5.2. URBAN LIVING LABS: EXPERIENCES OF NATURE-BASED SOLUTIONS IN THE EUROPEAN UNION

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Key messages

- Most innovation occurs in cities; and cities provide many opportunities for developing and studying case studies, which become living laboratories for guiding transitioning and stimulating innovation.
- NBS promote nature as a form of transition 'technology', and they exemplify the types of innovations that can assist cities in tackling climate-related issues such as flooding.
- Here we use an example from the United Kingdom, where a co-creation process with multiple stakeholders in a living laboratory can be used as a template for transitioning with NBS.

Introduction

Cities are a global locus of innovation, including when it comes to NBS. Cities and city neighbourhoods contain numerous working examples, or living laboratories, of how NBS may be realised and deliver efficient and measurable improvements and responses to climate change pressure. This chapter will illustrate this using the case study site of Derbyshire Street Pocket Park in London, United Kingdom. This is a space that was co-created during an iterative process with multiple stakeholders. Co-creation is derived from the business world, where customers work with innovators not just to provide feedback but also to solve problems and suggest pathways to success. In this case, the co-creation process sought to use NBS to solve climate problems, and to stimulate opportunities for addition benefits (or co-benefits). Indeed, deriving co-benefits from NBS was the guiding principle as a response to diverse environmental, ecological and social issues and as a way to facilitate transitioning.

NBS can be defined as 'actions which are inspired by, supported by or copied from nature. Many nature-based solutions result in multiple co-benefits for health, the economy, society and the environment, and thus they can represent more efficient and cost-effective solutions than more traditional approaches' ([234]). For some time it has been known that cities and urban areas in general can have a huge negative effect on biodiversity (either in the city or in the landscape that supplies food and energy to the city) ([235]). More recently, there has been wide recognition that biodiverse ecosystems, including cities, can supply or even augment the ecosystem services ([236]) that we know are necessary for a high quality of life and the creation of sustainable and resilient environments. In addition, studies are beginning to explore and reveal the outcome of the interplay between biodiversity, ecosystem services and urban green infrastructure, with respect to social capital networks, perceived and actual well-being, physical and psychological health, and productive, egalitarian and democratic livelihoods. Therefore, NBS have emerged as the main policy driver in actively transitioning cities, because they can be used to create multifunctional arenas and to fulfil multiple objectives simultaneously. This chapter will look at an example of a nature-based solution in an urban living laboratory setting and will discuss some of the learning experiences that have emerged from the co-creation process that was used to implement it.

[234] European Commission, 2015, p. 4.
[235] Elmqvist et al., 2015.
[236] See Chapter 2.3 above.

Challenges relating to nature-based solutions

Most cities see blue–green infrastructure as being necessary for buffering excess water, cooling surrounding areas, conserving biodiversity, and/or providing space for recreation and improving well-being. Others see blue–green infrastructure such as woodlands and street trees, green roofs and walls, and rain gardens as opportunities for reducing the effects of UHIs, increasing biodiversity, sinking carbon and diminishing the detrimental effects of particulate and noise pollution. Whatever the blue–green infrastructure typology, the challenges for creating, managing and innovating are high. City planners and managers have often been criticised for 'silo thinking': departmentalising and compartmentalising tasks to the extent that there is little cross-communication or cross-fertilisation of ideas and solutions ([237]). This can lead to missed opportunities for multifunctionality, and limitations on funding opportunities. In spite of the complexity of disciplines needed to agree on a nature-based approach that satisfies multiple needs and objectives, some cities or areas within cities have developed creative NBS that are exemplary in terms of cross-silo thinking and are characterised by the presence of co-creation processes for arriving at such solutions. In order to address the ongoing stressors in city making, there is an urgent need to connect this knowledge ([238]). In 2015, the European Commission established four goals within an innovation agenda for future NBS and renaturing cities: enhancing sustainable urbanisation; restoring degraded ecosystems; developing climate change adaptation and mitigation; and improving risk management and resilience. These four goals may be realised within seven nature-based innovation actions: urban regeneration; improving well-being; building coastal resilience; watershed management and ecosystem restoration; sustainable use of matter and energy; enhancing insurance values of ecosystems; and carbon sequestration. Currently, those implemented NBS have potential to be scaled up to city level and transferred as living laboratory exemplars to other cities across the globe. The idea of a living laboratory may seem odd, but cities are continually trying out new approaches and ideas as open innovations for tackling urban issues such as climate change and social cohesion. Often, researchers who engage with cities try to derive lessons on their effectiveness from these unstructured experiments rather than being integral to them from the outset. Living labs, as they are sometimes called, rely on co-creation, experimentation and evaluation being continuous, and they are often focused on a specific place such as a river or park. Living lab exemplars have the further potential to link cities with their hinterland to address challenges that they share through their interconnections. One such exemplar is Derbyshire Street Pocket Park in the United Kingdom.

