be fostered.*

### **Defining responsibilities for delivering the Open Space Strategy**

Glasgow's Open Space Strategy is a city-wide policy-based approach that will assist with upscaling nature-based solutions and therefore a broad range of partners, stakeholders and beneficiaries are involved. The Council is one of the biggest land owners and managers in the city. However, the management of this land, the development of policy and the operational action are divided across a number of services within the Council. Open space can be found within the assets that most of the Council services manage such as public parks, sports pitches, cycle routes and school grounds. The development of an Open Space Strategy provides the opportunity to embed nature-based solutions and sustainable open space management as a key asset management tool for the public managed land and to provide a direction of travel for the land in private ownership.

The main responsibility for the delivery of the Open Space Strategy sits with the Development and Regeneration Service of Glasgow City Council. This department works closely with other services and other parts of the Glasgow family, like Glasgow Life who have responsibility for formal sports and cultural life, to ensure that the guidance is implemented when spatial planning decisions are made. Creating a wider interconnected network has helped raise the profile of this emerging policy concept to audiences who may have previously been unaware of the benefits of nature-based solutions. Therefore, collaborative working practices are helping to localise, scale up and embed nature-based solution concepts within the city.

### **Which strategic city goals does the nature-based solution help to deliver?**

The Open Space Strategy has been drafted to reflect a wider context including the Scottish Government's planning policies and local policy documents such as the City Development Plan and Local Biodiversity Action Plan. The Open Space Strategy sits above a suite of documents that all aim to contribute to improving Glasgow's open space offer. Recognising the wider ambitions set out in national, regional and local policies and strategies helps to address shrinking public finances. By aligning the aspiration of these various strategies with the Open Space Strategy, it is anticipated that the strategy will play a key role in helping to deliver aspects of all of them. Whilst this can have a direct impact on the Council's ability to fund the upkeep and delivery of open space, it shouldn't limit the city's ambitions for securing as wide a range of public benefits as possible from our open spaces.

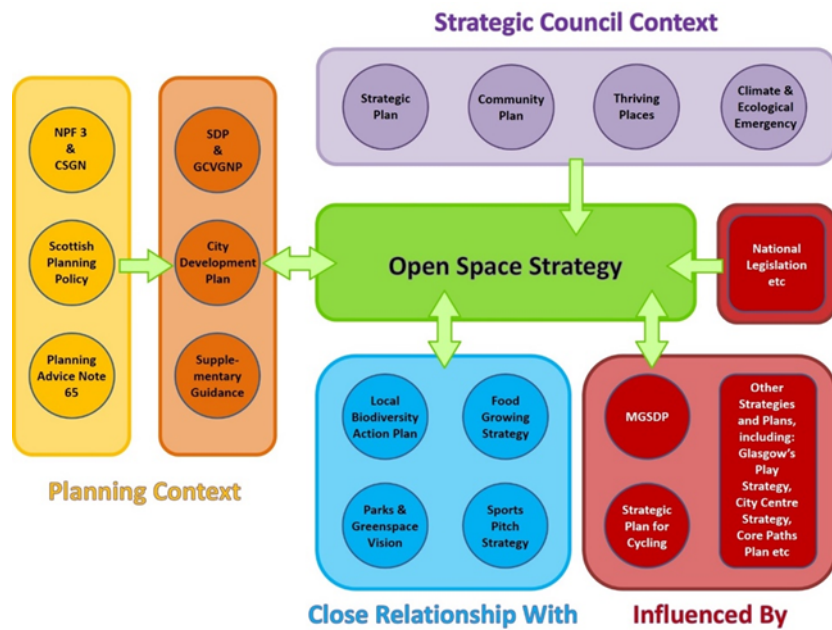


Image 5: The relationship between the Open Space Strategy and other strategic documents developed by the Council

### Formulating a step-by-step action programme with clear goals, responsibilities, funding sources and time frames

The Action Programme establishes the implementation plan for the next five years and there is an intention to monitor the progress of the plan annually – more in-depth and frequent monitoring will be developed during the lifetime of the strategy. The Action Programme touches on different dimensions of the implementation and the goals of the Open Space Strategy, including the engagement with local communities, identifying opportunities for improving community spaces, reviewing existing landscape designation boundaries and working with children when considering the future distribution of formal play spaces across the city.