Figure 65 – Derbyshire Street Pocket Park in east London, United Kingdom (source: image by Stuart Connop)

[237] Collier et al., 2013.

[238] Frantzeskaki and Kabisch, 2016; Frantzeskaki et al., 2019.

Case study: Derbyshire Street Pocket Park, United Kingdom

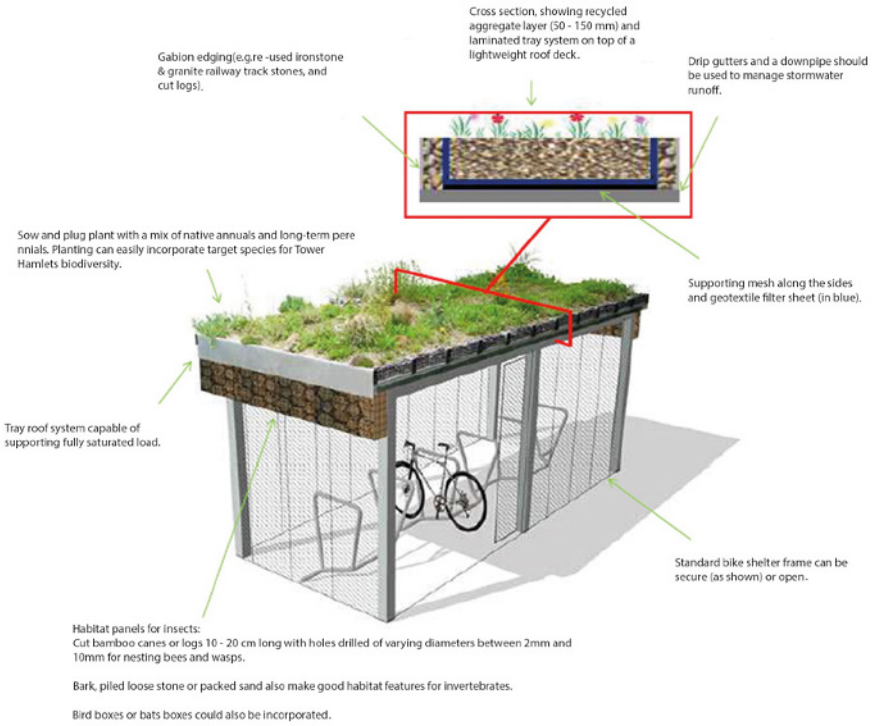
Derbyshire Street Pocket Park (Figure 65) is an excellent illustrative exemplar of small-scale urban NBS implementation in a living lab situation. The pocket park was developed in Bethnal Green, which is a high-density urban area of the London Borough of Tower Hamlets in the United Kingdom. Prior to development, the street was a classic example of badly designed and poorly used grey infrastructure. It was a 'dead-end' street, meaning that no through traffic was permitted, although the phrase in English has the additional meaning of being 'in a poor social and environmental state'. In effect, it was predominantly used for car parking and was rife with issues of neglect, illegal litter dumping and antisocial behaviour. An NBS approach was adopted to convert this underused and negatively perceived space into a space that provided environmental, economic and social benefits for local communities. The pocket park was designed by Greysmith Associates landscape architects, but a collaboration between the University of East London Sustainability Research Institute and Tower Hamlets Council formed the foundation of the NBS approach applied to the space.

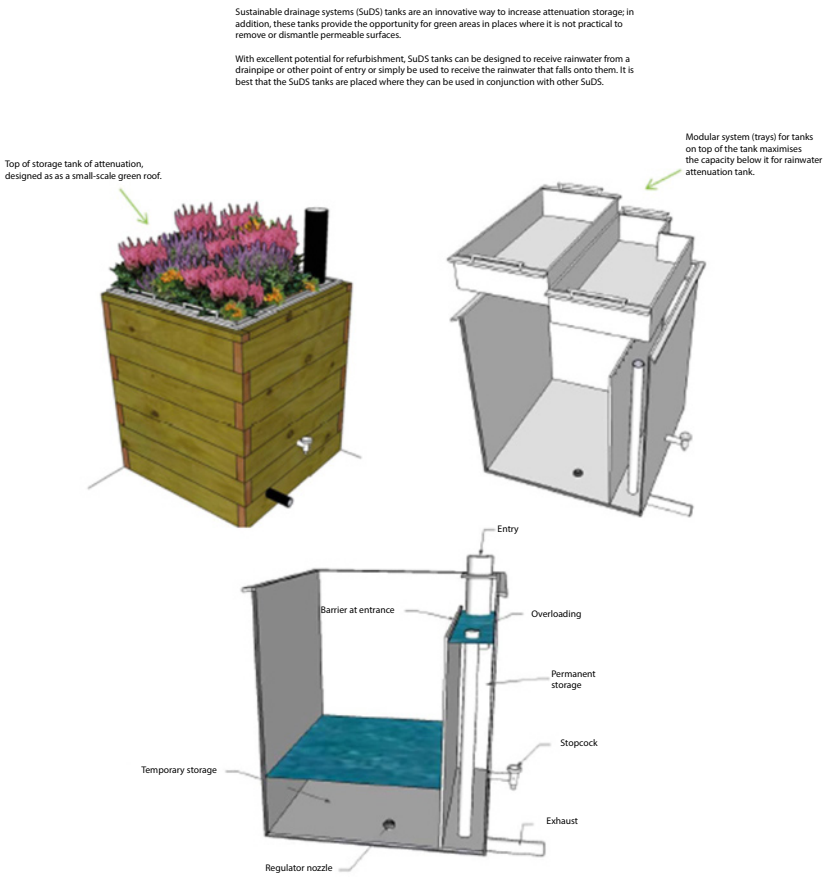
One of the key limiting factors here was that the space is built over a 19th-century sewer system. London's main storm water management system flows into a combined sewer network that is certainly not fit for purpose in the modern era. Under the combined pressures of population growth and increasingly intensive rainfall events driven by climate change, the combined sewer network was regularly overloaded. As in many cities where this occurs, this led to serious environmental and health impacts, especially with respect to localised flooding in areas where the local storm system became overwhelmed, and water pollution incidents when the combined sewer system exceeded capacity and was forced to release sewage into waterways across London. A proposed 'tideway tunnel' was planned in London to mitigate this occurrence, but it was also recognised that more sustainable and local storm water management was also needed to adapt the storm water management system to future climate change.

Under the umbrella of the European Commission's seventh framework programme ([239]) project TURAS ([240]), researchers from the Sustainability Research Institute worked with Tower Hamlets Council highways department in a co-creation process. The outcome of this collaboration was the co-design of a SuDS planning guidance document ([241]) that provided solutions to storm water management for the borough that were suitable for high-density urban areas. Within this co-design process, there was a recognition that retrofitting of storm water management infrastructure could be used as a mechanism to deliver broader benefits. Given this, a locally contextualised NBS approach to SuDS ([242]) was prioritised within the guidance, and a co-creation process ensued. This included a focus on unsealing surfaces through the use of permeable paving, rain gardens, grassy swales, tree pits, green roofs and planters, to provide storm water attenuation and infiltration, water quality improvement, biodiversity enhancement, and social and economic benefits through green infrastructure design principles. It also included a focus on 'ecomimicry' design principles ([243]) to ensure that the design was suitable for locally typical and important biodiversity. What started as a desire to deal with what is happening under the ground fast became a process to reinstate nature above the ground and to facilitate a transition within the community towards more sustainable awareness and behaviour.

[239] The seventh framework programme is the predecessor of Horizon 2020 and Horizon Europe, the principal funding mechanism for research, demonstration and innovation in the EU.
[240] Collier et al., 2013.
[241] Bastock et al., 2014.
[242] See Chapter 3.2.
[243] Nash et al., 2019. See also https://oppla.eu/product/174560

Figure 66 – Examples from the London Borough of Tower Hamlets NBS-focused SuDS guidance (source: Thames Water)





So, in order to showcase this urban planning approach, it was decided that a pocket park living lab would be co-created, involving local community organisations, landscape architects, a water company and local NBS business. This would be a park that incorporated the badly needed SuDS components combined with a holistic NBS approach to the co-design principles with a strong focus on environmental, social and economic benefits. It was intended that the resulting pocket park would be used as a borough-wide exemplar to demonstrate to developers and other stakeholders how the SuDS guidance could be implemented in high-density urban areas, and how NBS can have co-benefits, and thus become a catalyst for scaling out in communities throughout London. In this way, and from modest beginnings, the pocket park has had a very large influence on the borough and its residents. This influence has extended beyond the borough, across London, nationally and internationally through the winning of design awards and embedding as a good-practice showcase.