### Embedding collaborative governance structures for the long-term implementation of the Open Space Strategy

Historic nature-based solution case studies in Glasgow have been largely guided and implemented with a firm top-down governance approach set within an established strategic and local policy environment. Governance structures have not always been consistent, partly because projects have been planned and implemented by different actors, often working in silos. An aspiration is to tailor governance structures to the local conditions to ensure a positive long-term legacy. This should build on a shared responsibility approach working with formal and informal partners to ensure there is coordination and that suitable structures can be set up at the local level. The aim would be for community-led projects to put in place their own governance structures to be monitored by those community groups, social enterprises or other actors responsible. This could be the case for either individual nature-based solutions such as a community garden or those organised within a strategy or network (biodiversity corridor, rain gardens, food growing etc.). However, larger scale nature-based solutions will still require some formal institutional governance and facilitation from the Council and strategic partners.

### Ensuring support through clear communication

One of the main barriers for implementing nature-based solutions in Glasgow is a lack of understanding of what the concept actually means. Many terms have been used in recent decades

such as ‘green infrastructure’ or ‘green development’ and because nature-based solutions are broader, less engineered and include capturing the wider benefits, stakeholders are often not aware or get confused. To add to this, there is a challenging culture at Glasgow City Council and other public or third sector institutions that could be involved with the delivery of nature-based solutions across the city. Following a decade of cuts to public expenditure and particularly the disproportionate cuts to planning departments, a lack of resources has partly led to a negative culture and an unwillingness to learn amongst some actors. It’s also one reason why it is challenging to overcome silo working practices.

For these reasons, it is important to use opportunities to increase awareness to a much wider audience by communicating the right message to the right audiences. For these purposes, a communications plan is being prepared that identifies a large number of audiences both inside and outside Glasgow City Council and both official and more informal audiences. The plan is currently setting out a schedule of engagement activities that will aim to be innovative and tailored to specific audiences. For example, the plan already highlights opportunities to engage with various practitioners across the Council by using existing professional development programmes to present at a series of lunchtime learning events. The aim of this would be to increase the knowledge base and to ensure we are not missing opportunities to encourage the upscaling of nature-based solutions. Presenting the objectives of the Open Space Strategy to relevant Council public committees allows to formally and more directly communicate the merits of nature-based solutions to a high level, particularly to those who have greater democratic power at the local level. This is especially important now given the climate emergency declared at both city and national level. A change in culture with regards to working practices and the culture at Glasgow City Council is already becoming visible: as more people become aware of the objectives, the more curious they seem to become.

#### **“Guerrilla-techniques” to facilitate collaboration across departments**

The engagement of colleagues from within the city government has been critical to underpin an ongoing peer-education process with planners, consultants, architects etc., to influence how people within the government look for opportunities for open space. This is achieved via regular lunchtime slots that include interactive workshops during which the strategy could be presented. This also opened up discussion about where to add nature-based solutions, to reach uninterested colleagues and create a shared narrative. The strategy used to generate actionable knowledge resembles a sort of “guerrilla-technique” to place posters at natural convergence points, such as near coffee machines.

#### 5.4 Financing and business models

##### *Mobilising resources for implementation and long-term sustainability*

*Planning for up-front financing of nature-based solutions and long-term sustainability are a critical element of nature-based solution implementation. Rather than relying on public sector funding alone, there are several support tools to help cities put together a long-term business model for their nature-based solution, which includes assessing the potential of alternative sources of financing such as philanthropic or crowd-funding.*

#### **The Business Model Canvas: stimulating innovative financing and business models**

There is an awareness that applying a nature-based solutions lens to the current budgets could help to offset the budget pressure, may help to sweat the assets and even make some of our public open

spaces cost-neutral or cost-positive. Working through the Business Model Canvas tool<sup>1</sup> has allowed Glasgow to elaborate the wider value proposition of the Open Space Strategy and to clarify how this will be delivered through key activities and key partners. Each individual project or pilot will also be required to follow a nature-based solutions business model canvas.



### Glasgow, Pollak Park: Nature-based Solutions Business Model Canvas

Key activities	Key resources	Value proposition	Key Partners	Key Beneficiaries
<ul style="list-style-type: none"> <li>Maintaining the space</li> <li>Finding and sustaining investment</li> <li>Mapping</li> <li>Connectivity</li> <li>Sustainability appraisals</li> <li>Engaging/communicating with communities</li> <li>Identifying priorities/needs</li> <li>Capacity building</li> <li>Data</li> <li>Identifying opportunities</li> <li>Bottom-up and top-down developments</li> <li>Access for all</li> <li>Planting</li> <li>Climate modelling</li> <li>Air quality research</li> <li>Policy and public awareness</li> <li>Coordinating resources and skills</li> <li>Flood risk assessment and management</li> <li>Research and innovation</li> </ul>	<ul style="list-style-type: none"> <li>Space</li> <li>Expertise</li> <li>Technical skills</li> <li>Revenue</li> <li>Communication with communities</li> <li>Staff</li> <li>Peer support</li> <li>Partnerships</li> <li>Connected network of organisations</li> <li>Analysis and quantification</li> <li>Research</li> <li>Grants and funding</li> <li>Business models</li> <li>Infrastructure</li> <li>Coordinated vision</li> </ul>	<p><b>Social:</b> Brings people together, community cohesion, reduced social isolation, improves health and wellbeing, open space no matter what, sport and recreation</p> <p><b>Environmental:</b> Flood alleviation, reduces heat island, air quality, improved biodiversity, captured pollutants, power parks, habitat networks, carbon capture, climate action</p> <p><b>Indirect:</b> Recycling, biomass, education, cost - maintenance, health and safety, water environment, harming landscape, impact of events, cost from growth, degrading quality</p> <p><b>Economic:</b> Skills, development, employability, poverty alleviation, addresses flooding, future-proofing, makes city more attractive, tourism, increase property prices, desirability, looks more attractive, placemaking</p>	<ul style="list-style-type: none"> <li>NHS, Health Scotland, Community Health Scotland, PALS, Glasgow Life, MGSDP, Friends of groups, community councils, SenScot, TCV, Forestry Commission, SEPA, SusTrans, Community Energy Scotland, Energy suppliers, community planning partnerships, Clyde Gateway, events promoters, SNH, Zero Waste Scotland, Glasgow Community Food Network, housing associations, education providers</li> </ul>	<ul style="list-style-type: none"> <li>Entire city, Insurance companies</li> <li>Politicians, NHS</li> <li>Charities, Citizens</li> <li>Sports participants</li> <li>Under 5s, Council budget</li> <li>Businesses, Visit Scotland</li> <li>Entrepreneurs, Caterers</li> <li>Social enterprise</li> <li>Food growers, Big and small business</li> <li>Wildlife</li> </ul>
<p><b>Cost Structure</b></p> <p>Fixed: maintaining spaces, staff, partners, expertise, external funders, equipment</p> <p>Variable: environmental costs, experts, public programmes, cost of production</p>	<p><b>Cost Reduction</b></p> <p>Prioritising, efficiency, bespoke planning, innovation, technology - robotics, programmes, partnerships, energy production, events, employability schemes, asset transfer, managing portfolio, participation, land swaps</p>	<p><b>Capturing value</b></p> <p>Tourism, visitors, events, green tech, land hire, new facilities, cost-cycling, food and beverages, tours, growth, advertising, property values, increased population, increased rates, health benefits, green medicine, facility for schools/education, litter, community pride, imaginative partnerships, crowd funding, taxation, increased property value, R&amp;D, increase biodiversity, data capture, carbon capture, education, training, volunteering and skills development, increased business activity</p>	<p><b>Governance</b></p> <p>Overall Council governance: help to achieve goals, mixed model, community input and ownership, partnerships and participation, consultative, public access and transparency, social enterprise, council facilitation and guidance</p>	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730222



Image 6: The Business Model Canvas for the Open Space Strategy

### A coordinated approach to finance the nature-based solutions in Glasgow

In Glasgow, the budget for the management and maintenance of the publicly owned open space sites are managed by the Neighbourhoods and Sustainability team who deal with the operational day-to-day management of these spaces. Glasgow Life has a budget to manage demand-led sports facilities and Development & Regeneration Services delivers new Open Spaces, both public and private via planning policy. There is an acknowledgement that whilst policy seeks to provide equity of access for all to high quality open space, budget constraints; citizen knowledge and political decisions can all lead to an inequality of access and pressure on budgets.

#### 5.5 Nature-based Entrepreneurship (NBE)

*Engaging community and commercial enterprises in the design, implementation and long-term delivery of nature-based solutions*

*Nature-based solutions can provide opportunities to support nature-based enterprises. Nature-based enterprises can leverage nature-based solutions directly in their product/service offering e.g. green wall/roof providers, allotment garden food producer/markets, eco-tourism provider. Nature-based enterprises may also indirectly contribute to the planning, design, financing and sustainability of*

<sup>1</sup> <https://connectingnature.eu/financing-and-business-models>



*nature-based solutions e.g. landscape architects, specialist nature-based solutions equipment manufacturers, Community Interest Companies (CICs) managing nature-based solutions, crowdfunding platforms for nature-based solutions.*

### **How can nature-based solutions contribute to the economic and innovation priorities of Glasgow?**

It is important to identify how nature-based solutions can contribute to the existing economic priorities of a city – this helps to identify potential partners and opportunities to develop nature-based enterprises. Tourism was clearly identified as a sector with lots of potential synergies with nature-based solutions. Urban agriculture and allotment gardens for example can provide locally grown foods to farmers markets.