In the co-creation process, Derbyshire Street was identified for this demonstration, and local and regional co-funding was secured to deliver the design project. A co-production approach to design was adopted, including Greysmith Associated landscape architects, Tower Hamlets Council, Thames Water Ltd, the Greenroof Shelters company, and local stakeholders in the form of the Oxford House Community Centre (an organisation running community classes and events and providing affordable office space for organisations, charities and social businesses involved in the local arts, community and heritage). The resulting award-wining Derbyshire Street Pocket Park ([244]) now stands as an exemplar of an NBS approach to placemaking and an asset to the local community.

Figure 67 – Information board at Derbyshire Street Pocket Park explaining to residents the NBS design for the space (source: image by Stuart Connop)

Solutions

The finalised design is a perfect example of a nature-based solution providing a broad array of co-benefits targeted to the needs of the specific location and community, especially as follows.

- **Ecological benefits:** Numerous habitats were created in the form of small-scale green roofs on bicycle storage sheds and refuse bin covers, rain gardens and raised planters. All planting was designed to be of value to local biodiversity, particularly pollinators. Nesting cavities were provided for birds and cavity-nesting solitary bees and wasps. Niches were also created using rubble and stones in gabions as part of the bicycle storage sheds and the public seating.

[244] See the susDrain website for more on the case study (https://www.susdrain.org/case-studies/case_studies/derbyshire_street_pocket_park_london.html).

Figure 68 – Pollinator-friendly rain garden, permeable paving and attenuating planters with herbs for local residents to pick at Derbyshire Street Pocket Park (source: image by Stuart Connop)

- **Environmental benefits:** The combination of the provision of vegetation and the removal of hard surfaces helps to provide a cooler temperature in the space. Multiple shapes and vegetation reduced ambient noise, and with cars removed the space is now more open, with better air quality. The park itself is designed to manage storm water, to intercept rainfall, hold it and delay it from flowing rapidly into the storm drains. This has a very positive effect in reducing localised flooding and reducing the pressure on the combined sewer system. By using vegetation and permeable surfaces to provide this solution, it will, in addition, lead to an improvement in water quality and recharging of groundwater.

- **Social benefits:** The space provides active travel opportunities by providing a better walking route and connection to the local cycling network, including providing space for locking bicycles and leaving them. The space was created as an amenity space where local events are now held, and the increased stewardship and ownership of the space can help to reduce antisocial behaviour and add to local community cohesion. The planters were planted with edible herbs to provide a grow-your-own and foraging opportunity for local residents. The co-creation and co-design process were instrumental in boosting community capacity and in creating opportunities for participation in other projects in the area, thus augmenting social capital networks.

- **Economic benefits:** Since the implementation of this NBS, the local businesses that are associated with the space have seen a noticeable uplift in profits. There has been a reduction in the cost of dealing with illegal dumping because this has been reduced on site. On a broader scale, the pocket park contributes to a reduction in the costs caused by flooding from storm water entering the combined sewage system, both direct (reduction in storm water volume and rate) and indirect (related to the park acting as a catalyst for further roll-out of such SuDS schemes). It is too early to adjudicate whether the NBS approach has an effect on property prices or 'green gentrification', but this is always a possibility ([245]).

  As with all living labs, much of the work was trial and error or learning by doing, but eventually a co-creation process emerged that was successful, sustainable and scalable. This project was highly localised and culturally specific to the United Kingdom, but many of the solutions are easily transferable to any city or city district around the world. Notable features of this case study, which can be implemented in any community in any city, include the use of a democratic, co-creative process; the continuous inclusion of multiple stakeholders; clear and honest communication and engagement during and after the process; a city-led approach to developing NBS guidance followed by demonstration, to act as a catalyst for scaling out; measuring and evaluating successes and failures; and working with nature – not against it – to enable urban transition.

[245] Rigolon and Németh, 2019.

Figure 69 – Bicycle shelters linked to a cycling route providing active travel opportunities, but also providing forage, nesting and refuge opportunities for birds and insects (source: image by Stuart Connop)

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