Related to the city strategy to support urban agriculture, micro-breweries and distilleries were identified as potential nature-based enterprises.

Economic priorities can be linked with wider city programmes such as Stalled Spaces which aims to make better use of the large number of derelict and vacant lands in Glasgow. The Stalled Spaces programme can help to attract tourists e.g. to pop-up art installations.

Overall, nature-based solutions contribute to increasing the attractiveness of an area to both businesses and residents.

### **Linking to Innovation Ecosystem Actors to create opportunities for nature-based entrepreneurship**

The existing innovation ecosystem in a city can help to support nature-based enterprises. In Glasgow existing innovation support services were grouped under 5 main areas of expertise: financing, education, business advisory services, incubation and new innovations. From the perspective of innovation partners, a strong linkage in Glasgow was identified with the higher education sector – opportunities to collaborate with universities on new innovations were identified and opportunities to co-develop nature-based solution prototypes with the university sector were mentioned.

The benefits identified for innovation ecosystem actors in collaborating with Glasgow City Council on NBE strategies were quite varied: this collaboration could help to meet charitable or CSR objectives, provide opportunities for learning (Living Lab approach) and knowledge transfer, opportunity to access open source data, to increase their deal flow etc.

### **How can opportunities for nature-based entrepreneurship be identified and mobilised?**

Several barriers and enablers relate to the start-up and growth of nature-based enterprises and need to be taken into account for developing a strategy to support nature-based entrepreneurship. The main barriers identified relate to sites and land ownership issues. Costs were a key issue – affordable space for creatives was mentioned in particular and rates. At the moment, the UK government charges non-domestic rates for pipework needed for new technology. Therefore, if you connect to existing gas or electric systems you only pay for installation and then pay the supplier. Putting in district heating or other new technologies, non-domestic rates are applied to the pipework from the buildings to the energy plant or store and non-domestic rates are also charged on the energy plant. This makes new tech unviable as compared to existing technologies. Principal enablers include access to space, funding, support, expert knowledge and inspiration.

Barriers and enablers relating to the start-up and growth of nature-based enterprises need to be taken into account in developing a strategy to support nature-based entrepreneurship. The main barriers

identified in Glasgow relate to sites and land ownership issues. Finance is a key issue – affordable space for creatives was mentioned in particular and rates.

### Example: Studio Pop



Studio Pop is an award-winning social enterprise which has emerged from Glasgow’s Stalled Spaces Programme. Stalled Spaces is a programme introduced by Glasgow City Council to support community groups and local organisations across the city develop temporary projects on stalled sites or under-utilised open spaces. Studio Pop works collaboratively with communities to use stalled spaces to design, play and make ecological structures, community gardens and DIY workshops. For example in the deprived area of Maryhill, Studio Pop set up a ‘Remake Station’ - an eco-factory made of mobile shipping

containers where local citizens are upskilled in designing, testing, producing, exhibiting, and selling or bartering innovative products made from waste. On-site and digital workshops are offered, start-up projects are incubated and new minimum viable products are co-produced.

## 5.6 Co-production

### *Engaging and mobilising diverse actors in searching for and implementing joint solutions*

*Co-production facilitates collaborative knowledge sharing between diverse actors in cities – such as local policymakers, researchers, citizens, entrepreneurs. In this way, co-production generates shared problem definitions, visions or solutions fit to local needs, fosters new relationships, and mobilises and empowers actors to actively engage in creating better, and greener cities.*

### **What are opportunities for co-producing the Open Space Strategy and open spaces in Glasgow?**

Co-production is a method to engage with the various stakeholders at multiple levels of our process to develop and implement the Open Space Strategy. By looking at open space holistically and co-producing the strategy with multiple services and key partners, such as other departments within the City Council, the Glasgow and Clyde Valley Green Network, Greenspace Scotland, Central Scotland Green Network, as well as local communities and the wider public helps to break down internal silos and organisational barriers, connect nature-based solutions to multiple city agendas, generate new knowledge that can feed into both local and national agendas and ensure that we involve diverse actors while still addressing the needs of our citizens across the city.

### **Employing multiple engagement formats for co-production**

A multi-layered co-production approach is taken up that involves different types of actors in different processes for developing and implementing the Open Space Strategy. The Open Space Strategy is developed together with strategic partners and engages the wider public through consultation processes. Together with partners and local communities it is possible to identify open spaces and needs and opportunities for nature-based solutions. This builds on participatory data collection

methods and citizen science approaches to develop an interactive map that helps to inform about as well as keep track about open space development. On operational levels, local communities are engaged in the development of nature-based solutions in specific areas. For example, in specific areas in Glasgow (e.g. the Pollok area) it is worked with local communities to find out what their needs and aims are regarding open space and nature-based solutions and encourage multi-functional nature-based solutions. To this end, a number of different engagement events tailored to different audiences will be organised to redevelop the whole Pollok area (as well as in two other areas).

#### **Knowing the actors for inclusive co-production: stakeholder mapping workshops**

Stakeholder mapping workshops are a critical tool to find out which actors are operating where and to locate any relevant potential or existing nature-based solution projects where value can be added. Such workshops will take place within three identified geographical areas in Glasgow – Pollok, Easterhouse and Glasgow North. These areas were chosen because of the level of activity already taking place and partly because of the sociodemographic groups who live there. In addition, the workshops seek to initiate local and community-led entrepreneurship behaviours and collaborative governance models.

#### **Employing community engagement officers and professional facilitators**

The co-production work in local communities will be supported by a community engagement officer who links to the local communities, supports communities and gets their voices heard and offers opportunities to think about community engagement. In addition, Glasgow City Council established a formal partnership with Greenspace Scotland to improve stakeholder mapping and facilitating community engagement events. Setting up this formal partnership with an established organisation helps to share the responsibility for delivering on project objectives. It also provides local contacts, expertise (especially on facilitation techniques) and more manpower on the ground.

#### **Expectation management is crucial to avoid ‘participation fatigue’ and position the Council as facilitator**

Previous experience has shown that in order to motivate citizens to participate clear goals and benefits need to be communicated. It is hereby important to be honest – aspirational but realistic. Otherwise there might be a participation fatigue, with citizens ending up to think “this is just another project by the Council, nothing will happen”. A main aim of Glasgow City Council is to become a facilitator – to guide local community-led action on nature-based solutions by coordinating diverse activities and ideas and supplying knowledge on nature-based solutions thinking. This will lead to a more informed and empowered public for self-organised action.

### 5.7 Reflexive monitoring

*Systematic and real time learning about and for effectively implementing nature-based solutions*

*Reflexive monitoring is a novel monitoring and evaluation methodology that gives insight into the progress and direction of the nature-based solution implementation process in real time. Reflexive monitoring activities stimulate learning, allow to identify barriers and opportunities and enable flexible responses to changing circumstances and objectives. Reflexive monitoring therefore enables recognising and influencing the context in which nature-based solutions are implemented, and the emergence of innovations that might steer away from previous goals and plans when they are not fit anymore.*

### How does reflexive monitoring contribute to the implementation of the Open Space Strategy?

The reflexive monitoring process has been a challenging task for the Glasgow team due to a lack of resources and team members who changed positions during the first year.

### How to set up and do reflexive monitoring?

The Glasgow team is multifaceted and works collaboratively with their partners, other teams and community organisations across the city. Therefore, they fully understand the benefit of having the reflexive monitoring process to capture the key turning points in the project's development. Their main priorities has been to make best use of the reflexive monitoring process to realise it is a fundamental tool to ensure we are recording and analysing the impacts of our project.

Tools of the method	Description how tools were used and experienced
<i>Timeline of events - A monthly overview of main events that influenced the exemplar (e.g. via bullet journaling).</i>	The Glasgow team used an excel tracker to monitor relevant events and actions on a monthly basis. This allows us to keep track of events, identify a lead and ensure that lead is supported in their effort to resolve whatever issue has occurred in relation to open space strategy.
<i>Critical turning points - Important moments in time (e.g. challenges, positive outcomes, negative experiences) for the FRC-team because at these moments something changed in the process that helped or hindered to achieve the exemplar goals.</i>	<p>Critical turning points were initially difficult for the team to define. This was because we did not have a full understanding of what these were in the context of reflexive monitoring. The team now understand that these are significant events that alter the direction of our project in some way and that may require further action by relevant team members.</p> <p>At the moment, we seem to only record potentially problematic events. Further investigation is required to also ensure that we are capturing the positive critical turning points as well because we recognise that positive influences are equally important to record and analyse.</p>
<i>Timeline workshop - A tool to facilitate the monthly meetings of the FRC-teams to analyse the timeline of events and abstract challenges, successes and learning experiences and agree on critical turning points.</i>	The team uses our monthly meeting to invite along all relevant actors in relation to the identified critical turning points to discuss updates or ongoing actions. We have recently changed the format of this from a workshop style to more of a conventional meeting with an agenda. The content largely remains the same but we have found that it allows for a more meaningful discussion amongst the key players. Those who could perhaps be considered as 'satellite' team members (those from different departments/teams who may be involved with particular Connecting Nature projects or strategies) do not need to be directly involved in reflexive monitoring processes. This streamlines these workshops/meetings and allows the Connecting Nature

	<p>team to more closely analyse progress in relation to the tracker actions. We have only had the opportunity to conduct the meeting in this way on one occasion. Although feedback was good, we will continue to monitor going forward.</p>
<p>Dynamic learning agenda (DLA) - <i>A brief document to encourage participants to continue working on change. It contains the challenges that the project is facing at that moment summarised in learning questions. It is used as a tool for commencing and supporting the dialogue about the challenges faced by the project. The agenda is dynamic because it is modified over the course of the project.</i></p>	<p>Our dynamic learning agenda is captured within our analysis excel document. This has been coproduced between the team and the academic leads.</p>
<p>Eye-opener workshop - <i>The eye-opener workshop is an additional tool for turning outsiders into project insiders. The experiences and results of the project are shared and participants then reflect on the events, each from their own perspective to extract the lessons from the project experiences that are significant for their own situations.</i></p>	<p>An eye-opener workshop has not yet been required.</p>
<p>Learning History Narratives - <i>Narratives written by the FRC-team members that summarises the learning journeys in a short story. This captures the ‘personal’ history of the project which most of the times is lost, because it is not captured in scientific publications or management reports.</i></p>	<p>Glasgow’s Connecting Nature team has not yet had an opportunity to complete a learning history narrative.</p>

Table 1: Description of the tools of reflexive monitoring and how these were used and experienced.

### Regular feedback loop to reflect and overcome barriers

The reflexive monitoring process functions as regular forum for Glasgow in which all those involved can contribute, update and set actions on how to overcome a particular issue or barrier. This means they have a record of critical turning points and the person who is leading a related task tries to resolve them. This process encourages internal co-production at different levels and challenges the team to involve different stakeholders. The process can highlight areas where they have skills gaps i.e. the team lack some knowledge on the business and financial aspects of nature-based solutions and this has led to one team member attending a workshop on this subject.

### **Challenges to translate the academic approach to the context of the urban practitioner**

Glasgow often found the reflexive monitoring process to be conceptual or 'academic' and sometimes difficult to explain to those not directly involved, or those who may not have proficient research and analysis skills. The team has often felt that the language used and terminologies (such as 'learning outcome') are not user-friendly and can sometimes be rather ambiguous. Some inconsistencies in the guidance created barriers for the team at first (such as using 'social practices' or just 'practices'). These phrases have different meanings in English and so we needed to seek further clarification from academic partners.

### **Adapting the tools to the local context**

The team is now learning to engage in a more meaningful way and have adapted the reflexive monitoring format to suit local conditions in Glasgow as explained in the table above. It is difficult to identify how the learnings resulting from the reflexive monitoring process in the first year have directly impacted the development of the open space strategy, because the team has only recently gained a workable understanding. This lack of understanding may have resulted in a slight delay to some development aspects of the open space strategy, although this would probably be a negligible impact compared to other issues.

Reflexive monitoring has supported and benefited the team by identifying critical turning points related to raising awareness of the open space strategy and involving actors who may not have been involved before. For example, a critical turning point was the realisation that open space and nature-based solution ambitions were not considered enough by the development team in the city council. Through better communication with development manager officers this is now done ad hoc, but in the future it is expected this will be more formalised. Moreover, the process also has led to identifying new data sources for the indicators and the GIS mapping. As a critical turning point the team identified that there are siloes in terms of communication between different teams within the city council. By developing better relationships with different teams, these teams have become more willing to share their data.

Furthermore, the team has recently found that it is possible to use the process to record positive turning points too, as 'critical' often has negative connotations and can therefore be a misleading descriptive term. Going forward, the team will aim to fully capture those events.